
The Global Trade Slowdown: A New Normal?

A VoxEU.org eBook



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edited by Bernard Hoekman



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Trade and growth – end of an era?

Bernard Hoekman

EUI and CEPR

Trade growth has been anaemic since 2010. Already before the 2008 Global Crisis hit, the rate of growth of the ratio of global trade to GDP had slowed considerably. Most recent data show trade values declining. Has global trade peaked? Or is the trade slowdown simply a reflection of the state of the world economy and largely a cyclical phenomenon? This is the question that is addressed by the contributors to this CEPR/EUI eBook. While there is no consensus on the relative importance of cyclical versus structural factors, the analyses help to understand the forces that are at play and highlight the importance for the world economy looking forward of focusing on trade-related policies as well as on the macroeconomic policies that are needed to revitalise global economic growth prospects.

Introduction

One of the ‘stylised facts’ of the last six decades is that international trade has grown faster than global production and income, in contrast to previous time periods, when the elasticity of trade with respect to output was much lower (Irwin 2002). Indeed, recent history has seen unprecedented high growth rates of global trade relative to global income, driven by a mix of technological change and business innovation, policy reforms around the globe and the re-integration of China into the world economy.

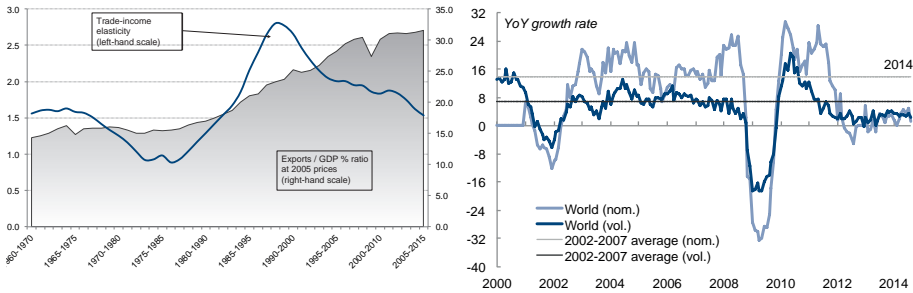
The ratio between trade and income or output is not a constant. As noted by Douglas Irwin in Chapter 1, there have been periods in history when the trade-to-production ratio grew rapidly, and periods in which trade and income have moved much more in

tandem. The period between the mid-1980s and the mid-2000s was a major outlier on the upside. It spanned two major geo-political developments and one economic one: (i) the fall of the Berlin Wall and the re-integration of central and eastern European nations with western Europe; (ii) the re-integration of China into the global economy, following the adoption of an export-oriented growth strategy that culminated with the accession of China to the WTO; and (iii) a great expansion in the use of so-called global value chains (GVCs) by large manufacturers and retailers, involving the outsourcing of parts of the production process to firms located in different countries.

Starting in the early 2000s, the rate of global trade growth slowed relative to income growth (first panel of Figure 1). Post-2008, trade growth has been particularly anaemic – in line with the very weak GDP growth performance (second panel). Indeed, the most recent data suggest that trade is not even keeping up with global output growth and has started to decline: the OECD reported in late May 2015 that total merchandise exports and imports, in current US dollars, for the G7 countries and the major emerging economies (Brazil, Russia, India, Indonesia, China and South Africa – the ‘BRIICS’) fell by 7.1% and 9.5%, respectively, in the 1st quarter of 2015 relative to the previous quarter (third panel). Trade is falling across the board, in contrast to the period immediately following the 2008 financial crisis in the US and Europe, when trade by the BRIICS was relatively dynamic. Exports of the emerging economies fell by 13.5% in March 2015 year-on-year (Kynge 2015), with China playing a major role – not only has China’s import demand for commodities been falling, but it is also importing fewer manufactured goods, with knock-on effects for major OECD countries and other Asian economies. Chinese imports (in current US dollars) fell 17% between the 1st quarter of 2014 and the 1st quarter of 2015. For the BRIICS as a group the value of imports fell 18%; for the G7, imports dropped by 11% (OECD 2015). These negative developments follow on from a four-year period in which trade was essentially flat after having recovered from the massive drop in 2009 (third panel of Figure 1). While the recent numbers are influenced by the appreciation of the US dollar, the basic conclusion

remains the same for trade measured in local currencies. Presently, trade is not a driver of growth for either industrialised or emerging economies.

Figure 1 Trade-income elasticity, export/GDP ratio and trade growth since 2000 and 2007



Source: Escaith and Miroudot (2015).

Source: Boz et al. (2015).



Source: OECD (2015).

Slow trade growth has led to worries that the world economy has run into a ‘peak trade’ constraint, i.e. the ratio of global trade to GDP has reached a limit (*Economist* 2014). Global trade increased 27-fold between 1950 and 2008, three times more than the growth in global GDP. As a result, according to the World Bank’s World Development Indicators database, the trade-to-GDP ratio for the world as a whole rose from roughly 25% in the 1960s to 60% today. The slow (absence of) growth in trade since 2009 has meant no change in this ratio since 2008. If the recent decline in trade is sustained, this 60% may turn out to be a peak for the world as a whole. This question is addressed in

this CEPR/EUI eBook. The contributors try to untangle the various forces that underlie the trade slowdown. One important element of any such analysis is an assessment of whether the recent situation is mostly the result of macroeconomic forces – basically a cyclical phenomenon reflecting weak demand resulting from the need to rebuild balance sheets and reduce public sector deficits and debt – or if there are other, more structural or longer-term dimensions that are operating in addition to the cyclical drivers and that imply that the world economy may have to adjust to a ‘new normal’ for global trade.

Does it matter?

Why should we care if trade grows faster than output? One reason is because trade is a source of demand – exports and imports are associated with economic activities that generate employment and income. Net exports are a key channel for crisis-hit economies to address deficits and reduce debt. If global demand and thus trade is anaemic, this is more difficult to do. Rising openness in recent decades, that is, an increase in the ratio of the sum of exports and imports to GDP, implies that economies have become more trade sensitive. High trade ratios also mean greater trade (inter)dependence – trade weakness has spillover effects.

A longer-term reason to care about the growth performance of the trade/GDP ratio is that trade is a channel for knowledge transfer (technology flows) and for specialisation according to comparative advantage, thereby improving resource allocation and supporting higher economic growth and welfare (real incomes) over time. Openness matters for growth. Of course, the degree to which this is the case will differ across countries, as it is in part a function of economic size, wealth (per capita incomes) and policy, as well as the level of trade/GDP that an economy starts out from. While recent policy debates and discussions have centred on the distributional implications within countries of the process of globalisation that underpins increasing trade/GDP ratios, the rapid growth in trade relative to income has been one channel through which poverty rates in developing nations have been reduced and progress made in raising average

per capita income levels and human development in many countries, thus reducing cross-country inequality. GVCs have played a role in this process, allowing firms to specialise in specific tasks and activities that are provided to international markets, without having to rely on (i.e. wait for) the development of a diversified industrial base in their home market (Baldwin 2011). If the trade slowdown reflects an upper limit being reached on the growth of the openness ratio, it has implications for the ability of countries to emulate the development strategy that has been used very effectively by many economies since the end of World War II.

Explaining the slowdown

Answering the question of whether trade has peaked requires taking account of the macroeconomic (cyclical) factors that suppress trade growth – the post-Global Crisis recession, the weak consumption and investment demand associated with rebuilding balance sheets and reducing debt overhangs, etc. – and then assessing whether this in itself explains much or most of the trade slowdown. If not, the question turns to what other forces may be at play. The literature in this area has focused in particular on the income elasticity of trade as a summary measure of the various drivers of the relationship between changes in income (output) and trade, that is, how trade responds to (is associated with) any given change in aggregate income (e.g. Gruber et al. 2011, Bussière et al. 2013). As is clear from Figure 1, this elasticity has been declining since the mid-2000s, suggesting there is more at work than the (clearly important) short-term macroeconomic factors.

A number of the contributions to the eBook – Chapter 3 by Emine Boz, Matthieu Bussière and Clément Marsilli; Chapter 4 by Patrice Ollivaud and Cyrille Schwellnus; Chapter 6 by Byron Gangnes, Alyson Ma and Ari van Assche; and Chapter 8 by Paul Veenendaal, Hugo Rojas-Romagosa, Arjan Lejour and Henk Kox – argue that the recent global trade dynamics are largely driven by cyclical factors, in line with other analyses (see, for example, ECB 2015). Other contributors – including Cristina Constantinescu, Aaditya

Mattoo and Michele Ruta (Chapter 2); Guillaume Gaulier, Gianluca Santoni, Daria Taglioni and Soledad Zignago (Chapter 5); Hubert Escaith and Sébastien Miroudot (Chapter 7); and Matthieu Crozet, Charlotte Emlinger and Sébastien Jean (Chapter 9) – and all of the contributors who focus on trade developments in East Asia – Tacho Bark (Chapter 10); Koji Ito and Ryuhei Wakasugi (Chapter 11); Willem Thorbecke (Chapter 12); Menzie Chinn (Chapter 13); and Jiansuo Pei, Cuihong Yang and Shunli Yao (Chapter 14) – argue that the trade-GDP relationship has changed for structural reasons, in part by pointing out that the slowdown preceded the Crisis. In the view of these analysts, when global economic activity picks up again this will be associated with less trade than was observed in recent decades.

Cyclical explanations

There is general agreement that a major explanation for the lack of trade dynamism that has characterised the last four years is weakness in aggregate demand, most notably in the Eurozone but also more recently in China. Intra-EU trade accounts for about one-third of global trade. The recessionary environment that has prevailed in the EU since the Crisis struck therefore has had a disproportionately large impact on global trade. In parallel with the slowdown of the Chinese economy, which represents another 10% of global imports, and the recent decline in trade of emerging economies, it is clear that macroeconomic factors have had a major negative impact on trade growth. The more interesting question is whether the current macro environment explains most of the observed stagnation in trade or if there are other factors at play. Boz et al. and Veenendal et al. argue that, on balance, cyclical forces are probably the most important factor, while Ollivaud and Schweltnus also make a case that cyclical factors can explain most of the slowdown. Ganges et al. note that uncertainty may well be a contributing factor, with agents holding off on investment decisions because of uncertainty as to the economic situation looking forward. Taglioni and Zavaacka (2013) argue uncertainty is an important short-run factor associated with the large negative demand shock from the EU, but also point to what appears to be a longer-term trend of disinvestment in capital

goods that started before the Global Crisis – a trend that contributors to this eBook confirm.

Structural factors

There are different potential explanations of a ‘structural’ nature (that is, non-macroeconomic) that can result in a decline in the income elasticity of trade. One is that it reflects a change in the composition of global trade towards products that have a lower elasticity. Another is that the slowdown simply reflects the end of the integration processes of China and central/eastern Europe – i.e. the high trade growth was largely a transitional phenomenon. A third is that it reflects the limits having been reached on the ability of (incentives for) firms to engage in the international fragmentation of production that is part and parcel of GVCs. A fourth potential explanation is a rise in government support for domestic industries, reducing the incentives for firms and households to buy goods and services from foreign suppliers.¹

Changes in the composition of global trade

In his chapter, Irwin emphasises that there have been large changes in the composition of world trade over time. In tandem with the rise of the share of manufactures in GDP, the share of manufactured products rose from some 40% of world trade in the immediate post-World War II period to over 80% today. Within manufactures, investment goods and durables are more trade-dependent than consumer goods, and are more directly linked to the (expected) state of the economy – expenditures on these types of goods can

1 Some of the factors termed ‘structural’ that are discussed in the contributions have a cyclical or time-bound dimension. Thus, an increase in protectionism and government support for domestic firms presumably will be tied to the state of economy as well as reflecting the preferences of the government; similarly, if the ongoing recession/slow growth environment results in a steeper fall in demand for investment goods than consumption goods, a resumption of economic growth will also increase trade growth. The term ‘structural’ is best regarded as shorthand for explanations that are not directly linked with the state of the macroeconomy.

be postponed until it is clear that demand is expanding. Thus a decline in demand for such goods may have a disproportionate impact on trade growth. The contributions that assess this possible explanation (e.g., Veenendaal et al.) suggest that compositional shifts play a role in explaining the decline in the trade elasticity and the trade slowdown—part of which is cyclical in nature.

China

All the contributors to the eBook agree that developments in China are important both in understanding the large increase in the global income elasticity of trade that occurred in the 1990s and the subsequent decline that started in the mid-2000s. This can be seen as a transitional factor, in that the (re-)integration of both Europe and China with the world are time-bound events that imply high trade growth rates that cannot be sustained – once the adjustments associated with what is to a large extent a move from autarky have occurred, trade will inevitably grow much more in line with income. Of particular importance as far as China is concerned is the decision by the government to rebalance the economy towards domestic absorption and away from an export-driven growth model. As argued by Guillaume Gaulier, Gianluca Santoni, Daria Taglioni and Soledad Zignago (Chapter 5), China’s re-integration had a juggernaut effect on the volume and structure of world trade. It is not clear whether other regions of the world – including other emerging economies such as India, Brazil or Nigeria/South Africa and their respective neighbourhoods – could in turn become new trade juggernauts that will drive the global trade-to-GDP ratio to a higher level as a result of actions to lower trade costs and pursue regional integration of markets. As they note, the world has changed with the rise of China; the country will be a serious competitor for such new entrants, who will find it more difficult to emulate the export-driven growth strategy that was pursued by China and other East Asian economies in recent decades.

Explanations involving GVC-based production strategies

Views differ on whether and to what extent the trade slowdown is due to this factor. There is general agreement that GVCs were a factor behind the rapid growth of global trade relative to income in the 1990s and the first half of the 2000s (Bems et al. 2013, Yi 2003) and that this helped to explain the collapse in global trade in the immediate aftermath of the 2008 Crisis, as well as the rapid recovery in 2009-2010 (Baldwin 2009). One reason why the adoption of GVCs led to an increase in the trade/GDP ratio is because this is an artefact of the way that trade and GDP are measured (Hummels et al. 2001, Johnson and Noguera 2012, Koopman et al. 2014). Trade flows are recorded on a gross value basis, including the value of the intermediate inputs that are embodied in a product. Thus, an input that is shipped from country A to B as part of a GVC is measured as an export from A to B; the value of the subsequent export of the processed product from B to C (or back to A) will embody the value of the imported input. From a value added perspective, this implies there is double-counting. GDP, in contrast, is a value added concept: it is the sum of all value added that is produced in an economy, including only net exports (exports minus imports).

The more international production is fragmented across countries, the greater the associated gross trade flows relative to total value added. Insofar as at some point in time businesses achieve what they perceive as the optimally dispersed use of GVCs, the growth of trade associated with this process will slow and increase more in line with total output (value added) produced. Indeed, if business managers decide that it makes more sense (i.e. it is more profitable) to shorten supply chains or to ‘re-shore’ production, the result will be that recorded gross trade flows fall and that the difference between the gross value of trade and trade in value added (TiVA) will become less.

Supply chain specialists predict that in the coming years there will be a move away from highly fragmented, globe-spanning supply chains towards a greater reliance on regional production networks (Srinivasan et al. 2014, Stank et al. 2014). This may also be the result of the adoption of new technologies such as 3D printing (‘additive

manufacturing’). However, in their contribution to this eBook, Gangnes et al. argue that to date there is not much evidence of a retreat from GVCs. They also argue that there is little evidence for GVC-based trade being more income-sensitive than other types of trade. Others disagree. Crozet et al. (Chapter 9), for example, argue that the trade slowdown is more pronounced for products where participation in GVCs is more prevalent.²

Protectionism

There is also no agreement regarding another potential explanation for the trade slowdown: protectionism. The majority view is that protectionism has not played a major role in reducing trade, although many contributors recognise this may be a factor at the margin. In their contributions (Chapters 15 and 17), Simon Evenett and Johannes Fritz disagree with this position. They argue that even if policy has limited effects for the world as a whole (which they do not believe), it may have significant impacts on specific (groups of) countries and on specific sectors. More generally, they make the important point that many of the policies that appear to be pursued by governments are directed towards assisting domestic industries through subsidies or the tax system, as opposed to large-scale increases in the average level of border protection. The efforts by international agencies to monitor protectionism may be akin to a drunk looking for his keys under the lamppost because there is light there. The impacts of different types of ‘murky’ policies on specific countries and sectors may be more significant than is generally presumed to be the case.

² Ferrantino and Taglioni (2014) argue that GVCs have contributed to the global trade slowdown because the goods that are produced in GVCs are more sensitive to changes in income than those that are not.

A new normal? Not necessarily

There are a number of reasons why trade may well grow faster than income in the coming decades and as a result drive the ratio of global trade (exports plus imports) to GDP beyond the level at which it currently seems to be stuck – around 60%. One possibility is that we will see further compositional shifts in global trade flows in the future, away from manufactures towards services. One reason this might materialise is as a result of ongoing and future technological change, the adoption of new international business models, and additional trade policy reforms. As stressed by Usman Ahmed, Brian Bieron and Hanne Melin (Chapter 18) and Amgad Shehata (Chapter 19), there is great potential for trade to grow faster than income looking forward because technology is enhancing the ability of small firms to engage in international trade. The stylised fact that most trade is done by large firms may change if a mix of technology and policy lowers the fixed and variable costs of international transactions enough to allow smaller companies to start dealing directly with buyers in foreign countries. The internet, digitisation, more efficient logistics, e-payment systems, translation software, and so on are all potential drivers of the internationalisation of SMEs.

Another reason – one that is given less attention in the various contributions to the eBook (with the partial exception of the chapters by Escaith and Miroudot and by Pesce, Karingi and Gebretensaye) – is that in the future trade in services may expand significantly faster than trade in goods. Recent efforts by the OECD and the World Bank to collect information on the restrictiveness of trade policies for services show clearly that barriers to trade in services are often significant.³ In addition to explicit discrimination, differences in regulation across markets restrict trade. New vintage trade agreements such as the Canada-EU Comprehensive Economic and Trade Agreement or the Transatlantic Trade and Investment Partnership may result in a reduction in the

3 See <http://iresearch.worldbank.org/servicetrade/aboutData.htm> and <http://www.oecd.org/tad/services-trade/services-trade-restrictiveness-index.htm>.

average level of services trade costs. Unilateral actions by governments to enhance competition on services markets as an element of increasing productivity performance may also help foster greater trade in services.

Services are more tradable than generally thought (Gervais and Jensen 2013). But in practice, trade in services will often involve FDI or the movement of service providers and/or buyers. These ‘modes of supply’ are not well measured. Indeed, sales of services by foreign affiliates are not regarded as trade in the national accounts, although they are regarded as trade by the WTO’s General Agreement on Trade in Services (GATS). As countries such as China shift towards greater reliance on domestic absorption, this is likely to generate greater demand for services and greater trade in services, including via FDI.

Of course, it may be that progress in liberalising trade in services will not be achieved. Indeed, insofar as the trade slowdown is in part due to beggar thy neighbour policies and these are extended to services and related policy areas (such as data flows), the world may experience slow trade for some time to come. The fact that most policy attention has centred on the use of traditional trade policies – tariffs and so-called temporary trade barriers such as antidumping (generally not that temporary) and safeguard measures – as opposed to other policies that may distort trade much more (subsidies and other measures to support domestic firms) is worrisome.

While the global policy picture matters, individual countries that confront high real trade costs as a result of national policies, adverse business climates, and so on will continue to have the opportunity to use trade as part of a growth strategy. Regions such as South Asia and Africa offer great potential for further trade growth (see Chapter 16 by Ottavia Pesce, Stephen Karingi and Isabelle Gebretensaye), but this is again conditional on actions to reduce trade costs and bolster capabilities and supply side capacity. Openness ratios are often already quite high for many African nation. What matters is increasing trade in value added by diversifying exports and changing the composition of trade.

At the end of the day, an increasing trade/GDP ratio is a measure of specialisation. The fragmentation of production that is reflected in the expansion of GVCs also occurs domestically. If on net the global trade/GDP ratio levels off, there may well be substantial scope for continued fragmentation and specialisation within countries and regions. As argued by Moreira et al. (2013), domestic trade costs matter as much as international trade costs; for some countries they may be substantially higher (e.g. Indonesia, a very large archipelago). These considerations illustrate the importance of continued – indeed stronger – focus on efforts to reduce trade costs broadly defined, both domestic and international.

Conclusion

The contributions to this CEPR/EUI eBook make clear that a combination of cyclical and structural factors is negatively impacting the growth performance of global trade. The impact of the macroeconomic situation post-2008 Crisis – notably the weakness in aggregate demand and within that, demand for durables and investment goods – played a major role in the recent trade slowdown and continues to do so. The gradual rebalancing of the Chinese economy away from an export-driven model towards greater reliance on domestic absorption is an additional factor that comes on top of the weakness of the Eurozone, generating additional knock-on effects on other emerging economies.

There is clear evidence that trade growth began to slow down before the 2008 Crisis hit, and that the very high growth of global trade relative to GDP was in part a consequence of the re-integration of China and central and eastern European countries into the world economy, which in turn was facilitated by the rapid growth in GVC participation and associated FDI flows. This process, by its nature, was a transitional one, generating trade growth rates that inevitably had to taper off once the adjustment process associated with re-integration had run its course.

It is important to differentiate between the ‘China factor’ and ‘diminishing returns to GVC strategies’ explanations for slower trade, as GVC growth has been a major feature

of China's trade expansion (as it was for central and eastern Europe). The potential for greater use of the 'GVC technology' and further specialisation and fragmentation of production remains very significant for many developing countries, arguing against the conclusion that the world has attained 'peak trade'. On balance, once the cyclical headwinds have abated, it is likely that trade growth will exceed GDP growth once again, albeit not as much as during the 1990s given the transitional nature of the trade growth attained by former centrally planned economies.

Much will depend here on the extent to which regions of the world that have lagged behind Europe, East Asia and North America manage to increase their participation in GVCs and the international fragmentation of production. This depends importantly on policies – action by governments to reduce trade costs and to refrain from 'protectionism' – and on the extent to which international trade in services will expand in the years to come. If the 'so far so good' assessment of trends in protectionism post-Crisis that has been the prevailing view (e.g. Hoekman 2012) needs to be revisited, this will imply additional headwinds for trade growth looking forward. There is clearly a need for greater effort to monitor and assess the extent to which policies are distorting trade. While there is some evidence that the spread of GVCs is one reason why we did not see large-scale recourse to traditional protectionism in the immediate post-Crisis period, as higher barriers on imports will make the end products produced by the chain less competitive (Gawande et al. 2015), governments continue to have strong incentives to use other instruments that can have beggar thy neighbour effects – such as subsidies of different kinds, including investment incentives and local content requirements (e.g. Hufbauer et al. 2013, Hoekman, 2015, Ossa 2015). This is the case independent of future developments in the use of GVCs.

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1 World trade and production: A long-run view

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As the appearance of this eBook indicates, there is renewed interest in the empirical relationship between world trade and various measures of world production. Changes in the relationship over time between these series could reveal something about changes in the composition of trade, the structure of production, and possibly even commercial policies.

This chapter aims to set the current discussion in historical context. It will examine the aggregate figures on trade and production over the past century as a way of framing the study of recent developments.

There are three readily available primary sources of data on world trade and production over the course of the 20th century. A standard source comes from the work of Angus Maddison, in particular his book *The World Economy* published in 2006 by the OECD. While his primary focus is presenting consistent measures of real GDP for as many countries as possible for as far back in history as possible, he also provides some limited information on world trade stretching back to the early 1800s.

A second source of data is contained in a draft paper from the United Nations Statistical Office from 1962. This paper, available on the UN website and compiled by the Norwegian economist Jon Ola Norbom, presents data from 1900 to 1960 (Norbom 1962). These data supersede those presented by the League of Nations in its various publications during the interwar period.

A third source of data comes from the WTO, which reports data from 1950 in the appendix tables to its annual volume *International Trade Statistics*.¹

This chapter presents figures using all three data sources to see what patterns emerge. In so doing, we will have a basis for judging whether the current relationship between trade and production is comparable to, or vastly different from, historical experience.

The Maddison data

While Maddison provides the best compilation of historical population and GDP data available, the foreign trade data are less useful. (Of course, international trade was not the primary focus of his efforts.) Many of his world export figures are in current dollar terms, which would be inappropriate to compare to real output or real income measures. He does present some real or volume measures on a less frequent basis, and in fact most of his trade data are not presented systematically on an annual basis. However, Table F-3 in Maddison (2006) does present the value of world exports by region at constant prices (millions of 1990 dollars) for six benchmark years – 1870, 1913, 1950, 1973, 1990, and 1998. These can be compared to his world real GDP figures for those same years.

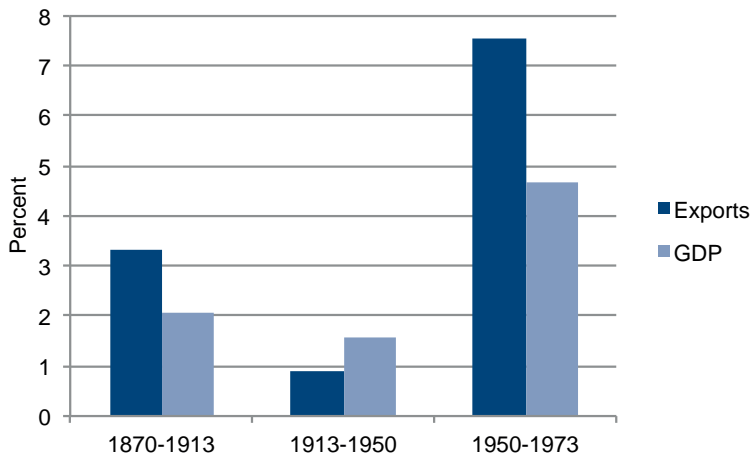
Figure 1 shows the average annual percentage change in world exports and world GDP for three periods: 1870-1913, 1913-1950, and 1950-1973. The pattern is consistent with standard accounts of these periods. The 1870-1913 period before World War I was the first era of globalisation, characterised by relatively open trade and free labour and capital mobility between countries (O'Rourke and Williamson 1999). During this period, world trade grew slightly faster than world GDP, but not twice as fast.² The turbulent 1913-1950 period was marked by two world wars and the Great Depression. Between the two benchmark years, world GDP growth exceeded world export growth,

1 https://www.wto.org/english/res_e/statis_e/its2014_e/its14_appendix_e.htm

2 Lewis (1981) presents annual data on world exports and production of manufactured goods from 1890 to 1913.

as exports were a casualty of the two wars and the interwar protectionism (Glick and Taylor 2010, Irwin 2013). (The 1920s show a more normal relationship, as that decade was largely free from conflict or depression.) The 1950-1973 period – the ‘golden age of growth’ – saw a rapid recovery of GDP in western Europe, strong growth in the US and the rest of the world, and a remarkably rapid increase in world trade.

Figure 1 Maddison data on world exports and GDP, constant dollars



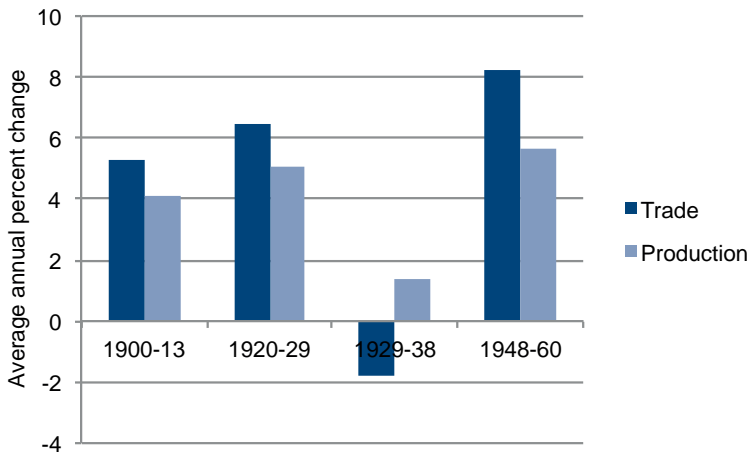
Source: Maddison (2006), Table A-a and F-3.

The United Nations data

The Norbom UN data provide annual estimates of the value, unit value, and quantum of world exports (total, manufactured, and others goods), as well as an index of world manufacturing production, annually from 1900-1913, 1921-1938, 1948, and 1950-1960. Unfortunately, data are not presented on world GDP or a more aggregated index of production or income that can be compared to the total world export figures. As a result, Figure 2 depicts just the average annual growth rates for trade and production of manufactured goods, which – as is well known – tends to grow faster than trade in other commodities.

The figures exhibit the same pattern as the Maddison data, with a little more refinement of the time periods. The two periods stretching from 1900-13 and 1920-29 are similar; in each, trade growth is just a percentage point higher than production growth. This shows that the interwar period was not uniformly depressed. Growth was rapid in the 1920s, but terrible in the 1930s during the Great Depression. Although most of the world downturn was concentrated in the years from 1929 to 1933, trade had still yet to recover to its 1929 peak by 1938, and production was just slightly higher. The post-war golden age period does not stand out nearly as much as in the Maddison data. Trade growth exceeds production growth and is higher than in the 1920s and pre-1913 period, but not by a substantial margin.

Figure 2 UN data on trade and production of manufactured goods, various periods



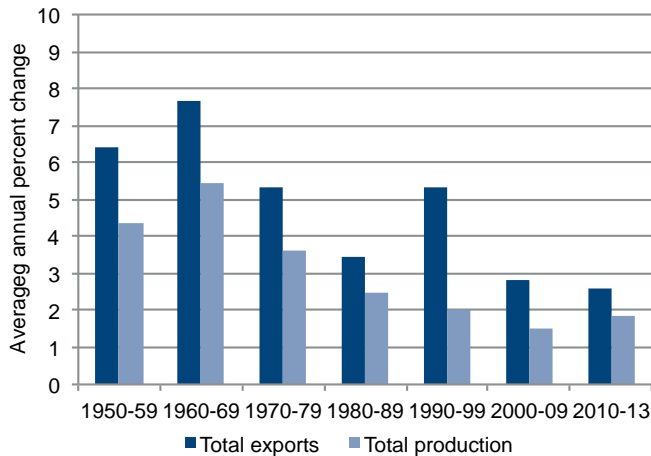
Source: United Nations (1962), Table 1.

WTO data

The WTO continues to publish annual data, starting in 1950, on the volume of world exports and production in its annual *International Trade Statistics*. These data are disaggregated into total, manufactured, fuels and mining, and agricultural. Figure 3 presents total exports and production, by decade. Two periods stand out. First, world exports slowed considerably in the 1980s, not just because of slower production growth;

rather, the margin by which exports exceeded production growth narrowed. This has sometimes been attributed to protectionism early on in the decade, something that has been difficult to demonstrate (Irwin 2002). The 1990s, however, saw a much more rapid expansion of exports in comparison to production. This has been attributed to the opening up of China, India, and other developing countries to world trade and will be explored in some of the chapters in this eBook. The most recent narrowing of the gap between production and exports (after 2010) has been a cause for concern and will also be studied in other chapters.

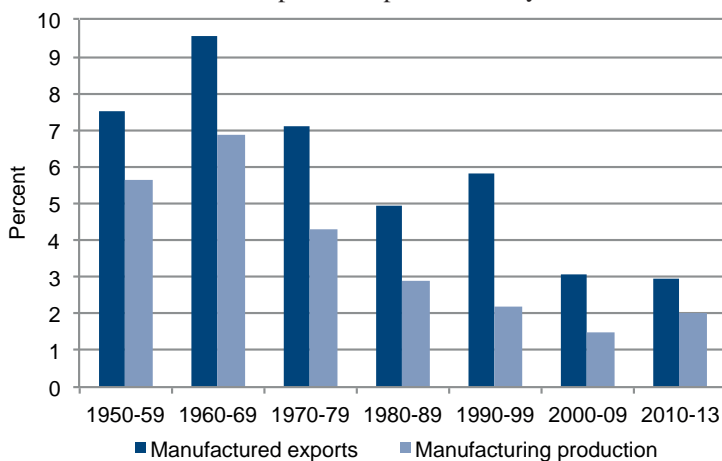
Figure 3 Total exports and production, by decade



Source: WTO (2014).

To provide a comparison with Figure 2, Figure 4 presents just manufactured exports and production. Given that manufactured goods comprise about two-thirds of total world trade, it is not surprising that the figure looks similar to Figure 3. The same patterns that are evident for total trade are also apparent in manufactured goods trade.

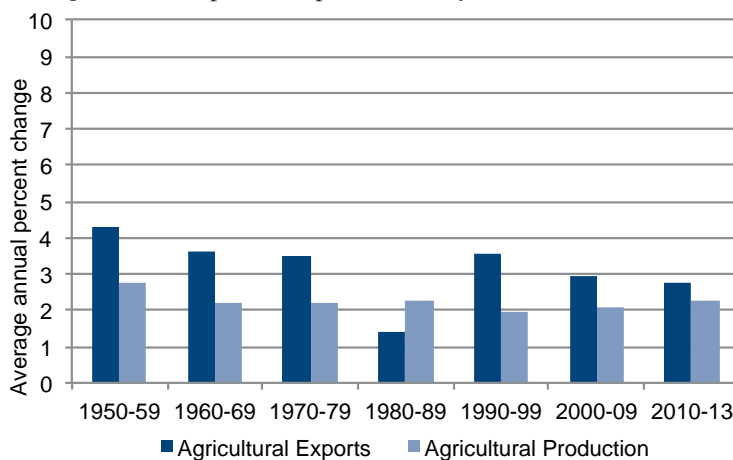
Figure 4 Manufactured exports and production, by decade



Source: WTO (2014).

Figure 5 focuses on agricultural exports and production, using the same scale as the previous two figures. Growth in this case is much slower than for total exports and manufactured goods exports. The 1980s was a particularly bad period for agricultural trade and saw the unusual pattern of growth in production exceeding growth in exports. However, the same narrowing of the gap between exports and production is evident here, particularly after 2010, as in the other figures.

Figure 5 Agricultural exports and production, by decade



Source: WTO (2014).

Assessment

The chapters in this eBook will explore the changing relationship between exports and production in much more detail than this cursory sketch does. Unfortunately, long-run historical data on trade and production are woefully incomplete and not detailed enough to provide many useful comparisons to today's world. (While data on the nominal value of trade have long been available, converting these data into a real or quantity basis is difficult because of the lack of price indices.) The quality of international trade data has improved throughout the course of the post-World War II period. Because trade data in recent decades are much richer and more complete than in the past, as the chapters in this eBook indicate, a more systematic analysis of the export-production relationship can be undertaken.

However, the simple figures presented here tell a fairly consistent and straightforward story. Under normal conditions – that is, excluding wars and depressions – trade growth exceeds production growth. The margin by which trade grows faster than production, however, is not consistent. In previous work (Irwin 2002), I examined trade and production trends for a sample of developed countries after 1870. The relationship between the two did differ over time. In particular, the elasticity of trade to production was much higher in the post-World War II period than it had been in the pre-World War I or interwar periods. In addition, the relationship was even stronger after 1985 than it had been before. This last point, reflecting the strong growth in trade in the 1990s, was clearly evident in Figures 3 and 4, and the analysis indicated that the implied long-run elasticity of trade with respect to income was large and historically unprecedented. In particular, it marked a significant change from the sluggish trade growth witnessed between 1973 and 1985. Observers at that time worried that protectionism in the 1970s and early 1980s might have been putting a brake on world trade. Bergsten and Cline (1983) argued that the slowdown in trade in the early 1980s was not due to protection but should have been expected given the world recession. However, the GATT Secretariat

(1985) also indicated that the trade-production relationship had changed after 1973, which the analysis of Irwin (2002) confirmed.

As the figures presented here demonstrate, however, the 1990s was an unusual decade and not representative of what would happen in the 2000s. Now it appears that the trade-production relationship has changed once again, with a marked slowdown in the growth of trade. Constantinescu et al. (2015) conclude that the recent slowdown may be due to the slowing pace of vertical specialisation rather than greater protectionism or the changing composition of trade or GDP. It is more difficult to evaluate these factors in terms of their past impact on the relationship, but two factors are clear. First, there have been large changes in the composition of world trade over long horizons. After World War II, manufactured goods accounted for about 40% of world trade, with agricultural goods and raw materials comprising most of the rest. Today, more than 80% of world trade is in manufactured goods. This fact probably accounts for the sensitivity of trade to production seen during boom periods, as well as sharp downturns such as the sharp contraction in world trade in 2009 that continues to receive analysis.

In addition, outside of the Great Depression, it is very difficult to find a large role of trade barriers and protectionism in the trade-income/production relationship. With regards to the Great Depression, about half of the decline in world trade between 1929 and 1932 has been attributed to protectionism (Madsen 2001, Irwin 2013). In the case of the sharp decline in world trade in 2009, Kee et al. (2011) find that trade policy measures account for only 0.4 percentage points of this decline in trade, or about 2%. Higher trade barriers clearly affect trade at the product and industry level, but it is difficult to conclude that they have operated to reduce aggregate trade growth outside of the 1930s. That said, the reduction of trade barriers in the 1990s, mainly through unilateral reforms by developing countries and big regime changes in China and India that brought them into world markets, may account for the spurt in world trade growth witnessed in the decade.

While the history must remain somewhat speculative, a fuller accounting of the more recent trade-income/production relationship is possible. The chapters that follow will give us insight into these developments.

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2 The global trade slowdown

Cristina Constantinescu, Aaditya Mattoo and Michele Ruta

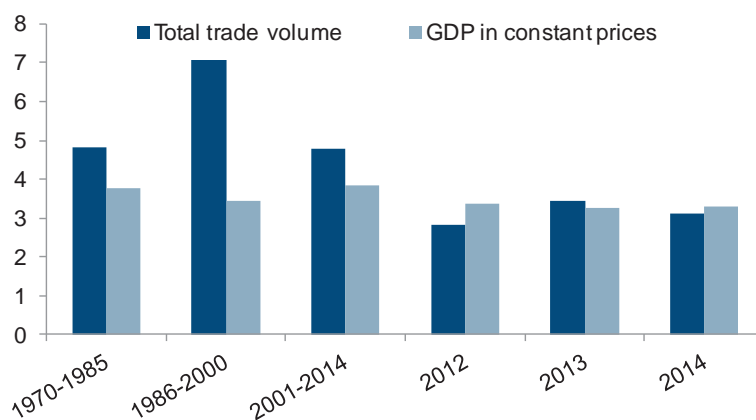
IMF; World Bank; World Bank

1 Trade growth after the Crisis

After the recovery from the Global Crisis, trade growth has so far been sluggish. The rate of growth of world trade (total trade volumes) slowed to 2.8% in 2012 and 3.4% in 2013, from 6.8% in 2011. These growth rates of world trade are well below the pre-Crisis average of 7% (1987-2007) and are slightly below the growth rate of world GDP in real terms, which has hovered around 3% in recent years (Figure 1).

Figure 1 Average growth rates in trade and GDP

Selected periods (percent)



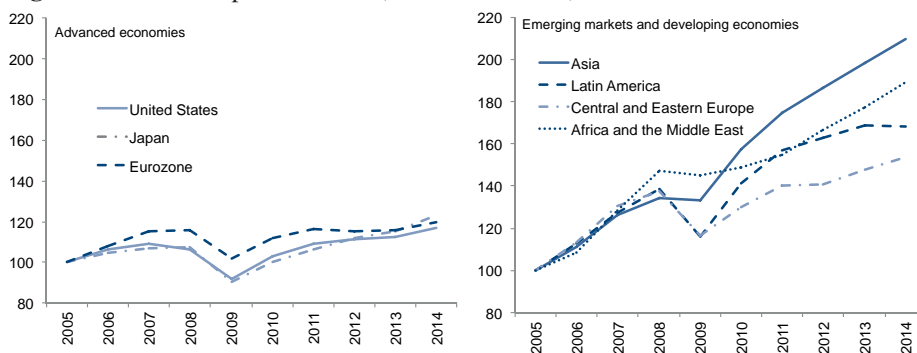
Note: Total trade is the sum of exports and imports of goods and services.

Source: IMF World Economic Outlook.

Latest estimates and preliminary data indicate that the global trade slowdown persisted in 2014. Estimates in the IMF’s *World Economic Outlook* for 2014 confirm this trend, with world output growth at 3.3% and trade volumes growing at 3.1%. That trade growth in 2014 remains subdued is also corroborated by preliminary data for merchandise trade, compiled monthly by CPB Netherlands Bureau of Economic Policy Analysis. Based on this source, growth rate of merchandise trade was 3.3% in 2014 (see the Appendix).

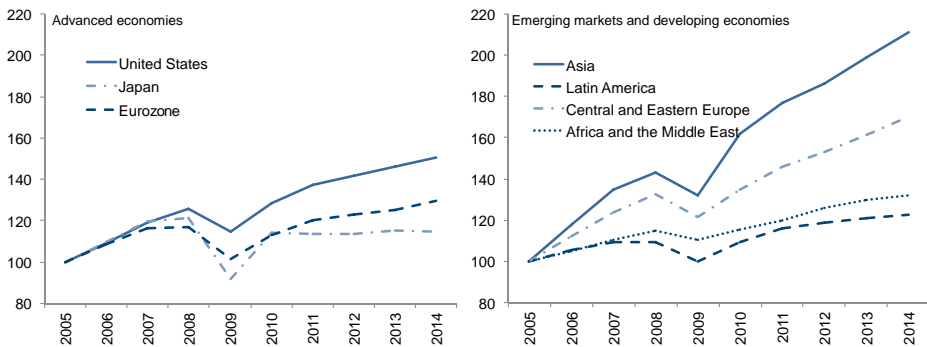
Trade growth in recent years has been weak in advanced economies, particularly in the Eurozone, and moderate in emerging markets and developing economies. Imports in the Eurozone declined by 1.4% in 2012 and increased by 0.9% in 2013, with improvements towards the later quarters of 2013 (Figure 2). Imports of emerging economies increased by 5.5% in 2013, with higher growth concentrated in Asia and Africa. Export growth varied more across regions, but follows the pattern of stronger growth in emerging and developing economies relative to advanced economies (Figure 3). As for 2014, both WEO estimates and CPB preliminary data indicate a slight pick-up in advanced economies and continued moderation in emerging markets and developing economies.

Figure 2 Total import volumes (Index, 2005=100)



Note: Total imports is the sum of imports of goods and services.

Source: IMF *World Economic Outlook*.

Figure 3 Total export volumes (Index, 2005=100)

Note: Total exports is the sum of exports of goods and services.

Source: IMF World Economic Outlook.

2 What caused the trade slowdown?

2.1 Cyclical versus structural determinants

Cyclical factors, notably weak demand in advanced economies, have contributed significantly to the global trade slowdown. Historically, the negative effect of a crisis on trade performance has not been limited to the crisis period, but has persisted through the medium term (Freund 2009, Abiad et al. 2014). The weakness in import demand is symptomatic of overall weakness in aggregate demand. Global GDP is about 4.5% below what it would have been had post-Crisis growth rates been equivalent to the pre-Crisis long-term average. Not surprisingly, trade weakness has been most pronounced at the epicentre of the crisis – in advanced economies, notably the US and the Eurozone where GDP levels are, respectively, 8% and 13% below levels that would be suggested by historical average growth rates, resulting in a deviation from trend by over 20% in import volumes for both areas (World Bank 2015). With high-income countries accounting for over 60% of global imports, their lingering weakness inevitably affects the recovery in global trade.

However, available evidence suggests that cyclical factors, while important, may not fully explain the trade slowdown. A recent study by Boz et al. (2014) assesses the

importance of cyclical factors using a model that accounts for both the weakness in aggregate demand and Crisis-induced shifts in expenditures toward less import-intensive components. The model, focusing only on advanced economies, finds that these cyclical factors explain about half of the gap between observed import growth and the growth that could have been expected in the absence of the Crisis.

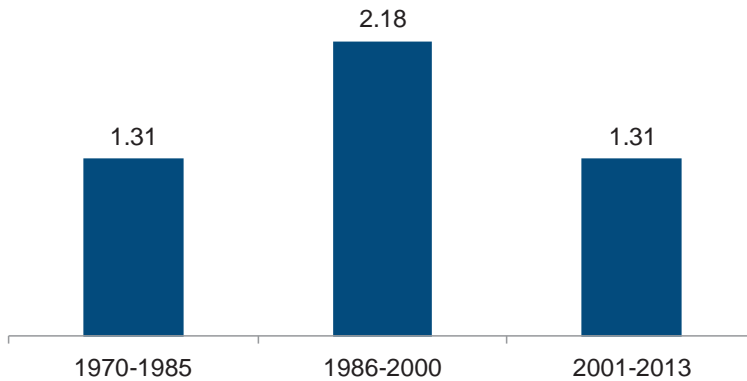
Another reason for the trade slowdown may be changes in the long-run relationship between world trade and income. Constantinescu et al. (2015) estimate the relationship between world trade and GDP in the last four decades and find that the long-term trade elasticity (the association between trade and GDP, which is the measure e_i in Box 1) rose significantly in the 1990s but declined in the 2000s. For the period 1986-2000, dubbed the ‘long 1990s’, a 1% increase in world real GDP was associated with a 2.2% increase in the volume of world trade (Figure 4). This elasticity is nearly double that of the preceding (1970-1985) and subsequent (2001-2013) years.¹ Statistical analysis confirms that there was a significant structural break in the trade-income relationship in the period 1986-2000 relative to the preceding and subsequent periods.

Structural factors may explain as much as half of the current global trade slowdown. A decomposition analysis based on the model estimates of Constantinescu et al. (2015) suggests that while short-term determinants (including weak global demand) were dominant during the Global Crisis and the first year of the recovery, the contribution of these factors has subsided in recent years (see Figure 5). The contribution of the long-term component to global trade growth over 2012-2013 may explain as much as half of the trade slowdown. These results suggest that trade after the Global Crisis is growing

1 The approach in Constantinescu et al. (2015) follows the methodology in the existing literature (e.g. Irwin 2002 and Escaith et al. 2010). Ollivaud and Schweltnus (2015) estimate the same elasticity using a different measure of world GDP from Constantinescu et al. (2015) (i.e. GDP at market exchange rates rather than the conventional purchasing power parity-based measure). Using the alternative measure, they find long-run elasticities of 1.3, 2.4 and 1.8 for the periods 1970-85, 1986-2000 and 2001-14, respectively (Table 1 on page 16 of their paper). Even though the final period elasticity is a little higher than the estimate presented here, the basic inverted-U pattern remains. Escaith and Miroudot (2015) use official exchange rates to compute a measure of long-term elasticity based on 10-year rolling period from 1960-70 to 2004-2014 and confirm a steep increase in elasticities until about the year 2000 and a steep fall thereafter.

more slowly not only because global GDP growth is lower, but also because trade itself has become less responsive to GDP.

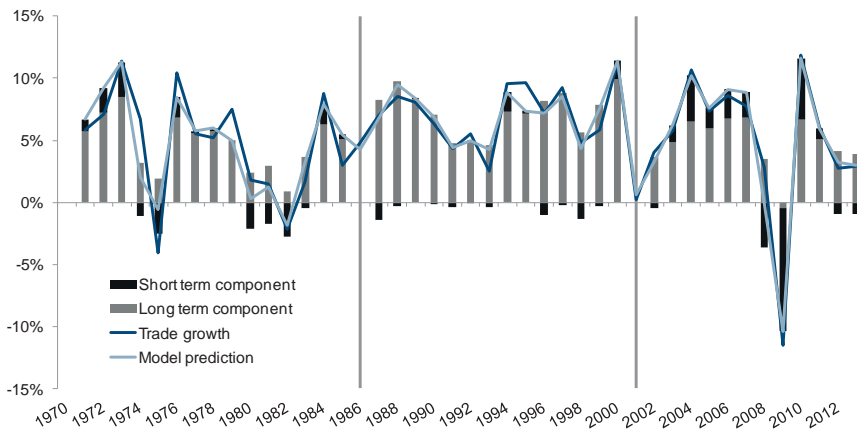
Figure 4 Estimated Long Run Elasticity of World Trade with Respect to World GDP (e_t)



Note: Elasticity equals $-\delta/\gamma$, with estimates derived from ECM specification: $d\ln(\text{imports})_{t-1} + \beta d\ln(\text{gdp})_t + \gamma \ln(\text{imports})_{t-1} + \delta \ln(\text{gdp})_{t-1} + \epsilon_t$. Imports volume includes goods and services and gdp is in real terms.

Source: IMF World Economic Outlook and authors' calculations.

Figure 5 Decomposition of world trade growth



Note: Trade in this figure refers to imports of goods and services.

Source: IMF World Economic Outlook and authors' calculations.

Box 1 Trade elasticity

The term ‘elasticity’ is widely used in this chapter. Economists use elasticity as a measure of how responsive an economic variable is to a change in another. Thus, income elasticity of demand measures the responsiveness of the demand for a good to a change in the income of the people demanding the good. The elasticity is quantified as the ratio of the percentage change in one variable (e.g. demand for a good) to the percentage change in another variable (e.g. income).

Usually implicit in the use of elasticity is the notion that one variable (e.g. income) has a causal influence on the other (e.g. demand for a good). Given the complex interactions between variables considered in this chapter, the implied causality requires strong assumptions and should be viewed with caution.

The *elasticity of imports with respect to own GDP* (e_i) measures how imports of a country (or group of countries) change when its (or their) own GDP changes. The underlying idea is that the demand for imported goods and services largely depends on the income of the country (or the group of countries), of which GDP is a good measure. We compute this measure at both the global level and the national level.

2.2 The possible structural determinants

The relationship between trade and income changes over time; a number of factors sometimes bring them closer together and sometimes push them farther apart. There are several possible explanations for the lower association of trade to GDP:

- *Changes in the pace of income convergence across countries and the associate impact on trade patterns and growth.* Escaith and Miroudot (2015) argue that the long-term evolution of world trade-income elasticity observed in the past 25 years can be partially explained by the relative evolution of advanced and emerging and developing economies. In particular, the faster income convergence observed after 2000 may explain the rapid expansion of world trade, and the slow-down of this

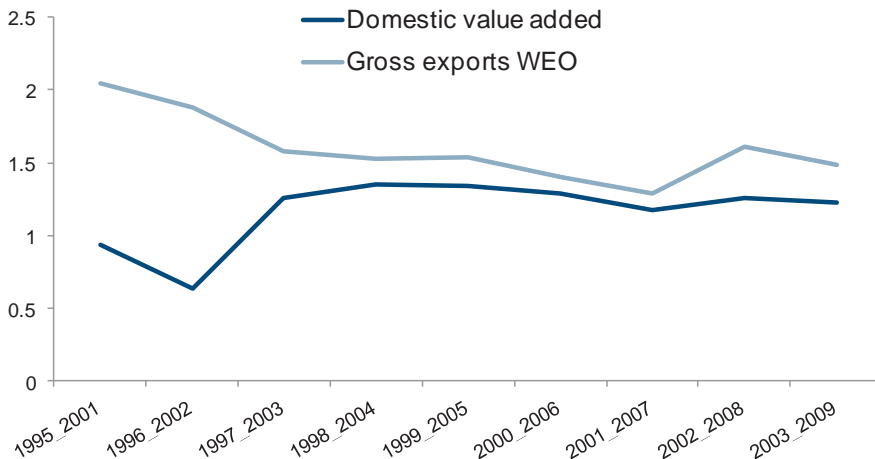
convergence after the 2008-2009 Crisis is likely to have deprived world trade of this structural driver. These insights are relevant to the post-Crisis slowdown but do not explain the observed lower elasticities after about the year 2000.

- *Changes in the composition of world income, such as the relative importance of investment and consumption.* The changing composition of GDP can explain the lower trade growth after the Global Crisis – particularly due to the decline in investment, which is the more trade-intensive component of GDP (Boz et al. 2014) – but not its historical decline since the early 2000s as the investment share in GDP surged before the Crisis.
- *Changes in the composition of world trade.* Changes in the composition of trade in terms of the relative importance of goods and services cannot fully explain the lower trade elasticity in the 2000s, because their measured share has been remarkably stable in recent years. Changes in composition along other dimensions, such as between durable and non-durable goods, may have contributed to the slowdown of trade, as we discuss in Section 4 below.
- *Changes in the trade regime, including the rise of protectionism.* Traditional protectionism seems to have increased only modestly, though we have relatively limited data on the extent of recourse to relatively opaque non-tariff measures. The available information suggests that new measures are a combination of trade restrictions and trade promotion whose ultimate effect on trade growth is ambiguous (Evenett 2014). However, the slower pace of trade liberalisation in the 2000s relative to previous period could plausibly have contributed to the lower trade elasticity, as we discuss in Section 7 below.
- *Changes in the pattern of vertical specialisation.* There is evidence that changes in the pace of expansion of global supply chains are playing a role in the trade slowdown, as we elaborate in Section 3.

3 Changes in the pattern of vertical specialisation

The slower pace of expansion of global value chains (GVCs) may be a cause of the trade slowdown. There is evidence to suggest that changes in international vertical specialisation underlie the slowdown in world trade. The long-run trade elasticity increased during the long 1990s as production fragmented internationally into global value chains, leading to a rapid surge in parts and components, and decreased in the 2000s as this process decelerated. Figure 6 illustrates this by comparing the elasticity of world trade in value added, i.e. exports net of imported inputs, with trade measured in conventional gross terms. Intuitively, if the slower pace of GVC expansion is a contributing factor to the trade slowdown, one would expect the gap between the gross and value added trade elasticities to close over time, with the former converging to the value of the latter. Figure 6 shows broadly this pattern, with the elasticity of gross trade to GDP decreasing over time and approaching the lower and more stable estimates of the trade elasticity in value added terms.

Figure 6 Long-run world trade elasticities (e_i): Value added trade and gross trade, seven-year periods

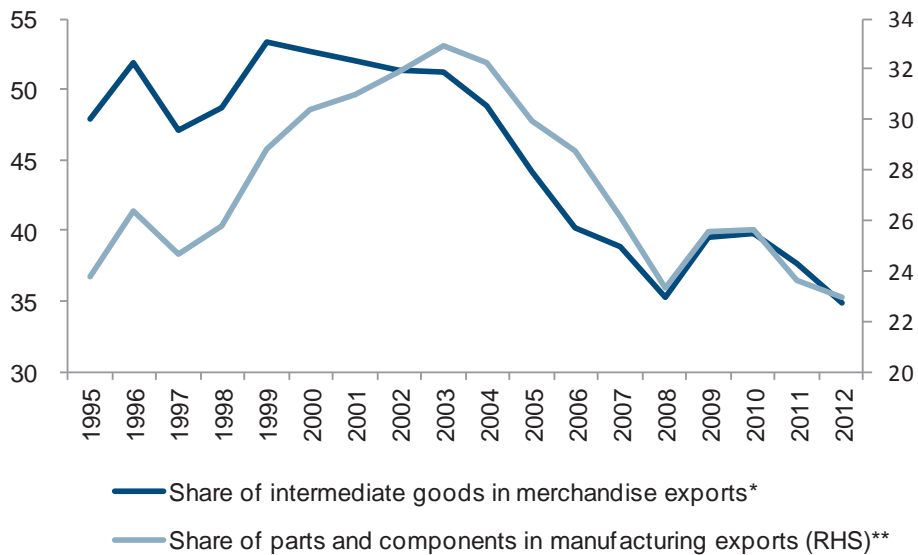


Note: The figure depicts 7-year rolling elasticities of gross world trade and domestic value added trade, both with respect to world GDP.

Source: IMF World Economic Outlook.

The changing pattern of trade in China and the US also suggests that the expansion of GVCs has slowed down. The share of Chinese imports of parts and components in its total exports has declined from its peak in the mid-1990s of 55% to a current share of approximately 35%, implying a diminished fragmentation of the production process (Figure 7). Further evidence of this change is the substitution of domestic inputs for foreign inputs by Chinese firms, which underpins the rise in domestic value added to trade (Kee and Tang 2014).²

Figure 7 China's imports of intermediates and parts and components as a share of exports, 1995-2012 (%)



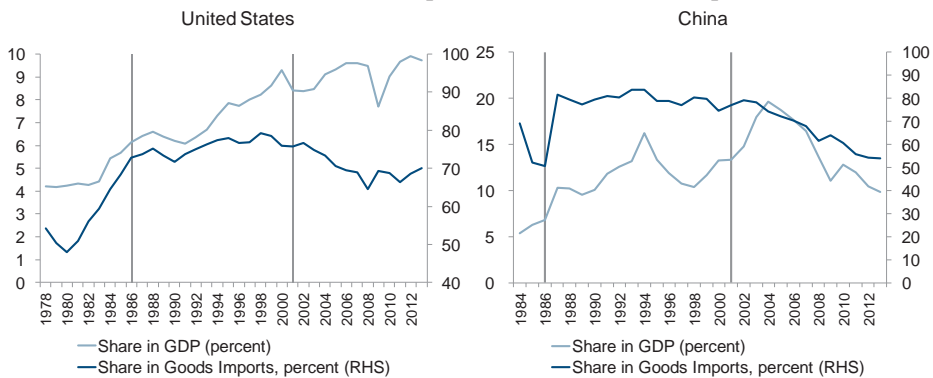
Notes: * Intermediate goods linked to global value chains are defined as categories 22,42 and 53 in UN Comtrade's BEC Classification. **Parts and components are defined as categories 42 and 53 in BEC plus 651 through 657 in SITC Rev. 3. Manufacturing is defined as categories 5 through 8, minus 68 and 891 in SITC3 Rev3.

Source: UN Comtrade and WITS.

2 The narrowing wage differentials with advanced economies may have also affected the incentives to locate low-skilled labour-intensive stages of production in China. These changes too may in part explain China's evolving position in global value chains.

The experience of the US mirrors that of China along several dimensions (Figure 8). The US was the primary source of the boom in Chinese and other emerging economies' imports of parts and components. At the same time, the US was the major destination for their exports of assembled goods. Since 2000, US manufacturing imports as a share of GDP have been stable at about 8%, after nearly doubling over the previous decade-and-a-half. Hence, the changing patterns of trade in both China and the US suggest – though not at this stage conclusively – that global value chains have played a role in the rise and subsequent decline in trade elasticities.

Figure 8 Share of manufacturing imports in GDP and goods imports: US and China



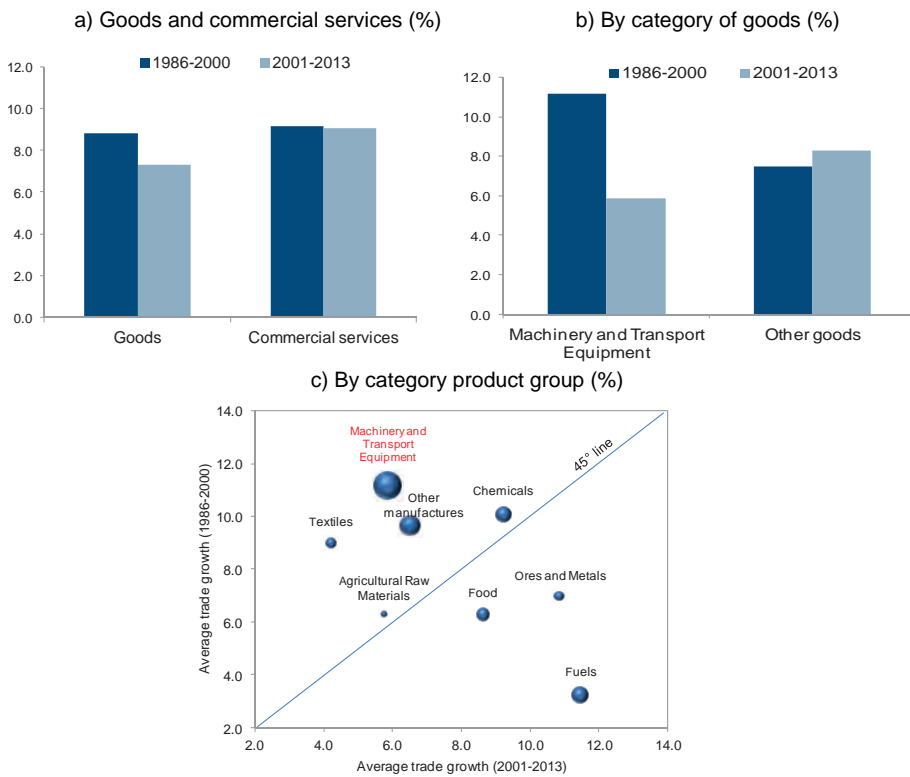
Source: UN Comtrade, IMF WEO.

All these changes do not mean that China is turning its back on globalisation. The enhanced availability of inputs domestically in China has been linked to foreign direct investment in these industries. There may also be a geographical dimension to these changes, with China's coastal regions beginning to source relatively more from the Chinese interior, because transport and communication costs have declined more sharply with the interior than with the rest of the world. Trade integration may now be taking the form of greater internal trade than international trade, which is captured by official statistics.

4 The sectoral pattern of the slowdown

The slowdown in global trade is concentrated in the manufacturing sector. Figure 9a shows that the rapid growth in world trade in volume terms in the long 1990s, and the subsequent slowdown in the 2000s, were driven by goods rather than services. Figures 9b and 9c reveal that within goods, the significant deceleration of trade growth was concentrated in the manufacturing sector.

Figure 9 World trade growth rates



Note: In Figure 9c, bubbles above the 45 degree line denote faster growth of trade in the long 1990s relative to the 2000s, and vice versa for points below the 45 degree line. The size of the bubbles reflects the share of the sector in total goods trade in the 2000s.

Source: UN Comtrade (SITC2 classification) for Figure 9c); WTO.

This slowdown in manufacturing trade had both cyclical and structural determinants. The weakness in demand in recent years has particularly affected import demand for durable manufactured goods. A breakdown of the different components of world trade elasticity to world GDP suggests that structural factors have also played a role. At the world level, the long-run elasticity of manufacturing trade to GDP was 2.6 in the 1990s and fell to 0.8 in the 2000s (Table 1). The services trade elasticity and the commodity trade elasticity actually increased in the more recent period, possibly because of the increasing tradability of services and the growing demand for commodities in emerging markets. This pattern confirms that developments within the manufacturing sector are key to understanding the global trade slowdown.

Table 1 Long-run elasticity of imports to GDP (e_i), by type of imports

Country/ region	Period	Total imports	Services	Goods		
				Total	Manufacturing	Comodities
World	1986-2000	2.18***	1.80***	2.31***	2.61***	1.66***
	2001-2013	1.31***	2.18	1.31***	0.79***	2.35***
US	1986-2000	3.68	1.68***	3.49***	2.75***	2.41**
	2001-2013	1.77***	1.95***	1.73***	1.14***	3.77**
China	1986-2000	1.54***	2.24***	1.44***	1.20***	1.26***
	2001-2013	1.10***	1.22***	1.10***	0.73***	1.84***

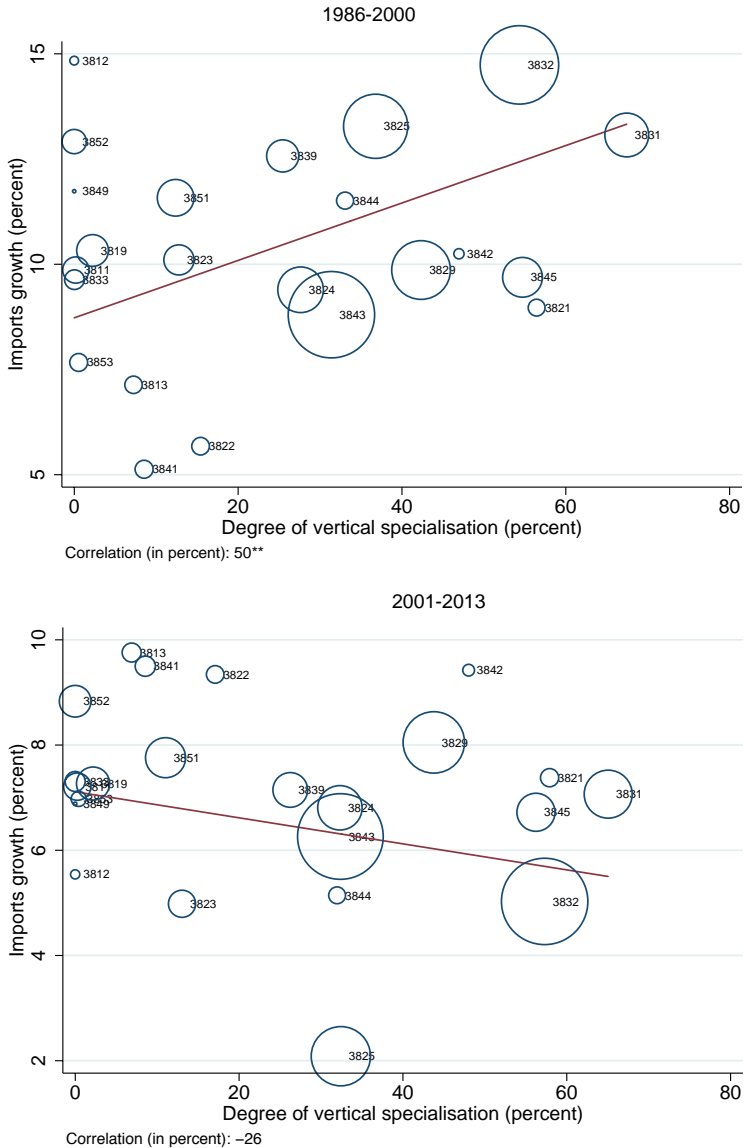
Note: *** indicates a significance level of 1%, ** of 5% and * of 10%.

Source: IMF WEO and authors' calculations.

Manufacturing sub-sectors witnessing the largest declines in growth are those with greater vertical specialisation. Consistently with the evidence produced in Section 2, a disaggregated analysis of the manufacturing sector indicates that the lower pace of trade growth is likely to have been driven by changes in global value chains. Figure 10 shows the relationship between the average growth rates of world trade of industrial manufacturing sub-sectors and their degree of international vertical specialisation (measured by the share of parts and components in total trade of the sub-sector).

Figure 10 Growth rates and degree of vertical specialisation

Manufacturing of Fabricated Metal Products, Machinery and Equipment (ISIC2 category 38)



Notes: *** indicates a significance level of 1%, ** of 5% and * of 10%. Vertical specialisation is measured by the share of trade in parts and accessories in total trade in the corresponding sector. The size of the bubbles denotes the share of the sub-sector in total trade of products in the category “Manufacturing of Fabricated Metal Products, Machinery and Equipment”; for a list of the sub-sectors, see <http://unstats.un.org/unsd/cr/registry/regces.asp?Cl=8&Lg=1&Co=38>.

Source: UN Comtrade (ISIC2 classification).

In the 1990s there was a strongly positive relationship between the two, with trade in the most vertically specialised sub-sectors seeing much faster rates of growth than in sub-sectors where GVCs are less developed. Then in the 2000s, while trade growth fell across the board, the largest declines were in precisely the sub-sectors with higher degrees of vertical specialisation, such as the manufacture of radio, televisions and communication equipment (-10%) and manufacture of electrical industrial machinery (-6%). Smaller drops in world trade growth were recorded in sub-sectors where GVCs are less developed, such as manufacture of watches and clocks (-0.7%).

5 Will the trade slowdown persist?

In the coming years, world trade is projected to grow but not at pre-Crisis levels. As the global economy continues to recover, global trade growth can be expected to pick up. However, given the still weak recovery projected, the contribution of demand to the pick-up in global trade is not likely to be substantial over the short to medium term. Moreover, structural factors may also influence trade performance. Table 2 and Figure 11 present two separate scenarios for world trade using estimates of world trade elasticities from a regression analysis for the periods 2000-2013 and 2008-2013, respectively. In the first scenario, world trade will grow in the medium term at an average of less than 5% per year. The latter set of projections portrays a picture with world trade growing at only about 2% on average per year.

Independently of the prevailing scenario, global trade growth over the medium term would rise considerably slower than the 7% rate typical of the pre-Crisis expansion. But which scenario is more likely? Reaching a firm conclusion on the extent of the trade slowdown is difficult at this stage. Formal tests indicate that there is a structural break in the pre- and post-Crisis trade-income relationship, lending support to the more pessimistic scenario. However, the estimates for 2008-2013 are based on a period that may be too short to rule out cyclical factors (albeit a long cycle) and to properly capture changes in the long-term association between trade and income.

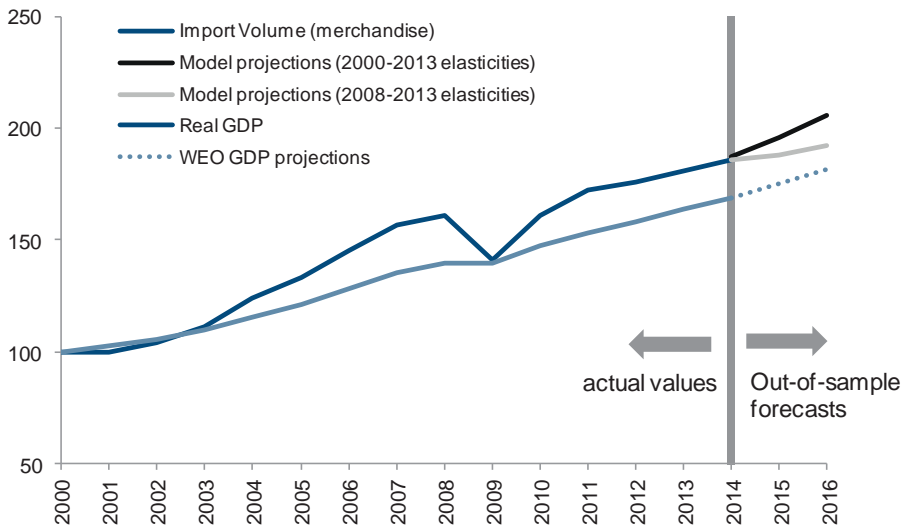
Table 2 Out-of-sample forecasts using model elasticities

	World imports of goods		Advanced economies' imports of goods		Emerging and developing economies' imports of goods	
	Model forecasts		Model forecasts		Model forecasts	
	2000-2014 elast.	2008-2014 elast.	2000-2014 elast.	2008-2014 elast.	2000-2014 elast.	2008-2014 elast.
2015	4.4	1.1	6.7	1.2	4.5	2.6
2016	5.1	1.9	6.0	0.5	6.3	3.0
2017	5.0		5.1		6.7	
2018	5.0		4.7		6.9	
2019	5.0		4.5		7.1	

Note: *** indicates a significance level of 1%, ** of 5% and * of 10%. Model projections beyond 2016 have not been made using 2008-2013 elasticities because the latter have been computed using quarterly data which is not available for IMF GDP projections beyond 2016.

Source: IMF WEO, IMF IFS and authors' calculations

Figure 11 Trade predictions (Index, 2000=100)



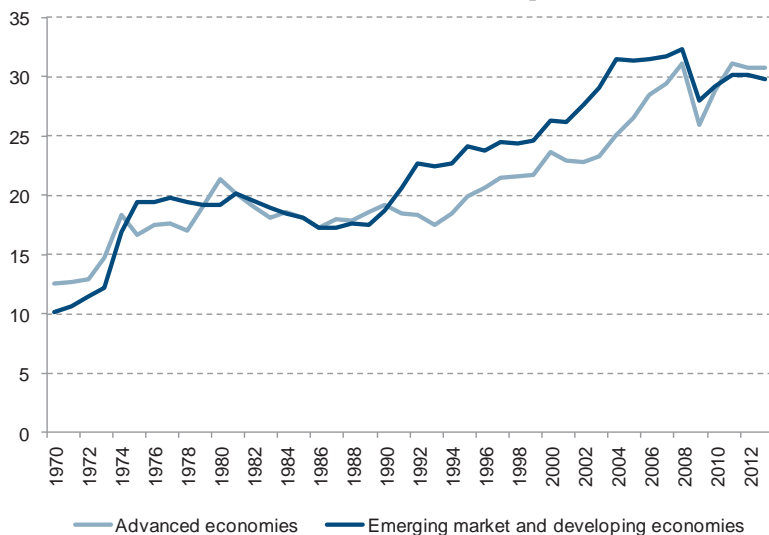
Note: Trade figures are only for goods because the quarterly data used to make projections is only available for goods. Model projections beyond 2016 have not been made using 2008-2013 elasticities because the latter have been computed using quarterly data which is not available for IMF GDP projections beyond 2016.

Source: IMF WEO, IMF IFS and authors' calculations.

6 Does the slowdown matter?

Most economies are more open today than they were in the 1990s, and trade can be expected to continue to contribute to countries' growth. Figure 12 shows that the ratio of imports of goods and services to GDP, a measure of openness to trade, increased from less than 20% in the early 1990s to over 30% right before the Crisis for advanced countries as well as emerging and developing economies. After a dip during the Crisis, the ratio has returned to the pre-Crisis level in recent years. Thus, the level of openness is as high as it has ever been. In so far as openness per se is associated with dynamic benefits, trade will continue to foster growth.

Figure 12 Imports of goods and services, percent of GDP in US dollars: Advanced countries and emerging markets and developing economies, 1970-2013



Source: IMF WEO

Nevertheless, the global trade slowdown may have implications for countries' growth prospects. There are two main channels through which slower trade growth may translate into slower GDP growth. On the demand side, sluggish world imports may limit opportunities for individual countries' exports. On the supply side, slower trade diminishes the scope for productivity growth through increasing specialisation and

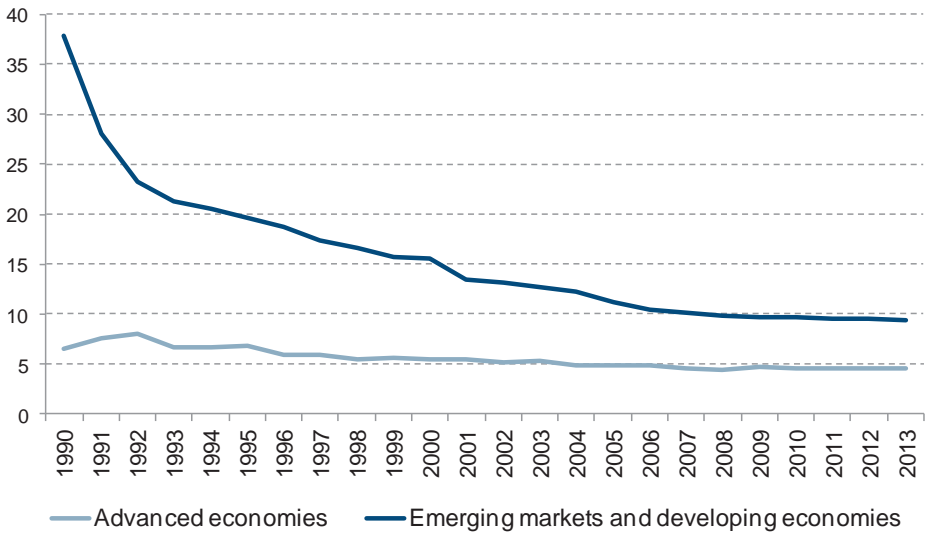
diffusion of technologies. In particular, a slower pace of GVC expansion may imply diminishing scope for productivity growth through a more efficient international division of labour and knowledge spillovers. A body of microeconomic literature links increases in productivity growth at the firm level to various aspects of GVC participation, such as imports of parts and components (e.g. Amiti and Konings 2007, Goldberg et al. 2010) and knowledge spillovers through the production chain (e.g. Atkin et al. 2014). In general, since a finer international division of labour is isomorphic to factor-augmenting technical change (Grossman and Rossi-Hansberg 2008), a slower pace of its expansion could indicate that world trade is contributing less to global growth today than it did in the long 1990s. This issue merits further investigation.

7 What can we do about it?

Part of the explanation for the slowdown in global trade may be that the benefits of past reforms have matured and new reforms have languished. In the 1990s and early 2000s, reforms in anticipation of and resulting from WTO membership allowed countries, most notably China, to rapidly integrate into the global trading system even as supply chains were built in Asia, Europe and North America. Applied tariffs fell from averages of nearly 30% to less than 15% in emerging and developing countries and from 10% to less than 5% in industrial countries (Figure 13).

The liberalisation led to a significant increase in the ratio of imports to GDP in all countries, with the ratio significantly higher for developing countries through most of the 1990s and early 2000s (Figure 12). The process of unilateral liberalisation slowed down after this period and multilateral negotiations have stalled. While some major regional trade initiatives are in the pipeline today, few have so far had the transformative effect of, say, the North American Free Trade Agreement in 1994 or the reforms in Eastern European countries in preparation for their accession to the EU.

Figure 13 Average applied tariffs* (percent): Advanced countries and emerging markets and developing economies



Note: *Simple averages of MFN Applied and Preferential tariffs. The data for tariffs does not pertain to a consistent sample of countries over time.

Source: UNCTAD TRAINS

While the engine of the long 1990s may have in part exhausted its energy, the scope for trade integration is still strong. Reforms aimed at reducing trade costs could lead to efficiency gains by improving access to markets and expanding global value chains, particularly to regions and countries that have missed out on these opportunities in the past. Trade costs could be reduced by cutting tariffs and non-tariff barriers to trade in both goods and services, and addressing distortions and inefficiencies in transport and logistics. How to advance trade integration is obviously beyond the scope of this short chapter, but three areas appear key to tackle the global trade slowdown: i) implement targeted unilateral policy actions to address impediments to goods and services trade; ii) update the global trade architecture to allow different speeds and depths of integration across country groups; and iii) ensure coherence among preferential and multilateral efforts.

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Appendix: World merchandise trade (percentage change)

	Quarter to previous quarter								Quarter on same quarter of previous year							
	2013	2014	2014Q1	2014Q2	2014Q3	2014Q4	2013	2014	2014	2014Q1	2014Q2	2014Q3	2014Q4			
World trade	2.7	3.3	-0.3	0.7	2.0	1.1	2.7	3.3	3.2	2.9	3.7	3.5				
World imports	2.6	3.5	0.2	-0.1	2.1	1.3	2.6	3.5	3.8	3.1	3.4	3.6				
Advanced Economies (c)	-0.3	2.8	0.6	0.7	0.7	1.0	-0.3	2.8	2.7	2.8	2.7	3.1				
United States	0.8	4.5	-0.1	2.5	0.5	4.2	0.8	4.5	2.9	4.0	3.8	7.3				
Japan	1.6	2.1	4.5	-6.9	0.8	1.1	1.6	2.1	9.2	1.1	-0.5	-1.0				
Euro Area	-0.6	2.3	0.9	0.4	0.5	-0.3	-0.6	2.3	2.6	2.6	2.3	1.7				
Other Advanced Economies	-1.7	2.1	-0.9	2.2	1.5	-0.3	-1.7	2.1	0.2	2.3	3.3	2.6				
Emerging Economies	5.6	4.1	-0.1	-0.9	3.5	1.6	5.6	4.1	5.0	3.4	4.1	4.1				
Asia	5.3	4.3	-1.8	-0.7	5.8	2.1	5.3	4.3	3.5	3.0	5.4	5.4				
Central and Eastern Europe	4.8	1.2	-0.3	-1.8	-0.3	1.1	4.8	1.2	4.6	2.4	-0.6	-1.4				
Latin America	8.9	2.5	2.5	-2.3	0.6	5.0	8.9	2.5	4.1	0.7	-0.6	5.7				
Africa and Middle East	5.3	7.2	3.5	0.1	2.2	-1.3	5.3	7.2	10.2	7.0	7.2	4.4				
World exports	2.8	3.2	-0.9	1.5	1.8	0.9	2.8	3.2	2.5	2.8	4.0	3.5				
Advanced Economies (a)	1.2	1.9	-0.1	0.5	0.9	1.7	1.2	1.9	2.0	0.8	1.6	3.0				
United States	2.6	3.3	-2.9	2.4	2.2	1.2	2.6	3.3	2.8	3.2	4.4	2.8				
Japan	-1.4	1.7	-1.0	-1.2	1.6	4.8	-1.4	1.7	2.5	-0.9	0.9	4.1				
Euro Area	0.3	1.8	0.7	0.6	0.2	1.1	0.3	1.8	1.4	1.8	1.6	2.6				
Other Advanced Economies	3.6	0.6	1.2	-0.9	1.3	2.2	3.6	0.6	2.8	-3.4	-0.3	3.7				
Emerging Economies	4.4	4.5	-1.7	2.6	2.7	0.2	4.4	4.5	3.0	4.8	6.3	3.9				
Asia	5.7	5.6	-3.1	4.9	3.9	-0.3	5.7	5.6	1.6	6.5	9.0	5.3				
Central and Eastern Europe	2.1	5.2	2.0	-1.1	0.8	1.1	2.1	5.2	8.3	5.9	3.8	2.9				
Latin America	5.2	1.9	-1.7	0.2	-0.1	2.6	5.2	1.9	5.4	0.9	0.5	1.1				
Africa and Middle East	0.5	0.0	0.9	-1.8	1.5	0.0	0.5	0.0	0.8	-2.0	0.5	0.6				

Source: CPB Netherlands Bureau of Economic Policy Analysis. All data are seasonally adjusted.

3 Recent slowdown in global trade: Cyclical or structural?

Emine Boz, Matthieu Bussière and Clément Marsilli¹

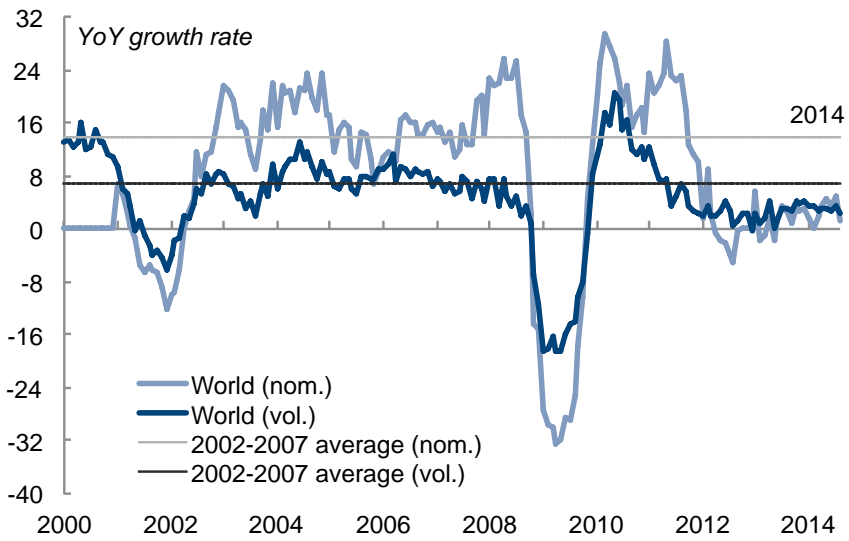
IMF; Banque de France; Banque de France

Introduction

Global trade started to slow down markedly in the course of 2011, after it had bounced back from the Great Trade Collapse of 2008-2009.² In 2012 and 2013, the growth rate of global trade reached only 3%, against nearly 7% in the pre-Crisis period (2002-2007) and 6.8% in the period 1985-2007 (Figure 1). A remarkable observation about this slowdown is that world trade has actually grown at a slower pace than world GDP in these two years, whereas in the pre-Crisis period global trade was growing more robustly than world GDP (Figure 2).³

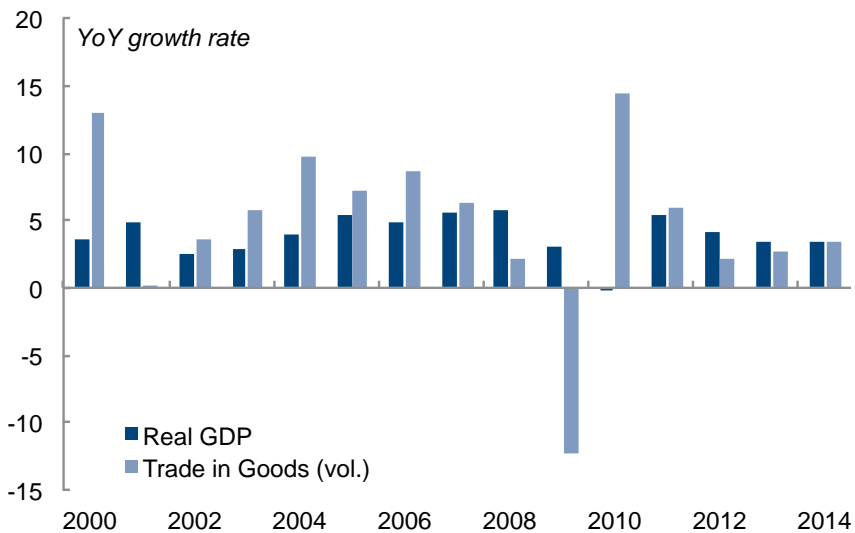
- 1 We would like to thank Richard Baldwin, Olivier Blanchard, Chad Bown, Bruno Cabrillac, Christian Durand, Michael Ferrantino, Guillaume Gaulier, Thomas Helbling, Philippe Martin, Arnaud Mehl, Gian Maria Milesi-Ferretti, Sébastien Miroudot, Steve Phillips, Giulia Sestieri, and Daria Taglioni for helpful comments. We also would like to thank Valérie Vogel and Marina Rousset for outstanding research assistance. The views expressed here are those of the authors and do not necessarily represent those of the institutions with which they are affiliated.
- 2 The Great Trade Collapse refers to the sudden and sharp drop in global trade in the wake of the 2008 Global Crisis; see in particular Baldwin (2009) for an early analysis.
- 3 The exact time of the slowdown is hard to gauge. The year-on-year growth rate of world trade dropped from 7.4% in May 2011 to 3.7% the following month and remained low thereafter, so one may consider that trade started to decelerate in mid-2011.

Figure 1 World trade in goods



Sources: CPB, WEO, and Banque de France staff calculations.

Figure 2 Global GDP and trade growth



Sources: CPB, WEO, and Banque de France staff calculations.

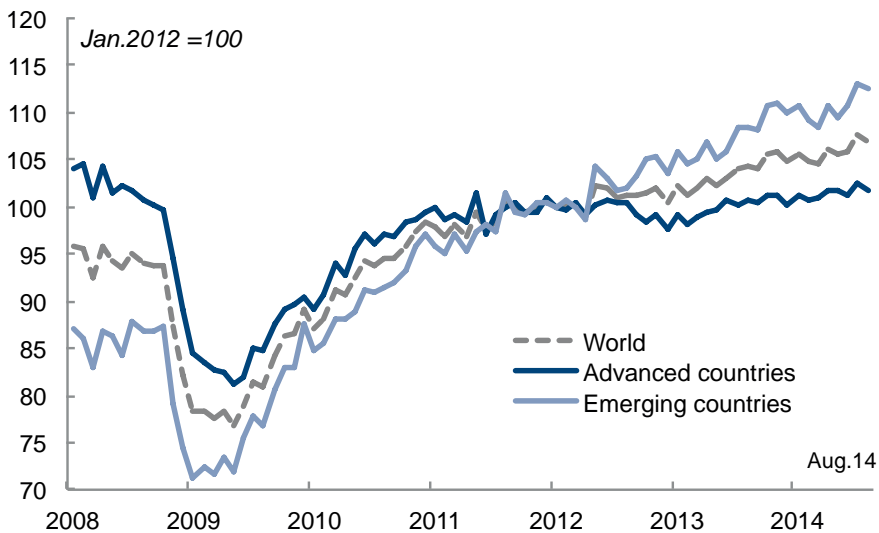
This raises the question of the factors behind the global trade slowdown. In particular, it is important to properly disentangle the role of cyclical versus structural factors, given that they have very different implications for the outlook. If the slowdown is merely a reflection of a slowdown in economic activity, which was very weak in recent years, then the projected pick up in output growth should result in a rebound of trade flows. However, the slowdown in trade could also reflect deeper, structural factors, such as a rise in protectionism or a change in global production schemes throughout the world. If such factors are at play, the dynamics of global trade and GDP could change permanently and rule-of-thumb elasticities commonly used for global forecasts may no longer be accurate.

To address this question, this chapter proceeds in three steps. First, we present some key stylised facts on the global trade slowdown. These stylised facts show that the trade slowdown was particularly pronounced in advanced economies, especially the Eurozone. However, most regions of the world have been affected, including emerging market economies (EMEs). The stylised facts also reveal that investment goods have been more affected than consumption goods. Second, we use a trade model to gauge how much of the slowdown can be explained by cyclical developments. This model, outlined in Bussiere et al. (2013), relates real imports to relative import prices and to a novel measure of aggregate demand, which weighs the components of GDP according to their trade intensity. This model was estimated for a panel of 18 OECD economies and was updated through 2014Q2. Results suggest that most of the slowdown can be explained by cyclical factors. Third, we turn to ‘structural’ factors often invoked in the context of the trade slowdown, such as the role of global production chains, protectionism and trade finance. Although the influence of such factors is hard to quantify, preliminary evidence suggests that they cannot be ruled out, but that their contribution may have been limited.

1 Key stylised facts

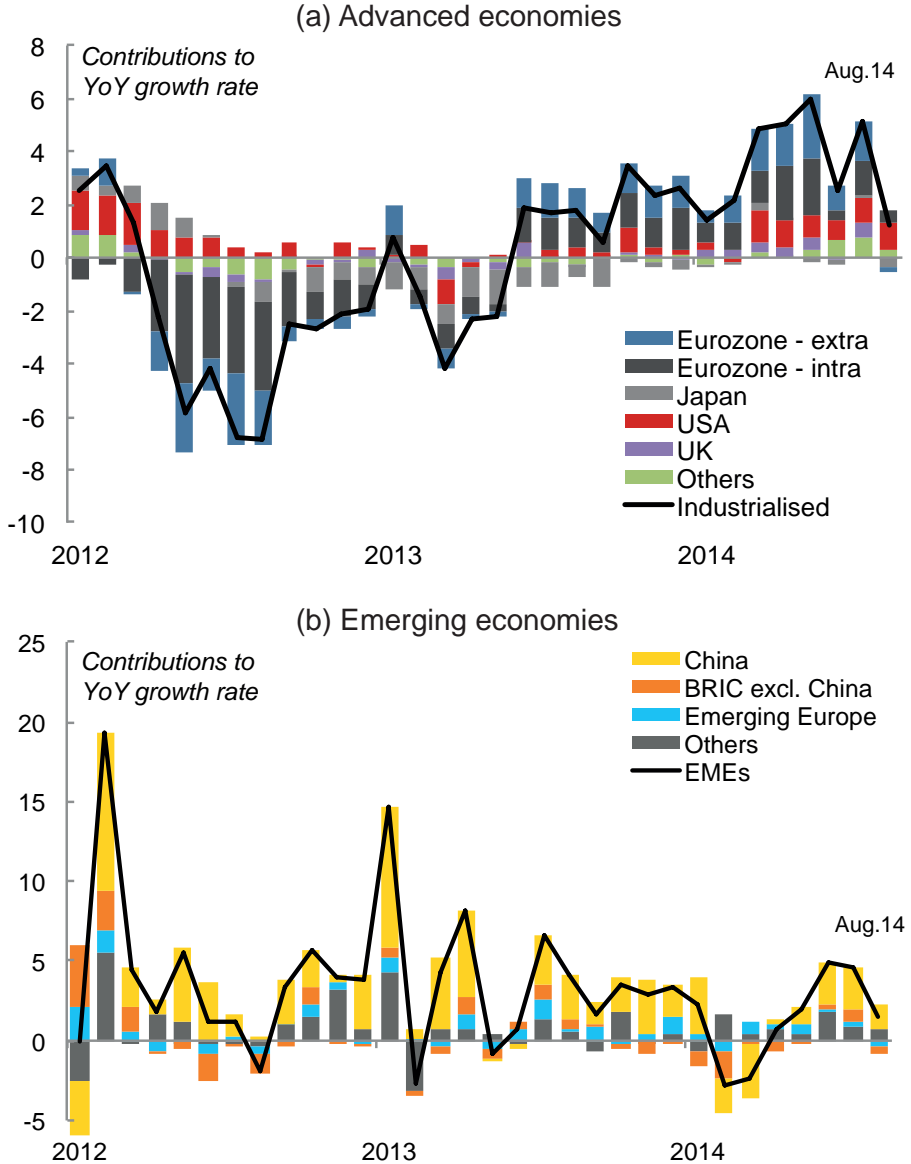
The trade slowdown seems to have a strong regional component. First, advanced economies have recorded particularly weak growth trade in volumes of trade (Figure 3). Second, there are noticeable differences even among groups of countries (Figures 4). Starting with the advanced economies, Eurozone trade was particularly weak in 2012, before rebounding somewhat in 2013. Even though most of the slowdown of Eurozone trade comes from intra-Eurozone trade (among member countries), extra-Eurozone trade also contributed negatively to global trade growth. Among the EMEs, European EMEs have shown weaker trade than other regions, especially in 2012 (likely because of the spillover effects from sluggish Eurozone economic activity) and in 2014, perhaps related to the crisis in Russia and Ukraine.

Figure 3 World trade in goods (volume)



Source: CPB.

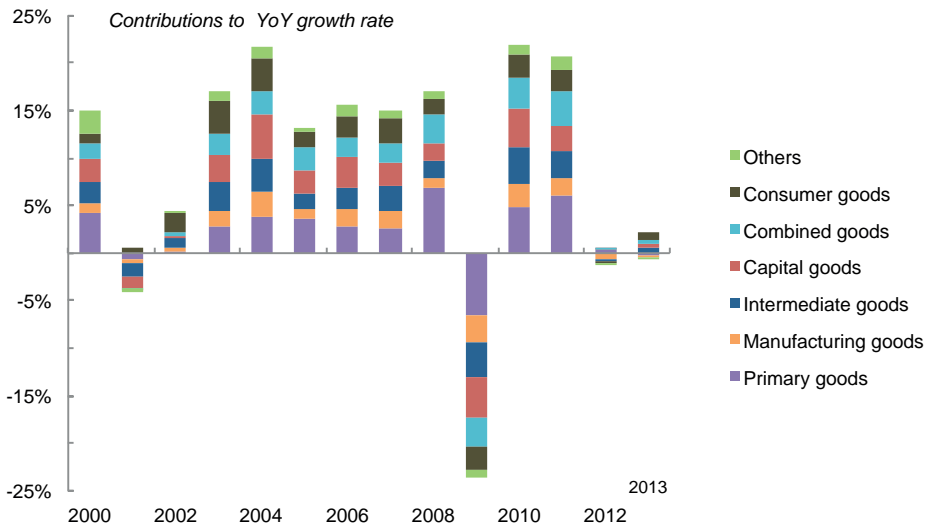
Figure 4 World trade in goods: Regional patterns (advanced economies and EMEs)



Source: National sources and Banque de France staff calculations.

Finally, the decomposition of world trade by sector shows that capital goods have contributed very significantly to the slowdown (Figure 5). Indeed, the contribution of capital goods to the decrease in the growth rate of global trade is 30% larger than that of consumer goods. This is consistent with the mechanism outlined in the following section, that is, that the fall in global trade has largely arisen from a fall in investment.

Figure 5 Contributions to world exports of goods by large sectors



Source: CEPII Chelem.

2 Quantifying the role of cyclical factors

We use the results of Bussiere et al. (2013), who estimate import elasticities based on various aggregate demand measures: import intensity adjusted demand (IAD), domestic demand and GDP. Unlike the more traditional demand terms, IAD gives more weight to the import-intensive components of demand, as read from the OECD input-output tables. It is formally defined as

$$\ln(IAD)_t = \omega_{C,t} \ln(C_t) + \omega_{G,t} \ln(G_t) + \omega_{I,t} \ln(I_t) + \omega_{X,t} \ln(X_t)$$

where the ω s are the weights capturing the import contents of the corresponding final demand expenditures.

Using IAD as the measure of aggregate demand, we estimate the following import equation:

$$\Delta \ln(M_{c,t}) = \delta_c + \beta_D \Delta \ln(IAD_{c,t}) + \beta_P \Delta \ln(P_{c,t}) + \varepsilon_{c,t}$$

where $M_{c,t}$, $IAD_{c,t}$ and $P_{c,t}$ denote real imports, aggregate demand and relative import prices, respectively, for country c at time t .

Figure 6 compares the predictions of the IAD model with actual trade volume growth. For the 18 advanced countries considered in the estimation, eyeballing the figure suggests that the model does a reasonably good job in accounting for the observed slowdown in imports.

To understand better the performance of these models and quantify the portion of the slowdown in trade that can be accounted for by cyclical factors, starting in 2012Q1, we compute the cumulative import volume growth in the data, that implied by the model, and finally what would be implied by assuming the historical average growth rate of import volume for 1985-2014 (Figure 7).⁴

4 The time period we consider in the calculation of the trend growth is 1985 to 2014Q2; note that this includes the Great Trade Collapse during which import volume shrank by 10% in one quarter. Pushing the starting date of the average calculation to the mid-1990s does not change our conclusion that about half of the trade slowdown can be explained by the model.

Figure 6 Import volumes, data and model

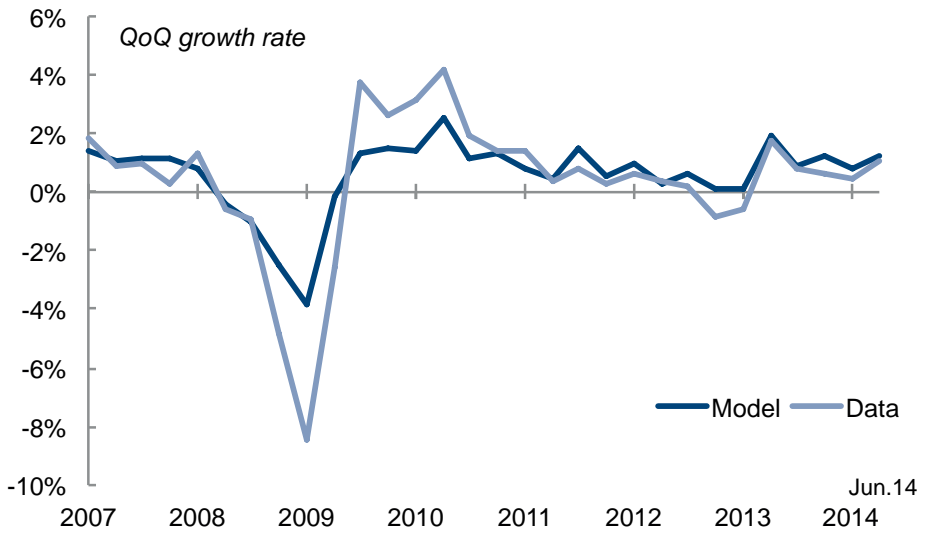
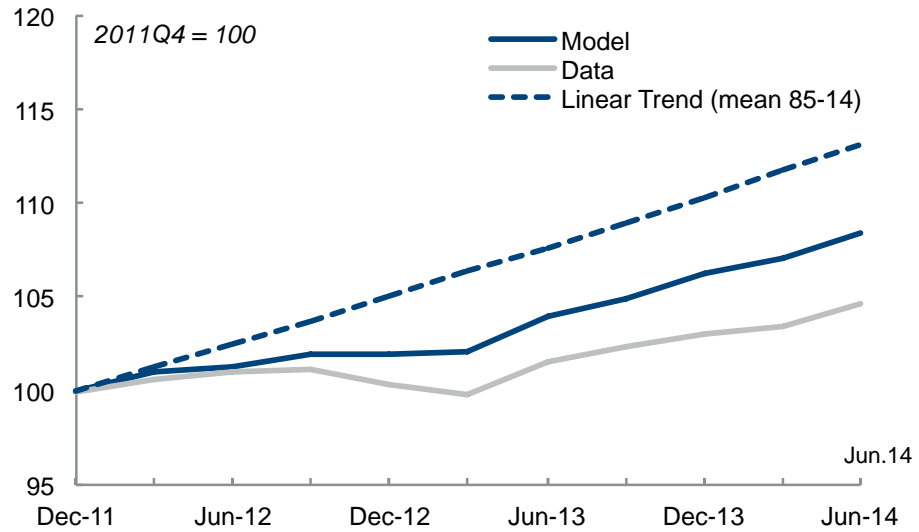


Figure 7 Cumulative import volumes, data, model and linear trend



We find that applying the historical average growth rate yields a cumulative growth of 13.2% for 2012Q1-2014Q2. For the same period, the IAD model predicts a cumulative real import growth of 8.6%, while the actual observed cumulative growth is 4.6%. Of the 8.6 (13.2-4.6) percentage point gap between observed trade growth and that based on a linear trend, cyclical factors can account for 4.6 percentage points, which amounts to 54% ($4.6/8.6=54\%$), i.e. a little more than half of the observed slowdown.⁵⁶

3 The role of non-cyclical factors

Non-cyclical factors are harder to quantify and to provide evidence for compared to the cyclical factors. Here we mainly discuss trends in global value chains (GVCs) and protectionism. The rationale for such ‘structural’ factors is as follows. Since the 1980s, global trade grew significantly faster than world GDP. One hypothesis for this development is that trade liberalisation gave trade a strong boost in the decades preceding the Global Crisis, which not only affected direct exports (from one country to another) but also contributed to an increase in the fragmentation of production across countries. More specifically, goods are not simply built in one country and exported to another, but are often produced through more complex value chains, with components built in one country, assembled in another and exported to their final destination. Some fear that the Global Crisis may have ended this trend, possibly because of a rise in protectionism (or a deceleration of the trade liberalisation process), but also because producers may have realised that global production chains were too long and inefficient.

5 If we calculate the same statistics starting in mid-2011 instead of 2012, the share of the slowdown explained by the model rises to 58%. The model tracks the data fairly well over the last two quarters of 2011. In fact, the model underestimates the slowdown mainly during two quarters – the last quarter of 2012 and the first quarter of 2013 – especially for a few observations, including for 2012Q4 for the US, Germany and Japan and for 2013Q1 for Australia, Netherlands and the UK.

6 We have also estimated the trade elasticity using the GDP model for several sub-samples to identify any time variation in the value of the elasticity. Our panel regressions suggest that the elasticity estimated for the slowdown period was not significantly different from that estimated using the entire sample, but this may be due to the fact that the slowdown period is very short and the coefficient not tightly estimated.

Global value chains

Data on GVCs rely on input-output tables, which come with a long lag.⁷ The latest numbers available in the WIOD database are for 2011, while OECD's TiVA database stops in 2009. Hence, for the recent slowdown, one can only analyse proxy measures of GVC trade.

Following Ferrantino and Taglioni (2014), based on the classification of products to intermediate and final by Sturgeon and Memedovic (2010), we approximate GVC trade by 'imported intermediate goods' in GVC-intensive sectors.⁸ More specifically, we calculate the ratio of intermediate goods imports to final goods exports in the Chinese electronics sector using 6-digit level export and import data from the International Trade Center. Since electronics constitute about 20% of China's imports, and China's imports are about 10% of world imports, we are thus capturing about 2% of world imports in this exercise. As a result, our results are suggestive rather than definitive. The dashed line in Figure 8 shows this proxy measure, which we computed using quarterly data up to 2014Q2.

Our second proxy for GVC trade is based on the interpolated and extrapolated version of the OECD's TiVA dataset by Duval et al. (2014). Based on this dataset, the foreign value added as a percentage of gross exports for the world and China are shown by the solid lines in Figure 8.⁹ After the monotonic increase in GVC trade at the global level starting as far back as the data are available, there was a decline during the Great Trade Collapse, as the solid blue line depicts. After the bounce back from the Global Crisis, there has been a flattening of GVC trade for the world and for China. The dashed line

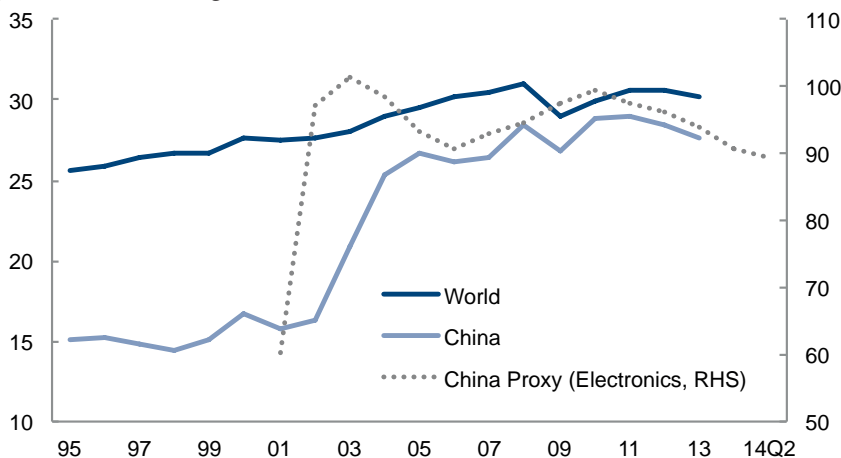
7 For a recent analysis of GVCs see, for instance, Sturgeon and Memedovic (2011), Baldwin and Lopez-Gonzalez (2013), and Gawande et al. (2014).

8 The main shortcoming of this approach is that if an imported intermediate good is used in the production of a final good that is consumed domestically, it should not be counted as a GVC. In fact, GVC trade would be a subset of imported intermediate goods. To the extent that the domestically consumed final goods and those that are re-exported behave similarly, the approximation in terms of growth rates will be good.

9 Note that we are plotting the foreign component of gross exports, so an increase implies an intensification of GVCs.

– the imported intermediate goods proxy for China’s electronics – tracks reasonably well the proxy constructed using Duval et al. (2014) for China and suggests a modest decline in GVC trade after around 2012. Overall, these proxies suggest that GVC trade has been stable or modestly declining during the global trade slowdown.

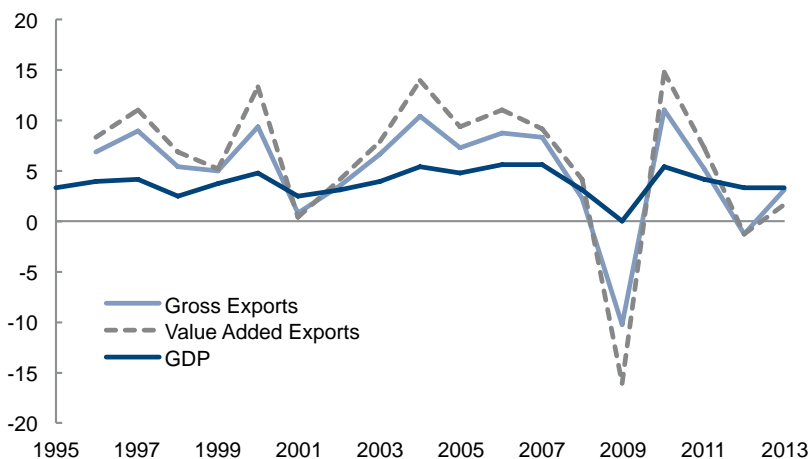
Figure 8 Trends in global value chains



Source: International Trade Center, Duval et al. (2014)

The dataset by Duval et al. (2014) makes it possible to compare the dynamics of value added exports with those of gross exports at the global level. Such a comparison, plotted in Figure 9, reveals that value added exports almost always grew faster than gross exports in real terms in the period for which we have data. 2012 and 2013 are exceptions to this; in 2012, the growth of value added exports was identical to gross export growth, and in 2013, gross exports grew more than value added exports. Even though this change in the ranking of value added and gross export growth is noteworthy, two years’ data are insufficient to confidently conclude that GVC trade growth is now permanently slower. GVC trade seems indeed to be very procyclical (as demonstrated during the 2009 trade collapse and the subsequent 2010 rebound), so it is difficult to see whether this corresponds to a structural change.

Figure 9 Global value added and gross exports



Source: Duval et al (2014), World Economic Outlook.

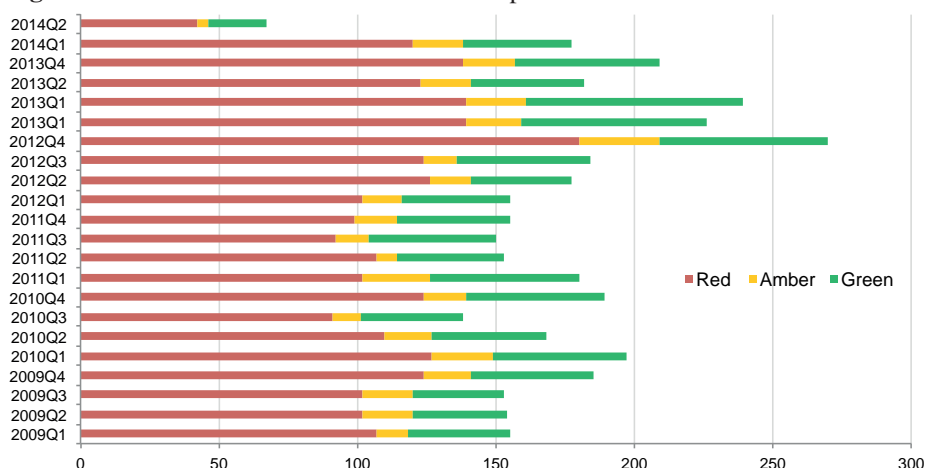
Protectionism

One leading source of information on protectionism is Global Trade Alert (GTA), an independent initiative coordinated by CEPR. GTA maintains a comprehensive database of trade measures since 2009 and colour codes each measure as red (almost certainly harms a foreign commercial interest), amber (likely to harm a foreign commercial interest) or green (trade liberalising or makes national policy more transparent).¹⁰

Figure 10 shows the number of new measures that had already been implemented at the time of writing. Overall, based on the figure below, one cannot argue that the number of protectionist measures declined in 2014Q2 because of the potential upward revisions, but one can comfortably say that during the recent slowdown, the number of protectionist measures remained around the levels observed during the Great Trade Collapse, or even slightly higher towards the end of 2012 and the beginning of 2013.

¹⁰ There are two disadvantages to the GTA data. First, more measures are added to historical numbers as they are discovered, so the most recent observations are very likely to be revised upwards significantly. Second, the data include ‘behind-the-border’ measures in addition to those that are directly targeted at trade.

Figure 10 Number of new trade measures implemented

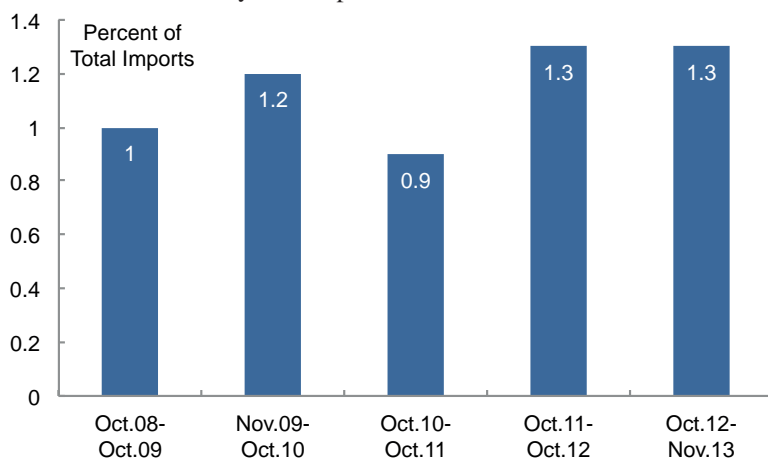


Source: Global Trade Alert.

A useful statistic on protectionism from the WTO is the imports covered by import-restrictive measures divided by total imports. An advantage of this approach over the number of measures from GTA is that the WTO takes the announced trade measures (only traditional measures) and matches them to disaggregated imports data to get a sense of the fraction of imports that get affected. Figure 11 plots the data starting from late 2008. Based on these findings, the WTO concludes that trade restrictiveness increased only modestly but accumulated over time, as new measures more than compensate the removal of old restrictions.

One of the most useful indicators on protectionism and that has a longer time series and good cross-country coverage is the World Bank's Temporary Trade Barriers Database (TTBD), which includes antidumping, global safeguards, China-specific transitional safeguard measures and countervailing duties. Based on a trade-weighted measure, this indicator shows that the stock of such barriers has increased mildly during the recent slowdown.

Figure 11 Trade covered by new import-restrictive measures



Source: WTO.

Overall, there seems to have been some small pick-up in protectionism during the period of the trade slowdown based on the GTA numbers, the trade covered by new import-restrictive measures from the WTO, and the TTBD from the World Bank. Given the shortcomings of protectionist measures, it is hard to reach a definitive conclusion; however, one can comfortably argue that the last 2-3 years was not a period of extensive trade liberalisation, which could explain why trade is no longer rising so much faster than GDP.¹¹

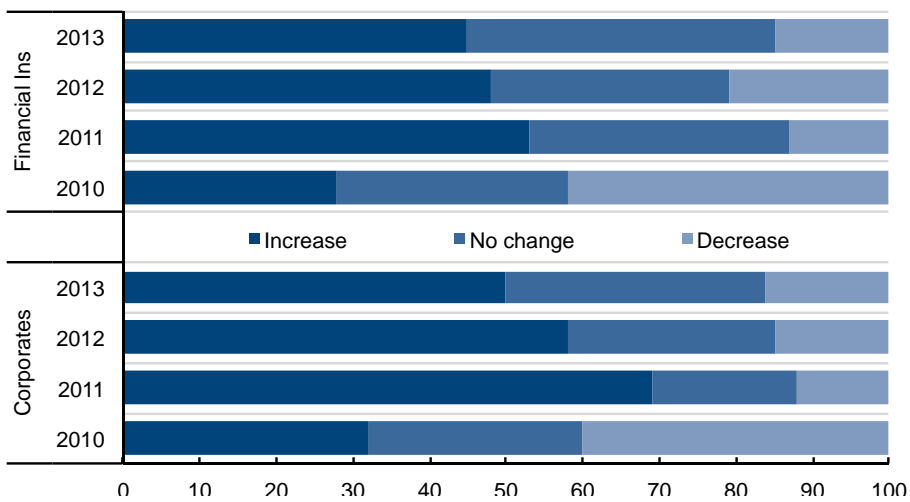
4 Trade finance

Another potential explanation provided for the Great Trade Collapse was a tightening in the availability of trade finance. In order to see if trade finance also played a role in the recent trade slowdown, in Figure we report the results of a survey of banks by the International Chamber of Commerce. The survey covers up to 298 banks in 127 countries in the last vintage in 2013. Since the country and bank coverage has been

¹¹ Trade liberalisation cannot continue forever anyway. In particular, once tariffs have been brought to zero they cannot be reduced further – the zero lower bound is a constraint (even though non-tariff measures can always be phased out).

expanding since the beginning of the survey, it is not ideal for a time series comparison. However, the coverage has been expanding to include smaller banks in less developed countries where one might expect financing to be tighter. Despite the inclusion of a larger number of smaller banks in less developed countries, Figure 12 shows that the availability of trade finance has not declined significantly, as evidenced by the more or less unchanged percentage of respondents reporting a decrease in its availability.

Figure 12 Availability of trade finance



Source: International Chamber of Commerce Global Survey.

Conclusion

As the analysis presented here underlines the role of cyclical factors among advanced economies, global trade should benefit from the projected recovery in these countries. Clearly, cyclical factors should disappear once the global recovery progresses further and do not call for a particular policy response (beyond what is needed to sustain the recovery). Among the non-cyclical factors, we tend to think that only protectionism may be a concern if there are further signs in the future that it is on the rise. In contrast, GVC trade can be seen as an optimal response to structural changes where policy action is harder to justify.

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4 Does the post-Crisis weakness of global trade solely reflect weak demand?

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OECD

1 Introduction

The anaemic recovery of global trade following the collapse of 2009 raises the question of whether this recent trade weakness mainly reflects cyclical factors or signals a structural break in the process of globalisation that may have implications for long-run global GDP growth. While over the two decades that preceded the Global Crisis, global trade grew on average at more than twice the rate of purchasing power parity (PPP) based global GDP, global trade growth over the period 2008-2014 was slightly below this conventional measure of global GDP growth. In other words, the long-term elasticity of global trade to GDP appears to have declined from around 2 in the two decades preceding the Crisis to around 1 thereafter.

Empirical studies suggest that the collapse of world trade during the Global Crisis of 2008-2009 mainly reflected a sharp decline in import-intensive components of demand such as investment and durable goods consumption, implying that the reversal of

1 This chapter is an abbreviated version of a working paper, Ollivaud and Schwellnus (2015), which provides additional data and analysis. The authors would like to thank Jens Arnold, Sebastian Barnes, Jérôme Brézillon, Thomas Chalaux, Jean-Marc Fournier, Catherine Mann, Mauro Pisu, Jean-Luc Schneider and Dave Turner for helpful comments and Inés Gómez-Palacio for assistance in preparing the document. This chapter should not be reported as representing the official views of the OECD or of its member countries. The opinions expressed and arguments employed in this chapter are those of the authors.

cyclical composition effects would lead to a rebound of global trade growth.² However, the fact that there may be less scope for further trade liberalisation than over past decades – especially in large emerging market economies – and less scope for further declines in international trade costs suggests that the recent weakness in global trade may in part also reflect longer-term structural changes (Krugman 2013).³

The main conclusion of this chapter is that most of the post-Crisis weakness of global trade can be attributed to weak global demand rather than structural changes. Section 2 argues that global GDP measured in PPP terms overestimates demand addressed at exports and shows that most of the deviation of global trade intensity from its pre-Crisis trend appears to be driven by trade weakness in the Eurozone. Section 3 assesses whether there is evidence for a structural decline in the global trade elasticity and discusses trends in investment, international production fragmentation and protectionism, all of which support the hypothesis that the post-Crisis slowdown in global trade growth mainly reflects global demand developments. Section 4 briefly discusses the implications of the empirical results for the OECD forecasting process and the future evolution of global trade.

2 The relation between global trade and global GDP over the past three decades

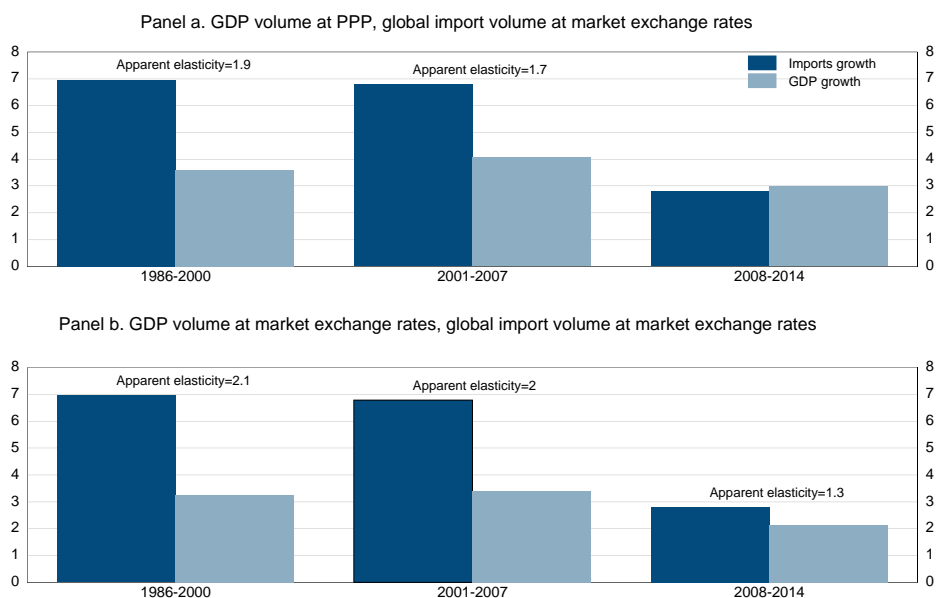
The apparent long-term elasticity of global trade measured at market exchange rates to GDP at purchasing power parities (the ratio of growth rates) remained at around 2 up until the Global Crisis of 2008-2009 and started to decline only thereafter, suggesting that there is little empirical support for the view that there has been a gradual decline over the past 15 years (Figure 1, Panel a). As observed by Constantinescu et al. (2015),

2 Based on an extensive review of empirical studies Bems et al. (2013) suggest that 65-80% of the trade collapse of 2009 can be attributed to declines in expenditure and shifts in its composition, with the remaining fall in global trade attributable to inventory adjustments and credit shocks.

3 Anecdotal evidence suggests that the global crisis triggered an increase in the number of ‘murky’ protectionist measures by G20 countries (Evenett 2013).

the apparent long-term elasticity of global trade to GDP declined from around 2 in the 1990s around to below 1.5 thereafter, but the decline reflects an abrupt change around the onset of the Global Crisis rather than gradual developments over the past 15 years, suggesting that it may, at least partly, reflect cyclical developments.

Figure 1 The apparent elasticity of global trade declined in the wake of the Crisis
Average annual growth rate (%)



Note: The apparent elasticity of global trade to GDP is computed as the average annual growth rate of global import volumes to the average annual growth rate of global GDP volumes. Global import volume and GDP volume at market exchange rates are measured in 2010 US dollars. Values for 2014 are partly based on projections in the *OECD Economic Outlook* (November 2014).

Source: OECD *Economic Outlook* database (November 2014); OECD calculations.

The decline in the apparent global trade-to-GDP elasticity is less pronounced when both global trade and GDP are measured at market exchange rates, instead of measuring global trade at market exchange rates and global GDP at purchasing power parities, as is done by Davies (2013) or Constantinescu et al. 2015) (Figure 1, Panel B). Global trade volumes are conventionally measured at market exchange rates, reflecting the presumption that arbitrage should limit price differences across countries. It therefore seems natural to measure global demand for tradable goods at market exchange rates

rather than PPPs; while a country with a low relative price of non-tradable goods may have the same real income as a country with a high relative price of non-tradable goods even at a lower GDP at market exchange rates, it will nonetheless contribute less to global demand for tradable goods. For instance, a country experiencing a large currency depreciation may experience only a marginal decline in GDP measured at purchasing power parities as the relative price of non-tradable goods to tradable goods declines, but reflecting the decline in GDP at market exchange rates, its purchasing power for tradable goods would nonetheless decline substantially. Mismeasurement of global demand for tradable goods when using global GDP at purchasing power parities can introduce a substantial downward bias into estimates of the global trade elasticity, which becomes especially pronounced when the growth differential between low-income and high-income countries increases or when global GDP growth declines, as was the case in the wake of the Global Crisis (Box 1).⁴

Box 1 Which is the appropriate measure of global GDP in the context of global trade analysis?

This box shows that measuring global trade volumes at market exchange rates while measuring global GDP at PPPs introduces a bias into estimates of global trade elasticities.

For illustrative purposes, consider a global economy consisting of two countries with equal and constant import intensities (defined as ratios of national import volumes to national GDP volumes in constant national currency). A logical requirement is that in this economy the global trade elasticity be 1 irrespective of real growth differentials across countries; equal import intensities imply that the composition of GDP growth is irrelevant for global trade growth while constant import intensities imply that import volumes grow at the same rate as GDP volumes.

4 The growth differential between G7 countries and the BRICS countries increased from around 4.5 percentage points over the period 1986-2007 to 5.5 percentage points over the period 2008-2014, while global growth slowed by around 1 percentage point (from 3.3% to 2.1% at market exchange rates).

Formally, the global trade elasticity is defined as:

$$\sigma^w \equiv \frac{w_M^1 g_M^1 + w_M^2 g_M^2}{w_Y^1 g_Y^1 + w_Y^2 g_Y^2},$$

where superscripts denote countries 1 and 2, g_M and g_Y are growth rates of imports and GDP, and w_M and w_Y are shares in global imports and GDP. Note that irrespective of the currency of aggregation, the assumption of constant import intensities implies that import volumes grow at the same rate as GDP volumes, *i.e.* $g_M = g_Y$.

If imports and GDP are aggregated in the same currency – for instance, in US dollars at market exchange rates as in this chapter – the assumption of equal import intensities across countries implies that country shares in global imports and global GDP are identical, *i.e.* $w_M^i = w_Y^i$. In this case, the global trade elasticity indeed collapses to 1:

$$\sigma^w = \frac{w_Y^1 g_Y^1 + w_Y^2 g_Y^2}{w_Y^1 g_Y^1 + w_Y^2 g_Y^2} = 1.$$

By contrast, if imports are aggregated at market exchange rates and GDP is aggregated at PPPs, the assumption of equal import intensities across countries no longer implies that country shares in global imports and global GDP are identical; depending on the direction of the purchasing power correction, a country's weight in global GDP at PPPs may be larger or smaller than its weight in global imports at market exchange rates:

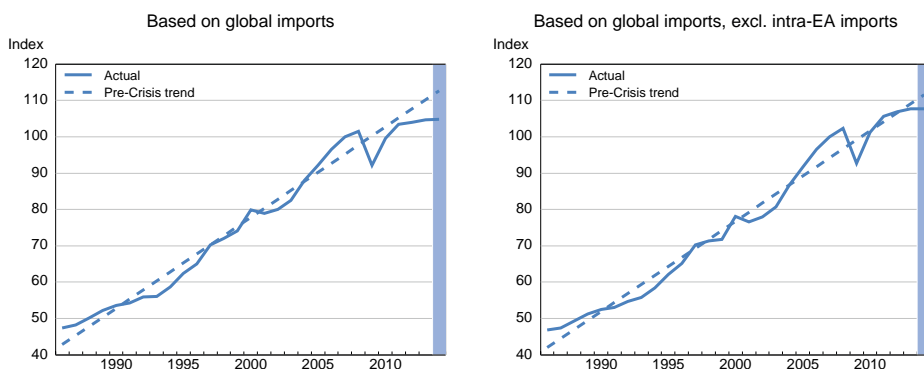
$$\sigma^w = \frac{w_M^1 g_Y^1 + w_M^2 g_Y^2}{w_Y^1 g_Y^1 + w_Y^2 g_Y^2}.$$

Assuming that the purchasing power correction reduces country 1's share in global GDP, *i.e.* $w_Y^1 < w_M^1$ and $w_Y^2 < w_M^2$, and that GDP growth in country 2 is higher than in country 1 (country 1 can be thought of as an advanced economy and country 2 as an emerging market economy), it follows immediately that the bias (i) is negative, (ii) increases in absolute terms with the growth differential between the two countries, and (iii) increases in absolute terms as global GDP growth declines.

Developments in global trade intensity – here defined as the ratio of global trade volume to global GDP volume – further support the view that the global trade-to-GDP relationship was fairly stable over 1986-2007 (Figure 2, Panel A). Over 2001-2007, global trade intensity was close to its pre-Crisis trend (1986-2007), but it started to deviate abruptly in 2009. Despite the trade rebound of 2010, global trade intensity remains well below its pre-Crisis trend.

Figure 2 Global trade intensity has deviated from its pre-Crisis trend

Ratio of global import volume to global GDP volume at market exchange rates, index 2007 = 100



Note: Global import volume and GDP volume at market exchange rates are measured in 2010 US dollars. The trend line represents the pre-Crisis trend 1986-2007. Values for 2014 are partly based on projections in the *OECD Economic Outlook* (November 2014).

Source: OECD *Economic Outlook* database (November 2014); OECD calculations.

The post-Crisis deviation of global trade intensity from its pre-Crisis trend is partly driven by the post-Crisis weakness of intra-Eurozone trade. If intra-Eurozone trade – which was hit particularly hard by demand weakness in the Eurozone – is excluded from the measure of global trade, post-Crisis global trade intensity is only marginally below its pre-Crisis trend (Figure 2, Panel B).⁵ By statistical convention, intra-Eurozone trade – which accounts for around 10% of global trade and is similar to intra-national trade

5 See Ollivaud and Schweltnus (2015, Annex 1) for details on the construction of intra-Eurozone import volumes and data on post-Crisis growth in intra-Eurozone import volumes.

along several dimensions, as it is not subject to tariffs or currency risk and transport costs among geographically proximate countries are low – is included in the measure of global trade. Consequently, a shock to Eurozone demand may have a disproportional effect on global trade, as it reduces both intra-Eurozone imports among highly integrated member countries and imports from outside the currency union. By contrast, a shock to US demand reduces both inter-state imports and imports from outside the US, but only the reduction in extra-US imports is accounted for in the conventional measure of global trade.⁶ To some extent, the deviation of global trade intensity from its pre-Crisis trend therefore appears to reflect a statistical convention – which may reverse once demand in Eurozone countries picks up – rather than a structural development.

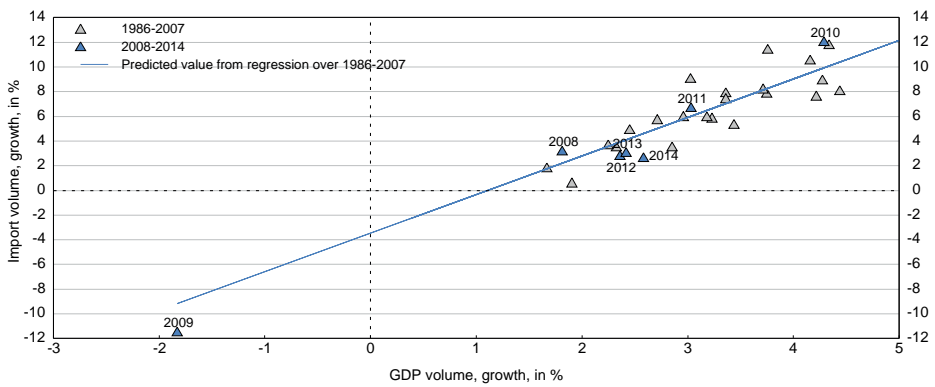
Annual growth rates of global trade (including intra-Eurozone trade) in the wake of the Crisis are well explained by annual growth rates of global GDP, leaving little room for structural explanations of global trade weakness (Figure 3). Even for the years 2011-2014 – which are conventionally viewed as highlighting a structural break in the trade-GDP relationship (Davies 2013, Constantinescu et al. 2015) – annual global trade growth is close to the predicted values from the linear regression of trade on GDP growth over the pre-Crisis period (1986-2007). A noteworthy feature of the linear trend line in Figure 3 is that it is consistent with a decline in the apparent elasticity of global trade to GDP without assuming a change in the long-term trade-to-GDP relationship; at the average GDP growth rate over 1986-2007 of 3.3%, the linear trend line predicts trade growth of 6.7%, implying an apparent elasticity of 2.1, while at the average GDP growth rate over 2008-2014 of 2.1%, the equation predicts trade growth of 3.1%, implying an apparent

6 The share in global GDP of the US is slightly higher than that of the Eurozone (23% versus 18% in 2010), but its share in global trade is only around half that of the Eurozone (12.5% versus 24% in 2010). Assuming similar import elasticities – which is consistent with the results in Bussière et al. (2013) and Morin and Schwellnus (2014) – the effect on global imports of a similar decline in demand across the two zones would be about twice as large for the Eurozone as for the US.

elasticity of 1.5.⁷ The procyclicality of the apparent global trade elasticity appears to be – at least partly – related to the procyclicality of global investment intensity (Ollivaud and Schwellnus, 2015). Other possible explanations include the greater procyclicality of the goods sector, which constitutes the bulk of trade, relative to the services sector, which constitutes the bulk of GDP, and the procyclicality of international production fragmentation (Freund 2009).

Figure 3 Post-Crisis trade growth has been close to the rates predicted by GDP growth

Global trade and GDP volumes at market exchange rates



Note: Values for 2014 are partly based on projections in the *OECD Economic Outlook* (November 2014). Global import volume and GDP volume at market exchange rates are measured in 2010 US dollars.
 Source: *OECD Economic Outlook* database (November 2014); OECD calculations.

Summing up, the decline in the apparent elasticity of global trade to GDP does not appear to pre-date the Global Crisis of 2008-2009, suggesting that the abrupt change thereafter may at least partly reflect demand developments. The decline in the apparent elasticity is partly related to the weakness of intra-Eurozone trade and post-Crisis

7 The regression of global trade growth on global GDP growth $\Delta \ln(\text{imports}_t) = \alpha + \beta \Delta \ln(\text{gdp}_t) + \varepsilon_t$ corresponds to a short-run model that does not restrict the long-term elasticity of global trade to GDP. More specifically, if $\alpha \neq 0$ the long-term elasticity implied by this model $\Delta \ln(\text{imports}) / \Delta \ln(\text{gdp}) = \beta + \alpha / \Delta \ln(\text{gdp})$ depends on long-term GDP growth. For the coefficients estimated over 1986-2007 ($\alpha = -3.5$ and $\beta = 3.1$), GDP growth of 3.3% (average 1986-2007) implies a long-term elasticity of 2.1 while GDP growth of 2.1% (average 2008-2014) implies an elasticity of 1.5.

growth of global trade appears to be well explained by global GDP growth, further supporting the hypothesis that the global trade weakness may at least partly reflect demand developments.

3 Can weak demand account for the weakness of post-Crisis global trade growth?

Based on a more formal econometric analysis and the description of recent trends in investment, international production fragmentation and protectionism, this section further investigates whether post-Crisis trade developments may reflect a structural break in the relationship between global trade and GDP, or whether demand developments alone are sufficient to explain the post-Crisis global trade weakness. We estimate a standard error correction model over different sub-periods to detect structural breaks in the long-run trade elasticity. This model suggests that the long-run relationship between global trade and GDP was stable over 1986-2007, with a structural break around the year 2008. However, the error correction model constrains the apparent trade elasticity to be constant irrespective of medium-term GDP growth, which is inconsistent with the stylised fact that the apparent elasticity declines in the wake of global downturns. Consequently, the error correction model attributes a decline in the apparent elasticity to a structural break in the long-run trade elasticity. We show that a less restrictive model that does not constrain the long-term elasticity to be constant can account for the post-Crisis decline in apparent elasticity and accurately tracks post-Crisis trade developments without any structural change in the trade-GDP relation. Details on the different methods to assess the stability of the trade-GDP relation are provided in Ollivaud and Schwellnus (2015).

3.1 Econometric estimation of the long-term global trade elasticity

We use a standard error correction model framework to estimate the long-term elasticity of global trade to GDP over different time periods (Irwin 2002; Constantinescu et

al. 2015). This framework assumes that a stable cointegration relationship between global trade and GDP exists within sub-periods, but that this relationship may change across time periods as exogenous factors such as trends in trade liberalisation, transport costs or international production fragmentation change. Following the notation of Constantinescu et al. (2015) to facilitate direct comparison of estimation results, the estimated equation takes the form:

$$\Delta \ln m_t = \alpha + \beta \Delta \ln y_t + \gamma \ln m_{t-1} + \delta \ln y_{t-1} + \varepsilon_t \quad (1)$$

where Δ denotes first differences, m_t denotes global import volume and y_t global GDP volume at time t , α is the regression intercept and ε_t is the error term. The short-run elasticity of global trade to GDP is β while the speed of adjustment to the long-run equilibrium is $-\gamma$. The long-run elasticity of global trade to GDP is given by $-\delta/\gamma$.

Estimation of equation (1) based on a PPP-based measure of global GDP would imply that the long-term global trade elasticity declined to around 1.3 around the year 2000 (Table 1, Model 1), which would be consistent with the conventional view that the long-term trade-GDP relationship changed around the turn of the century (Constantinescu et al. 2015). According to this view, the years 1986-2000 would appear to be a period of exceptionally high trade growth, with an estimated long-term global trade elasticity of 2.3, while the decline to around 1.3 at the turn of the century would indicate a return to the pre-1986 norm.

Based on global GDP at market exchange rates – which is a more accurate gauge of global demand for traded goods than global GDP at PPPs – the estimated long-term trade elasticity has remained around 2 over the past 15 years (Table 1, Model 2). While the estimates suggest a significant decline at the turn of the century, the estimated long-term elasticity has remained well above the pre-1986 norm.⁸ Moreover, the estimated long-term elasticity has declined only marginally from 2.3 to around 2 once intra-

⁸ It should be noted that the differences between sub-periods in Table 1 are statistically significant at the 5% level.

Eurozone flows are excluded from the measure of global trade (Table 1, Model 3). Given that estimates of long-run elasticities obtained over short samples such as 2001-2014 may be affected by cyclical factors and that removing intra-Eurozone flows only removes part of the cyclical effects of the Global Crisis, these results cast considerable doubt on the hypothesis that the long-run trade elasticity declined around the year 2000.

Table 1 Estimation results for Equation (1) based on annual data
Long-run elasticity

Model	Definition of long-run elasticity	1970-1985	1986-2000	2001-2014
(1)	Global import volume at 2010 US\$ to global GDP volume at PPP	1.3***	2.3***	1.3***
(2)	Global import volume at 2010 US\$ to global GDP volume at 2010 US\$	1.3***	2.4***	1.8***
(3)	Global import volume ex. intra-EZ imports at 2010 US\$ to global GDP volume at 2010 US\$	1.3***	2.3***	2.0***

Notes: Based on the estimation of the following equation:

$$d\ln(\text{imports})_t = \alpha_1 + \beta_1 * d\ln(\text{gdp})_t * DV_1 + \gamma_1 * \ln(\text{imports})_{t-1} * DV_1 + \delta_1 * \ln(\text{gdp})_{t-1} * DV_1 + \alpha_2 + \beta_2 * d\ln(\text{gdp})_t * DV_2 + \gamma_2 * \ln(\text{imports})_{t-1} * DV_2 + \delta_2 * \ln(\text{gdp})_{t-1} * DV_2 + \alpha_3 + \beta_3 * d\ln(\text{gdp})_t * DV_3 + \gamma_3 * \ln(\text{imports})_{t-1} * DV_3 + \delta_3 * \ln(\text{gdp})_{t-1} * DV_3 + \varepsilon_t,$$

where *gdp* is global GDP volume; *imports* is global imports of goods and services; *DV*₁, *DV*₂ and *DV*₃ are dummy variables for the periods 1970-1985, 1986-2000 and 2001-2014 respectively; and ε_t is the error term. The long-term elasticities for the sub-periods 1970-1985, 1986-2000 and 2001-2014 are given by $-\delta_1/\gamma_1$, $-\delta_2/\gamma_2$ and $-\delta_3/\gamma_3$, respectively. Statistical significance is established using a non-linear Wald test. *** indicates a significance level of 1%.

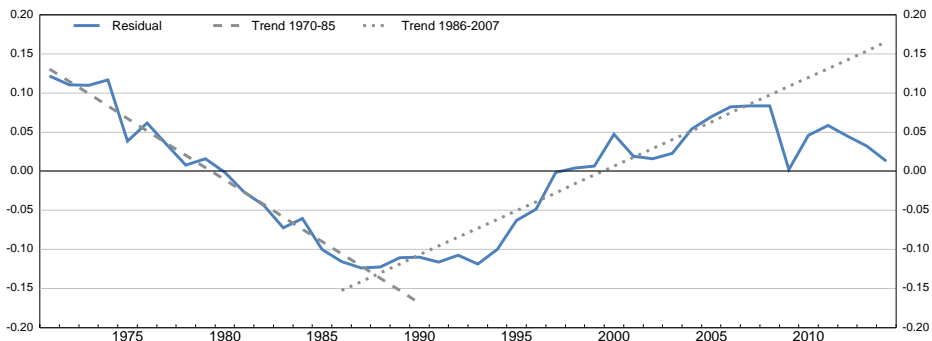
Source: OECD Economic Outlook 1996 database; OECD calculations.

The limited decline in the long-term elasticity of global trade to GDP (measured at market exchange rates in the remainder of this chapter) over 2001-2014 appears to be driven by post-2007 developments rather than structural changes preceding the Crisis (Figure 4). The residual of the long-term cointegrating relationship between global trade and GDP underlying the error correction model in equation (1) – estimated over the period 1970-2014 – is trending down over 1970-85 and trending up over 1986-2007. The break in the long-run elasticity of global trade to GDP around the late 1980s partly reflects the acceleration in the process of globalisation, especially trade liberalisation in a number of large emerging market economies such as China, India and the former Soviet economies, as well as the implementation or deepening of major

regional trade agreements such as the North American Free Trade Agreement and the Single European Market, which triggered the international fragmentation of production chains. Instead of producing predominantly in a single country, multinational firms increasingly fragmented the production chain across several countries to take advantage of cost differences, implying that value added increasingly crossed borders several times before being shipped to the final consumer. The post-2008 deviation of the residuals from the pre-Crisis trend reflects the decline in the apparent global trade elasticity in the wake of the Crisis, but in the context of the severity and the length of the Crisis the limited number of post-Crisis observations suggests caution in interpreting this as a structural break.⁹

Figure 4 The break in the cointegrating relation between trade and GDP coincides with the Global Crisis

Residual of the long-term equation underlying equation (1) estimated over 1970-2014



Note: Residual based on the estimation over 1970-2014 of the long-term equation implicitly underlying the error correction model in equation (1): $\ln(\text{imports})_t = \alpha + \beta * \ln(\text{gdp})_t + \varepsilon_t$. Global import volume and GDP volume at market exchange rates are measured in 2010 US dollars.

Source: OECD *Economic Outlook* database (November 2014); OECD calculations.

9 Formal tests for structural breaks detect statistically significant changes in the long-term relationship between global trade and GDP in the late 1980s and around the onset of the Global Crisis in 2008-2009 but no change around the year 2000, suggesting that the break in the global trade elasticity did not pre-date the Crisis (Ollivaud and Schwellnus 2015).

While it is tempting to interpret the decline in the apparent elasticity and the break in the long-term residuals around the Crisis as reflecting a structural slowdown in the process of globalisation, the fact that this decline coincides with the onset of the Crisis suggests that it may at least partly be driven by demand developments.¹⁰ In the very long term there is no reason for the global trade elasticity to remain above 1 as the potential for further transport cost reductions and trade liberalisation declines (Krugman 2013).¹¹ However, it appears unlikely that the transition from a long-term elasticity of well above 2 to around 1 would occur as abruptly as suggested by Figure 1.

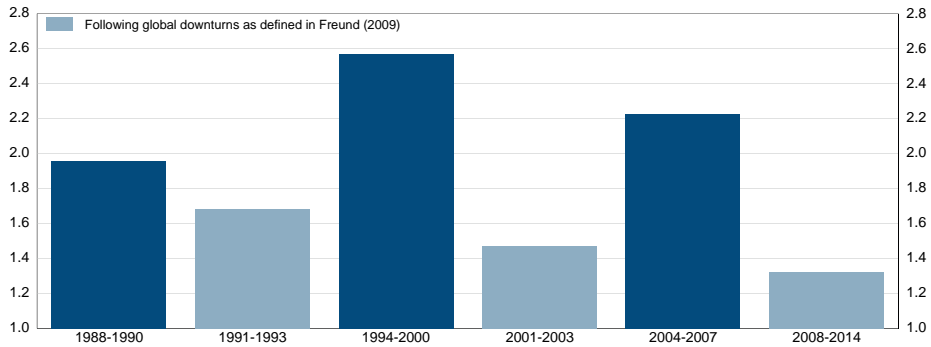
Even at a stable long-run elasticity of global trade to GDP, over short sample periods the ratio of global trade growth to global GDP growth – the apparent elasticity – can vary for cyclical reasons (Figure 5). Econometric tests typically suggest a stable long-term relationship between global trade and GDP from the late 1980s to 2007 (as represented by a stable δ/γ in equation 1), but in the wake of global downturns identified by the statistical filtering method of Freund (2009) the apparent elasticity was typically well below the stable long-term elasticity. Against the background of the severity of the Global Crisis, the decline in the apparent elasticity over 2009-2014 does not appear as particularly striking.

10 Note that the residuals of the long-term equation and the statistical tests for structural breaks in the long-term cointegrating relation between global trade and GDP are based on the long-term equation in (logarithmic) levels which assumes a constant apparent global trade elasticity irrespective of global demand growth (Ollivaud and Schwellnus 2015). The statistical tests therefore mechanically attribute a decline in the apparent global trade elasticity to a change in the structural long-term global trade elasticity.

11 Gruber et al. (2011) constrain the long-run global trade elasticity to 1 but allow for an exogenous globalisation trend meant to capture the effect of transport cost declines, trade liberalisation or the lengthening of global value chains on the global trade growth.

Figure 5 The ratio of global trade to GDP growth typically declines following global downturns

Volumes, market exchange rates



Note: Global import volume and GDP volume at market exchange rates are measured in 2010 US dollars. Values for 2014 are partly based on projections in the *OECD Economic Outlook* (November 2014).

Source: OECD *Economic Outlook* database (November 2014); OECD calculations.

A model that includes only growth rates of global trade and GDP tracks post-Crisis trade developments fairly accurately without assuming any structural break in the parameters over the period 1986-2014, suggesting that about 85% of the post-Crisis weakness in global trade can be explained by global demand developments.¹² By constraining the long-term global trade elasticity to be constant even at persistently low GDP growth, the error correction model in Equation 1 can account for the post-Crisis decline in the apparent elasticity only by assuming a structural break in the long-term elasticity. By contrast, the model in growth rates can account for the stylised fact that the global trade elasticity declines in the wake of global downturns without assuming any structural break in the trade-GDP relation. The remainder of the chapter focuses on the following model in growth rates:

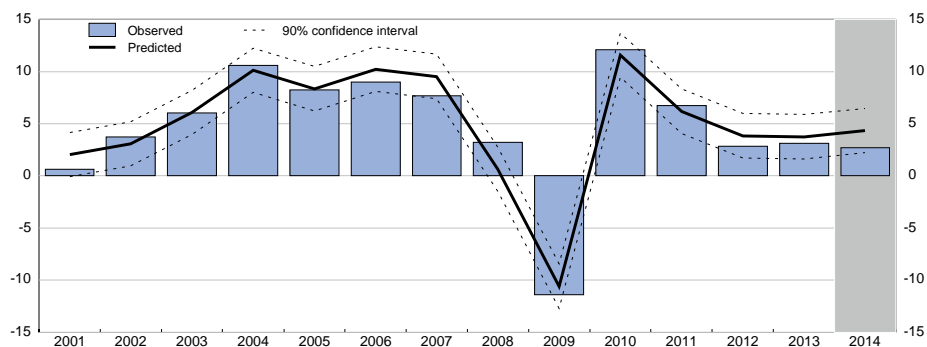
$$\Delta \ln m_t = \alpha + \beta_1 \Delta \ln m_{t-1} + \beta_2 \Delta \ln y_t + \beta_3 \Delta \ln y_{t-1} + \varepsilon_t \quad (2)$$

12 Global trade growth declined from 6.9% over 1986-2007 to 2.8% over 2008-2014, with the model estimated over 1986-2007 explaining 3.5 percentage points of the overall decline.

where Δ denotes first differences, m_t denotes global import volume and y_t global GDP volume at time t , α is the regression intercept and ε_t is the error term. Formal tests suggest that the parameters of this model are stable over the estimation period 1986-2014 and the in-sample fit is accurate even for the post-Crisis period (Figure 6).¹³

Figure 6 In-sample fit of the model in growth rates without structural break

Estimated over 1986-2014, import volume growth (%)



Note: The predicted value of global import volume growth is based on the estimation of equation (2) over the period 1986-2014. Values for 2014 are partly based on projections in the *OECD Economic Outlook* (November 2014). Global import volume and GDP volume at market exchange rates are measured in 2010 US dollars.

Source: OECD *Economic Outlook* database (November 2014); OECD calculations.

For the years 2012-2013 and possibly 2014, the model of growth rates slightly over-predicts global trade growth but the error is well within the model's error margin and is likely to reflect a number of special factors rather than major structural developments. The over-prediction for 2012 and 2013, for instance, partly reflects the extraordinary demand weakness of the highly trade-intensive Eurozone, for which imports declined by 1% in 2012 and grew by only around 1% in 2013. The projected trade weakness for 2014 appears to mainly reflect developments in non-OECD Asia, including China, rather than Eurozone developments. A structural explanation for the recent trade weakness can therefore not be ruled out fully. However, it would be premature to

13 The detailed estimation results are reported in Ollivaud and Schwellnus (2015).

conclude from unexpectedly low trade growth in 2014 that there has been a structural break in the long-term trade-GDP relationship.¹⁴

Estimations based on quarterly data confirm the results based on annual data in the sense that the estimated long-term global trade elasticity over the period 2001-2014 is around 2 and that the limited decline with respect to the 1990s reflects post-Crisis developments (Ollivaud and Schwellnus 2015). Although higher-frequency data allow a more precise estimation of the dynamics of the trade-GDP relationship, quarterly data cannot resolve the fundamental issue that over periods of seven years estimates of the long-term elasticity are highly unstable and can be perturbed by cyclical effects. Testing the long-run relationship between trade and GDP with 30 quarterly observations is conceptually no different from testing it with seven yearly observations (Hakkio and Rush 1991). Rather than using quarterly data to estimate the long-term elasticity over short sample periods, this chapter therefore applies standard econometric methods to test for the existence of a stable cointegration relationship between global trade and GDP over the period 1986-2014. These tests suggest that the cointegration relationship was broadly stable over 1986-2008, implying that quarterly data also reject the hypothesis that the decline in the global trade elasticity pre-dated the Crisis.

Summing up, the econometric analysis suggests that the most likely scenario for global trade growth over the next 2-3 years is a rate of about twice that of global GDP growth at market exchange rates as cyclical effects fade and GDP growth picks up to around its pre-Crisis average, as projected by all major international organisations. While the limited number of post-Crisis observations precludes a definitive rejection of the hypothesis that structural changes in the global trade-GDP relationship may have contributed to the recent trade weakness, the econometric analysis rejects the hypothesis that the limited decline in the long-term global trade elasticity reflects structural developments pre-dating the Crisis of 2008-2009 (Constantinescu et al. 2015). Based on a model of growth

¹⁴ The possible over-prediction for 2014 is similar in size to that for 2001, after which trade resumed growth similar to the rate predicted by the model of growth rates.

rates that does not constrain the elasticity of global trade to GDP to be constant, post-Crisis trade developments are well explained by GDP developments alone, suggesting that the decline in the apparent global trade elasticity after 2008 mainly reflects cyclical factors rather than a structural break in the process of globalisation.

3.2 Trends in investment, production fragmentation and protectionism

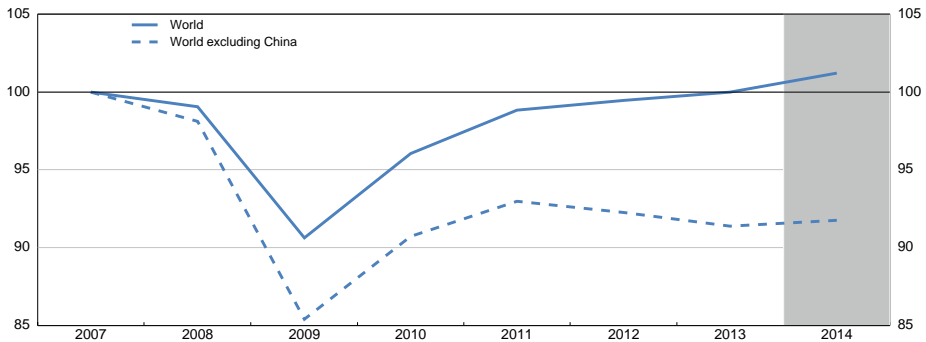
This sub-section assesses whether recent developments in global investment, international production fragmentation and protectionism are consistent with the results from the econometric analysis. We first analyse whether in the wake of the Crisis the composition of global demand shifted away from import-intensive investment, a development that may at least partly reverse as the global recovery strengthens over the next years. We further analyse whether post-Crisis developments in international production fragmentation signal a structural break or whether the slowdown is consistent with typical cyclical developments and whether there is any evidence for changes in trade protection.

Investment

Global investment has been weak in the wake of the Crisis, suggesting that the shift in the composition of global GDP towards less import-intensive components such as government consumption or private non-durables consumption has contributed to the post-Crisis weakness of global trade. The apparent rebound of global investment intensity in the wake of the Crisis has largely been driven by developments in China, for which the post-Crisis investment boom largely reflects infrastructure investment (OECD 2013) whose import content is low (Figure 7). For the remaining countries, investment has been exceptionally weak in the wake of the Crisis, further supporting the notion that trade may rebound strongly if investment intensity, especially in OECD countries, rebounds.

Figure 7 The ratio of global investment volume to GDP volume has been weak in the wake of the Crisis

Index (2007 = 100)



Note: Global investment and GDP volumes measured at market exchange rates. The value for 2014 is partly based on projections in the *OECD Economic Outlook* (November 2014).

Source: *OECD Economic Outlook* database (November 2014); OECD calculations.

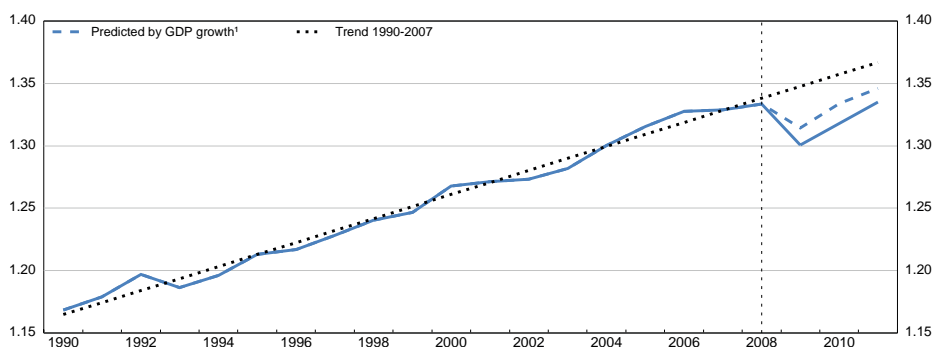
International production fragmentation

There is no evidence for a slowdown in international production fragmentation – the process of slicing up the production process into stages located in different countries – in the run-up to the Global Crisis and the decline for 2009 is broadly consistent with global GDP developments, suggesting that there is thus far no evidence for a structural break. A common measure of international production fragmentation is the ratio of gross exports to value added exports, which can be interpreted as the average number of border crossings for each unit of imported final good (Fally 2012). This measure started to increase along a linear trend in the late 1980s up to 2008, thereby raising gross exports and the global trade elasticity. It started to deviate from trend only at the onset of the Crisis (Figure 8). Regression analysis suggests that international production fragmentation is procyclical in the sense that international production fragmentation accelerates when global GDP growth is high and decelerates during global downturns. This procyclicality may reflect the fact that during global recessions the composition of global trade shifts toward products with shorter value chains (Ferrantino and

Taglioni 2014), or the fact that multinational companies postpone investment projects related to international outsourcing. Based on the estimated semi-elasticity of international production fragmentation to global GDP, post-Crisis developments in international production fragmentation are largely explained by GDP developments, with international production fragmentation declining in 2009 and rebounding over 2010-2011 (Figure 8).

Figure 8 The decline in international production fragmentation in 2009 is consistent with GDP developments

Ratio of gross exports to value added exports



Note: Between OECD-WTO reference years (1995, 2000, 2005, 2008 and 2009) the gross exports to value added exports ratio is interpolated using the ratio in Johnson and Noguera (2012). The OECD-WTO reference year 2011 is based on preliminary data.

1. Predicted value for 2009 and 2011 based on the estimation over 1990-2008 of $\Delta GVAX_t = \alpha + \beta * \Delta \ln(gdp)_t + \varepsilon_t$, where GVAX is the ratio of gross to value-added exports.

Source: OECD-WTO Trade in Value Added (TiVA); Johnson and Noguera (2012).

Protectionism

Increases in protectionism appear to have played at best a marginal role in the slowdown of global trade following the Crisis. While circumstantial evidence suggests an increase in the number of ‘murky’ protectionist measures taken by G20 governments (Evenett 2013) – including subsidies to domestic industries, anti-dumping actions or discriminatory regulation – the WTO (2014) concludes that “the share of world trade affected by restrictive trade measures is not high” and that the rise in trade-restrictive

measures has to be seen in the context of offsetting trade liberalising measures, especially in lower-income G20 countries. For instance, the share of world trade covered by trade-restrictive measures introduced by G20 countries in 2012 was similar to the share covered by trade-liberalising measures (around 1% of world trade).¹⁵

4 Implications for projecting trade when GDP projections are known

Models linking global trade and GDP are routinely used in the OECD Economics Department to assess the consistency of the global trade and GDP projections. The results reported in this chapter imply that in the near term, consistency checks should be conducted based on the relationship between global trade growth and GDP growth since around the late 1980s, as the relationship has been fairly stable thereafter with no evidence for a structural break in the equation in growth rates (equation 2) in the wake of the Global Crisis.¹⁶ Based on the estimation of equation 2 over 1986-2013 that has tracked global trade growth fairly accurately over 1990-2013, global GDP projections for 2016 of 3.3% at market exchange rates (3.9% at PPPs) in the November 2014 *OECD Economic Outlook* imply that global trade growth should pick up to around 7%.

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15 The share of world trade covered by trade-restrictive and trade-liberalising measures is a crude indicator for the trade effects of protection as trade effects depend on the type and the size of the measures and import demand elasticities.

16 In the medium term, it is likely that the apparent elasticity of global trade to GDP returns to a level well below 2 as trade liberalisation and declines in transport costs are likely to proceed at a slower pace than over the past two decades.

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5 The power of the few in determining trade accelerations and slowdowns

Guillaume Gaulier, Gianluca Santoni, Daria Taglioni and Soledad Zignago¹

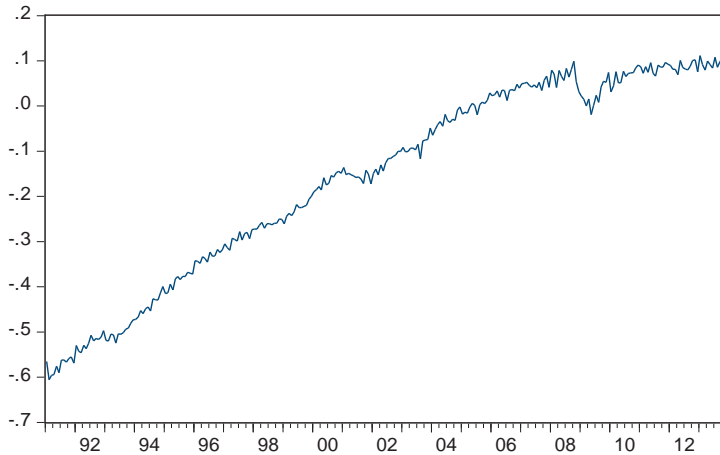
Banque de France; CEPII; World Bank; Banque de France

1 Introduction

Growth in international trade has decelerated significantly since its sharp recovery in 2010. This is evident looking at the logarithmic growth of global trade in goods over global industrial output (Figure 1). In our view, and in line with Constantinescu et al. (2015) and Subramanian and Kessler (2013), the entry of China in the global economy as an exporter of labour-intensive goods and the subsequent re-orientation of its production to meet domestic demand played an important role in explaining global trade developments, and in particular the trade acceleration (relative to GDP) before the Global Crisis and its slowdown in recent years.

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Figure 1 Growth of trade to industrial production (ratio of global trade over global industrial output), 1990-2014 (log)



Source: Authors' calculations, using CPB monthly data.

The analysis presented in this chapter is based on an assessment of trade developments in the last ten years (2005-2014) using a methodology that allows decomposing growth of global trade into demand-side changes, supply-side changes, and changes in the extensive margin, i.e. compositional effects due to market orientation and product specialisation. Our analysis focuses on growth rates, so we abstract from any time-constant factors. The methodology, as applied to exports, is discussed in detail in Gaulier et al. (2013). Here, we highlight the key features:

- We use a world matrix of imports and exports, with bilateral trade data at the product level (HS-6 digit level of disaggregation).²

2 The database on trade growth and competitiveness indicators was produced by the authors (see Gaulier et al. 2013). In writing this chapter, we expanded the original database that was developed for exports to also cover the import side. Our trade growth and competitiveness database provides internationally comparable quarterly information for 228 countries and territories – in values, volumes, and prices – on the growth of exports and imports; export and import geographical effects; effects due to the product mix and sectoral specialisation in 5,300 HS-6 digit products; and changes that are idiosyncratic to the importer or exporter being evaluated. The dataset is updated to 2014q3 and is constructed using monthly product-level bilateral trade data available for the period since 2005 at the HS 6-digit level (2002 classification) from Trade Map of the International Trade Centre (ITC) (see <http://www.trademap.org/Index.aspx> for further details).

- We use quarterly data to better control for the timing of any shocks and we look at changes, not only in value, but also in volume and unit value terms, to capture differences between nominal and real effects.³
- Export growth decomposition is carried out by means of an econometric shift-share analysis, where we identify and estimate the various components via fixed effects.⁴
- From the decomposition, we obtain measures of ‘adjusted market shares’, which we use as a proxy for changes in demand (import decomposition) and supply (export decomposition).
- Finally, by distinguishing products by stage of production (consumption, intermediates, capital goods, and primary), we can also investigate some aspects of the role played by the internationalisation of production and global value chains in determining the trade developments observed over the past ten years.

The rest of the chapter is structured as follows. We start with a short discussion on trade elasticity, in Section 2. Section 3 shows that the recent slowdown is primarily associated with a (decelerating) supply shock from China and a (negative) demand shock from the Eurozone.⁵ It also shows how China’s integration and developments in global trade in intermediates – a measure that is used to provide a first approximation of global value chain (GVC) trade in the literature – may have been sufficient by themselves in influencing much of the acceleration/deceleration of global trade observed in our sample. Section 4 discusses some hypotheses for how global trade may evolve in the future and on the role that possible emerging juggernauts may play. Section 5 presents some conclusions and policy implications.

3 Changes are measured in log first differences, since these preserve additive properties (unlike regular growth rates).

4 In each quarter, import (export) growth in product k from country i to destination j is regressed on origin, product and destination fixed effects. The contribution of each dimension is identified by the estimated fixed effects. Depending on the trade flows, the country-destination (origin) fixed effect is used as an index of a country’s supply (demand) developments. In a gravity model framework, our country fixed effects can be seen as the average, across products, of the outward and inward multilateral resistance terms.

5 See Taglioni and Závacka (2013) for the role of demand uncertainty in explaining the latter.

2 Supply and demand shocks in the current trade downturn

The gravity equation suggests that in the absence of shocks, trade should have a (fundamental) elasticity not higher than 1 (relative to economic activity).⁶ This empirical fact is confirmed by standard gravity models (Disdier and Head 2008, Head and Mayer 2014). Using the time series plotted in Figure 1, Gaulier (2015) shows that a simple time series model with a long-run income elasticity of 1 has better predictive capacities over trade developments during the past three decades – including before and since the Great Trade Collapse – than a model with larger elasticities.⁷ The observed acceleration/deceleration pattern of global trade relative to global GDP must then be attributed to reductions in trade costs induced by (trade-biased) technological innovation and trade liberalisation, not to changes in the fundamental elasticity of trade to economic activity. In this chapter we highlight a third factor that may lead to persistent deviations of the (observed) trade elasticity from a value of 1: country-specific supply shocks in large trading nations.

For our analysis we distinguish three main periods: pre-Crisis (which we set equal to 2006q1-2008q3); Crisis and rebound (2008q4-2011q2); and post-Crisis (2011q3-2014q2). The values for each period refer to year-on-year changes measured in log first differences.⁸ To avoid clutter in the exposition, we group impacts across five countries/regions: the Eurozone, the US, an aggregate for China and Hong Kong, all other developed countries, and the rest of the world.

A drop in the global supply of exports by China in the post-2011 period is the most notable change on the supply side. Before the Crisis, China was contributing on

6 This is true in the absence of permanent technological and/or trade liberalisation innovations. Elasticity should be below 1 if one accounts for: (i) different (non-homothetic) preferences between countries; and (ii) the fact that less traded industries (such as services) expand their share in global demand as income.

7 See, for example elasticities, estimated in Freund (2009) and Lanz et al. (2010).

8 Data-point for 2006q1 measures the log first difference of trade (imports or exports, depending on the flow examined) relative to 2005q1.

average 1.3% to export growth every year (Table 1, first column). After the Crisis, its contribution fell to close to zero (0.3%). ‘Adjusted’ market shares follow the same trend. These control for compositional changes and can be considered a proxy for supply-side changes. Before the Crisis China was contributing on average 1.7% export market shares annually in adjusted terms (Table 1, column 4); after the Crisis this fell to 0.6% (Table 1, column 6). These results are consistent with recent literature documenting a reorientation of Chinese production towards its domestic market (Kee and Tang 2012, Koopman et al. 2012, Lemoine et al. 2014).

Table 1 The supply side: Countries’ contributions to changes in exports, measured by ‘adjusted’ export market shares (quantities)

	Export growth			Adjusted market share contribution		
	Pre-Crisis 06Q1-08Q3	Crisis & rebound 08Q4-11Q2	Post-Crisis 11Q3-14Q3	Pre-Crisis 06Q1-08Q3	Crisis & rebound 08Q4-11Q2	Post-Crisis 11Q3-14Q3
Eurozone	1.8	-.03	0.4	1.4	0.1	0.4
US	0.3	0.1	0.2	0.2	-0.1	0.1
China & Hong Kong	1.3	0.4	0.3	1.7	0.6	0.6
Other developed	1.1	-0.1	0.3	0.8	-0.5	0.1
Rest of world	0.9	0.7	0.6	1.3	0.6	0.7
World	5.4	0.7	1.8	5.4	0.7	1.8

Notes: Contributions to change in world export market shares and ‘adjusted’ world export market shares, respectively. Contributions are measured in quantities. Adjusted world export market shares control for geographical orientation of exports and product mix/sectoral specialisation. Countries’ contributions may not sum up to world growth due to rounding.

Source: Authors using data from Trade Map of the International Trade Centre (ITC) (<http://www.trademap.org/Index.aspx>).

On the import side, the contraction in demand from the Eurozone is the single most important contributor to cross-country reallocations of demand. This is true both for import market shares (Table 2, column 1 vs. 3) and for adjusted import market shares, which control for compositional reallocations due to differences in sourcing patterns (Table 2, column 4 vs. 6).

Table 2 The demand side: Countries' contributions to changes in imports, measured by 'adjusted' import market shares (quantities)

	Import growth			Adjusted market share contribution		
	Pre-Crisis 06Q1-08Q3	Crisis & rebound 08Q4-11Q2	Post-Crisis 11Q3-14Q3	Pre-Crisis 06Q1-08Q3	Crisis & rebound 08Q4-11Q2	Post-Crisis 11Q3-14Q3
Eurozone	1.5	-0.3	0.0	1.7	-0.5	-0.1
US	0.1	-0.2	0.1	0.0	-0.3	0.1
China & Hong Kong	1.0	0.9	0.6	0.8	1.0	0.8
Other developed	0.8	-0.2	0.1	0.7	-0.1	0.1
Rest of world	2.1	0.5	0.9	2.3	0.7	0.9
World	5.4	0.8	1.8	5.4	0.8	1.8

The recent trade downturn seems therefore to be not only associated with a natural phasing out of the impact of lower trade costs worldwide, but also strongly influenced by a negative demand shock in the Eurozone and by the reorientation of growth towards domestic demand in China. As trade within countries is not recorded, the rebalancing of the Chinese growth model translates into a contraction of the elasticity of trade to GDP. The mechanics through which this happened for China are discussed next.

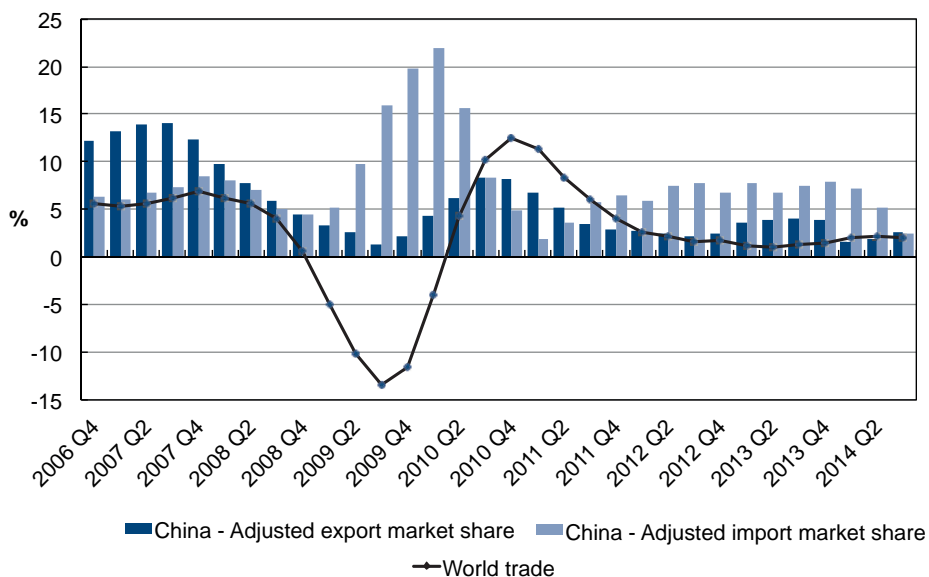
3 China, or the 'large country' effect in international trade

This section focuses on the channels through which the integration of low-cost exports from a large country such as China can result in an increase in the elasticity of global trade to economic activity (GDP or Industrial Production) proportional to the country's export surplus. It also discusses why an increase in Chinese domestic demand for products in which China specialised in can lead to a reduction of this elasticity.

Discussions about the macroeconomic aspects of international trade are often based on the 'small country' assumption. This implies that even a complete elimination of trade for a country would have an imperceptible effect upon world demand and supply for a given product, and thus would not affect global trade. But, in reality, a handful of large

countries dominate both global imports and global exports. China is big enough to suggest that its growth path could have driven the elasticity of trade to GDP to increase, and more recently, to fall. This is consistent with the high correlation between world trade growth (black line) and China's export growth (Figure 2, darker bars). In contrast, the relative growth of China's imports (lighter bars) is either negatively correlated or not correlated with global trade. This is consistent with a push from China on world trade through supply dynamics rather than a pull from it through demand.

Figure 2 Growth of global trade and growth of China's adjusted market share



Notes: 'Adjusted' market shares control for compositional changes. Hence, they can be considered a proxy for supply-side changes.

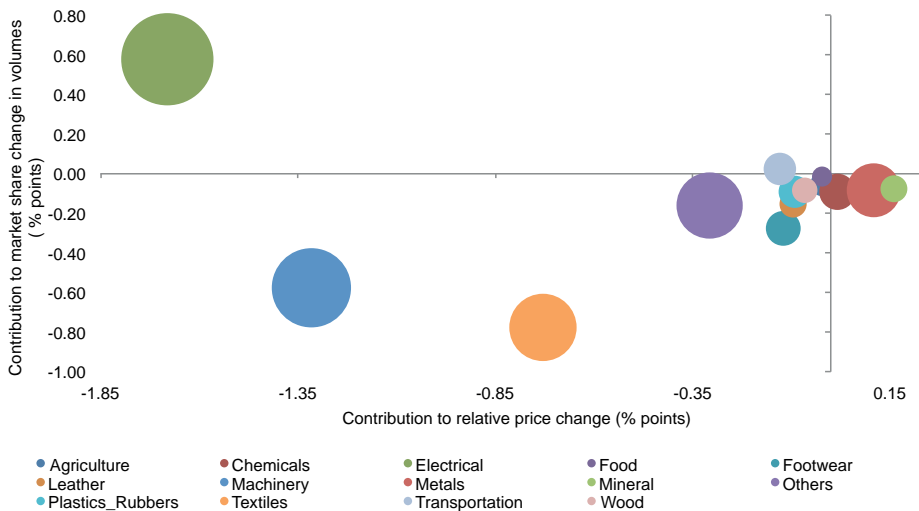
Source: Authors' calculations using monthly data from Trade Map of the International Trade Centre (ITC) (<http://www.trademap.org/Index.aspx>).

When China integrated into the global economy, it did so by specialising in goods and tasks for which it had a comparative advantage in production (low labour costs) and low domestic demand. The mechanism that may have been at play is described below.

- *Trade acceleration phase.* The initial supply-side shock of China's integration led to export growth from China, as predicted by Ricardian theories, through specialisation

in labour-intensive activities, for which it had a comparative advantage. In parallel, rich countries specialised in knowledge and technology intensive activities, moving away from labour-intensive activities. With Chinese domestic demand, including for its own products, remaining low over a prolonged period of time and a large production base compared to the world total, China generated a large export surplus that drove down the world price for goods in which it specialised and reinforced specialisation patterns based on Ricardian comparative advantages and the reallocation of global demand for those products towards Chinese exports (see Figure 3 for evidence of a correlation between Chinese market shares and price contractions of the Chinese export bundle in different sectors in the pre-Crisis period).

Figure 3 China’s export specialisation and contribution to world import prices and volumes of China’s export bundle, 2006q1-2008q3

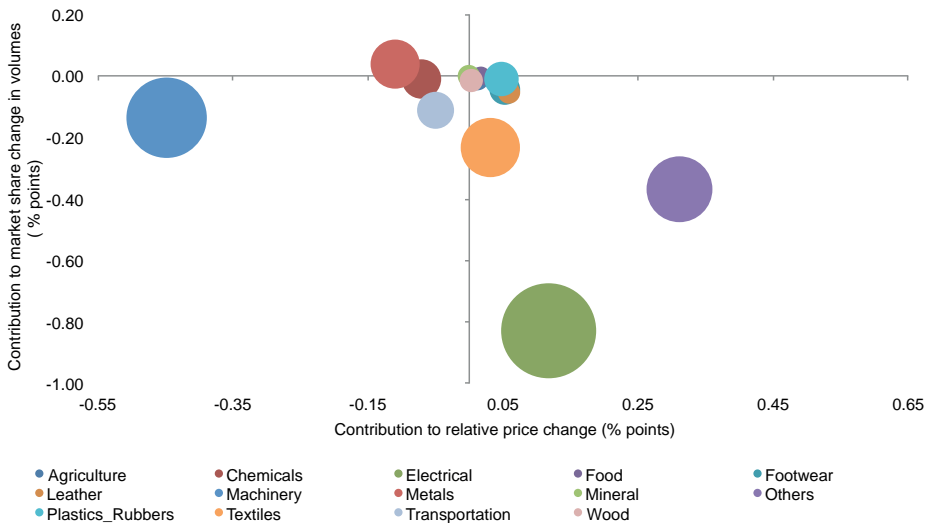


Notes: The size of the bubbles (weight) is equal to a country’s sector specialisation; for example, China’s largest export sector in 2006–2008 was Electrical Equipment, visualised with the largest circle. As the quantities of worldwide imports of Electrical Equipment (y-axis) expanded over the period, but the prices contracted (x-axis), the corresponding bubble lies in the north-west quadrant of the chart. The chart shows a correlation between the size of the bubbles and the contraction of world prices of the Chinese export bundle over the same period of time.

Source: Authors’ calculations using data from Trade Map of the International Trade Centre (ITC) (<http://www.trademap.org/Index.aspx>).

- *Trade deceleration phase.* With the rebalancing of the Chinese growth model towards domestic demand, the downward pressure on global prices of the products in which China specialises is lower and so is the rate of reallocation of market shares in favour of imports from China (see Figure 4, which shows the phasing out of the correlation between Chinese market shares and world prices of its export bundle). Looking at the y-axis it appears that over the past decade, China tended to specialise in products with a decreasing relative growth of worldwide sales.

Figure 4 China’s export specialisation and contribution to world import prices and volumes of China’s export bundle, 2011q3-2014q3



Notes: The size of the bubbles (weight) is equal to a country’s sector specialisation; for example, China’s largest export sector in 2011–2014 was Electrical Equipment, visualised with the largest circle. Unlike the pre-Crisis period (Figure 3), worldwide imports of Electrical Equipment expanded over the period in prices (x-axis). Hence, the corresponding bubble lies to the right in the chart. The chart shows that the pre-Crisis correlation between the size of the bubbles and the contraction of world prices of the Chinese export bundle (identified in Figure 3) has largely disappeared in the post-Crisis period. Machinery is the only sector in which China holds a sizeable global market share and in which the prices of its export bundle were still contracting after the Crisis. Nevertheless the drop in prices was much lower compared to the pre-Crisis period (1.4% average annual contraction in the pre-Crisis period vs. 0.5% in the post-Crisis period). The results (computed but not reported) for the period since 2012 show that even for the Machinery sector, the products exported by China stopped contracting in prices since 2012.

Source: Authors’ calculations using data from Trade Map of the International Trade Centre (ITC) (<http://www.trademap.org/Index.aspx>).

The acceleration/deceleration pattern of global trade was heightened by a contraction in the quantity of intermediates trade (an imperfect proxy for GVC trade) and a slowdown

in price increases, but the effects of the supply-side shock from China would have happened even without the changes in GVC trade that intermediates goods may suggest. The contraction of trade in intermediates is quantified in Table 3. It shows the adjusted growth rate of industry-specific effects to demand and supply for four categories of traded goods using the UN Broad Economic Categories (BEC) classification: consumption, intermediate goods, capital goods, and primary goods.

Table 3 Adjusted growth rate by BEC categories, quantities vs. values (%)

		QUANTITIES			
		Consumption goods	Intermediate goods	Capital goods	Primary goods
Pre-Crisis	06Q1-08Q3	5.1	6.1	7.8	0.6
Crisis & rebound	08Q4-11Q2	-0.6	1.3	0.6	0.4
Post-Crisis	11Q3-14Q3	1.7	1.4	2.0	1.3
All	06Q1-14Q3	2.1	2.9	3.4	0.8
		VALUES			
		Consumption goods	Intermediate goods	Capital goods	Primary goods
Pre-Crisis	06Q1-08Q3	12.8	17.7	13.3	23.3
Crisis & rebound	08Q4-11Q2	0.4	1.5	0.8	-0.8
Post-Crisis	11Q3-14Q3	4.3	2.8	2.8	3.1
All	06Q1-14Q3	5.8	7.3	5.6	8.6

Notes: Contribution of consumption (CONS), intermediate (INT), capital (CAP), and primary (PRIM) goods to export growth.

Source: Authors' calculations using data from Trade Map of the International Trade Centre (ITC) (<http://www.trademap.org/Index.aspx>).

Keeping in mind the caveat that our measure of GVC trade is based on gross trade flows and hence approximates GVC-trade only very imperfectly, we find evidence of a change in patterns before and after the Crisis. We report estimates for trade in quantities and for trade in values, which include price changes. The top panel of Table 3 focuses on quantities – trade in intermediate goods is contracting somewhat in quantity terms. It was increasing on average 6.1% per annum before the Crisis, while since 2011q3 it has been growing at a much slower pace (1.4% annually on average). Intermediate goods

displayed the second highest rate of growth in the pre-Crisis period (behind capital goods) but the second lowest rate of growth in the post-Crisis period (nearly on a par with primary goods). In value terms, the adjusted growth rate of intermediate goods is still positive at 7.3%, but significantly below the pre-Crisis level of 17.7%, suggesting that prices for intermediates may have increased. The supply-side shock from China comes on top of developments in intermediates or GVC trade, since the figures in Table 1 (right panel) are net of countries' specialisation, measured at the individual product level.

4 Any new China emerging?

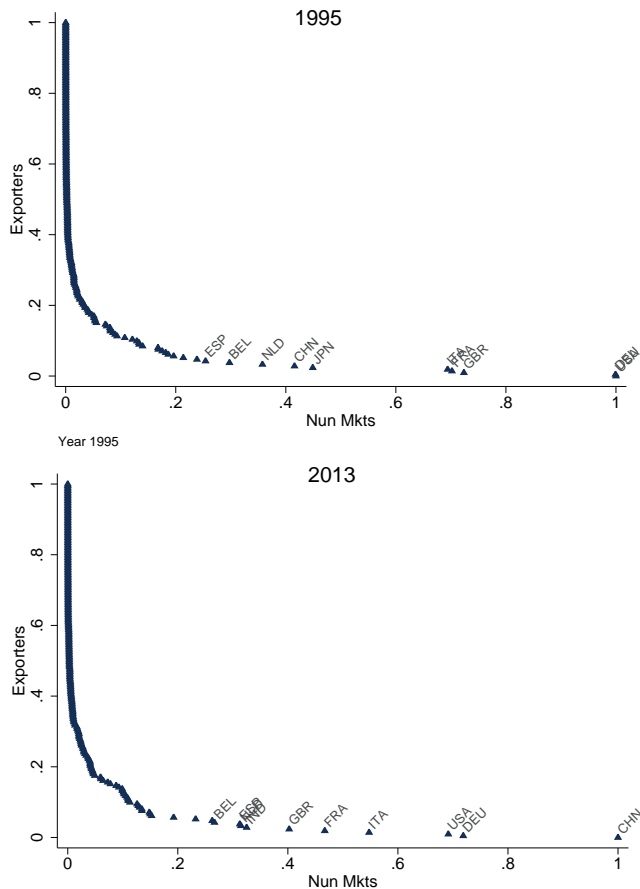
A deeper analysis of the influence of China on global trade suggests some hypotheses for how global trade may evolve in the future and as well as insights for policy.

China's impact on the supply side goes beyond developments concerning trade in intermediates, which our methodology can control for. In the expansionary phase of trade growth, the supply-side shock from the integration of China into global trade altered the comparative advantage lines of different world locations. Global growth in trade was driven by market reallocations and specialisation effects along comparative advantages. The recent reorientation of China's production towards servicing domestic demand has reduced some of the competitive pressures on the global market, clearly visible through the price dynamics of China's export bundle. But it has also resulted in a moderation of the pace of global trade growth. The contribution to the latter however could be considered almost a statistical artefact. It does not reflect a slowdown in production, or a build-up of trade barriers, but is rather an 'accounting' phenomenon due to international trade statistics that do not record trade with itself.

Going forward, while in principle new accelerations of global trade growth could materialise – as countries like India, Russia, Brazil as well as entire regions such as sub-Saharan Africa and South Asia are still largely marginal to the global economy – it is unlikely that they would unleash the same acceleration/deceleration patterns as

observed in the past two decades. This is primarily because these countries will face a different type of competition on global markets than that faced by China in recent decades. While China was competing mainly against incumbents with a comparative advantage in knowledge-, technology- and skill-intensive activities, new potential trade juggernauts would compete on international markets with a country having similar comparative advantages to theirs (i.e. labour) and whose presence in global markets is pervasive (Figure 5).

Figure 5 Pervasiveness of China's exports on global markets, 1995 versus 2013



Notes: In 1995, the US and Germany reached the largest number of markets with at least 1% of total imports (country*product) while China was present (with at least 1% market share) in 41% of the markets supplied by the US and Germany. By 2013, the situation flipped: China is the country reaching the largest number of countries – choosing a random product-country combination, China is present in it already with at least 1% of the market shares. The second most pervasive exporter, Germany, reaches only 71% of China's product-market coverage and the US only 69%.

5 Conclusions and policy implications

This chapter presents evidence from the analysis of global trade developments in the past ten years, using a matrix of import and export data at the product level, with worldwide coverage and controlling for geographical and sectoral composition effects. Our analysis suggests the recent trade deceleration is most closely linked to two country-specific factors, even after controlling for competing explanations. These factors are (i) a reorientation of China's production towards domestic demand, and (ii) the massive destruction of demand in the Eurozone (a phenomenon linked only partially to the cycle, see the contribution by Ollivaud and Schwellnus in this eBook). Our key findings are the following.

The trade acceleration observed before the Global Crisis was largely driven by a supply-side shock, in which the cost-competitiveness of China's manufacturing exports triggered market reallocation from domestic production in third countries.

China's trade growth has phased out in the most recent period due to a combination of policy-induced and economic factors. Beyond policy drivers, the trade deceleration is largely a normal phenomenon of economic dynamics. In the absence of new shocks, growth in the trade-to-GDP ratio is likely to be followed by decelerations. There is no reason in steady state to expect a trade elasticity that is greater than 1. When this happens, it is due to adjustments to a technology shock or to a sufficiently large change in trade costs. Elasticities observed in the 1990s and 2000s should therefore be considered exceptional and temporary, unless a sequence of new trade shocks or trade-biased changes in consumption patterns take place due to further trade liberalisations or technological innovation.

Abstracting from cycle-related shocks, such as subdued demand in the Eurozone, trade growth patterns are much more uniform across countries in the 2010s than before the Global Crisis. Developments in trade in intermediate goods (an imperfect proxy for GVC trade) also seem to support this view. The 1990s and 2000s have seen

an unprecedented expansion of trade in intermediates. While before and during the Crisis trade in intermediates was more dynamic than trade in consumption goods, more recently these two types of trade seem to have inverted patterns, with trade in intermediates being more subdued than trade in consumption goods. The nature and drivers of such observed trends in trade in intermediates are beyond the scope of this chapter.

Going forward, while in principle new global trade accelerations could be expected, as other large countries and regions (e.g. Brazil, Russia, India or Africa) become better integrated in global trade, new trade juggernauts confront a different competitive environment than China did. The pervasive presence of China on global markets suggests less scope for trade based on markedly different comparative advantages and specialisation patterns.

Two final considerations are in order. First, if intra-industry trade becomes more relevant in the future, trade policy should broaden its current focus. The integration of China in the global economy led the trade policy debate to focus on all those causes of international trade generated by differences between countries. Accordingly, it prioritised an agenda centred on trade facilitation and trade cost reduction. And this was enough in a world of markedly different comparative advantages. Lowering trade costs allowed countries to specialise following their comparative advantages. Gains in efficiency took place through specialisation and market reallocations. Nevertheless, as theories of intra-industry trade remind us, non homogeneity of goods is also a source of international trade. Competing and succeeding in international markets may increasingly require targeting intra-industry trade as well, which in turn entails complementing the trade facilitation agenda with supply-side policies aimed at boosting productivity, quality and diversification.

The second consideration concerns the link between China's role in driving the global acceleration and deceleration of trade in the past two decades and global imbalances. Further research is warranted into understanding if the record-high global imbalances

observed during the years of high trade growth were directly connected to the nature of trade creation determined by China's entry into the global economy – a supply-driven shock and the subsequent sizeable market reallocations from domestic supply to imports.

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6 Global value chains and the trade-income relationship: Implications for the recent trade slowdown

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1 Introduction

Since an initial rebound from the Great Trade Collapse of 2008-2009, world trade growth has been particularly anaemic. In 2011-2013, the volume of trade expanded at an annual rate of 3%, less than half the average of roughly 7% for the period 1985-2007. For the first time in almost half a century, trade has grown more slowly than the global economy. The sub-par rate of trade growth during this period has raised the question of whether it is merely a result of the prevailing exceptionally weak demand conditions – particularly in Europe – or whether there have been structural changes in the trade-income relationship. The answer has important implications for trade growth going forward.

Cyclical factors may well have played a key role in the trade slowdown. While trade growth decelerated in all regions, the greatest slowdown was in the advanced countries, and it was particularly marked in the Eurozone in 2012. This may have been compounded by the composition of demand growth. Because of weaknesses in investment and private consumption, the import intensity of aggregate demand growth

was relatively low. Boz et al. (2014) suggested that this might account for about half of the shortfall in trade growth during this period.

If cyclical weakness is the primary cause of the recent anaemic trade growth, then we might expect a rebound to, or near to, previous trend growth rates over time. However, others have argued that the slowdown is much more persistent, reflecting structural changes that include the evolving nature of production within global value chains (GVCs). A recent paper by Constantinescu et al. (2015), for example, found that the responsiveness of trade to income – the long-run income elasticity of trade – began to decline earlier in the 2000s after a sharp rise in the 1990s. They attribute this to a slowing down in the pace of international vertical specialisation that started well before the Great Recession of 2008-2009.

The discussion of a potential structural trade slowdown in some ways represents the flip side of a literature that has explored the apparent rise in trade's responsiveness to income at the end of the 20th century, and the particular role that GVCs may have played in this development. In this chapter, we consider the ways in which GVCs may affect the income elasticity of trade and efforts to identify their relative contributions to rising elasticities over time. We then consider what insights this provides regarding the recent trade slowdown.

2 Global value chains and rising income elasticities

Interest in the relationship between trade and income increased in the wake of the Great Trade Collapse of 2008-2009. Compared to previous economic downturns, the drop in trade was unprecedentedly sudden, severe and synchronised, with world trade declining more than 30% in the first quarter of 2008 relative to a year earlier (Baldwin 2009). The main question was whether the unusually large trade response reflected an increase in the elasticity of trade to income in comparison to previous periods.

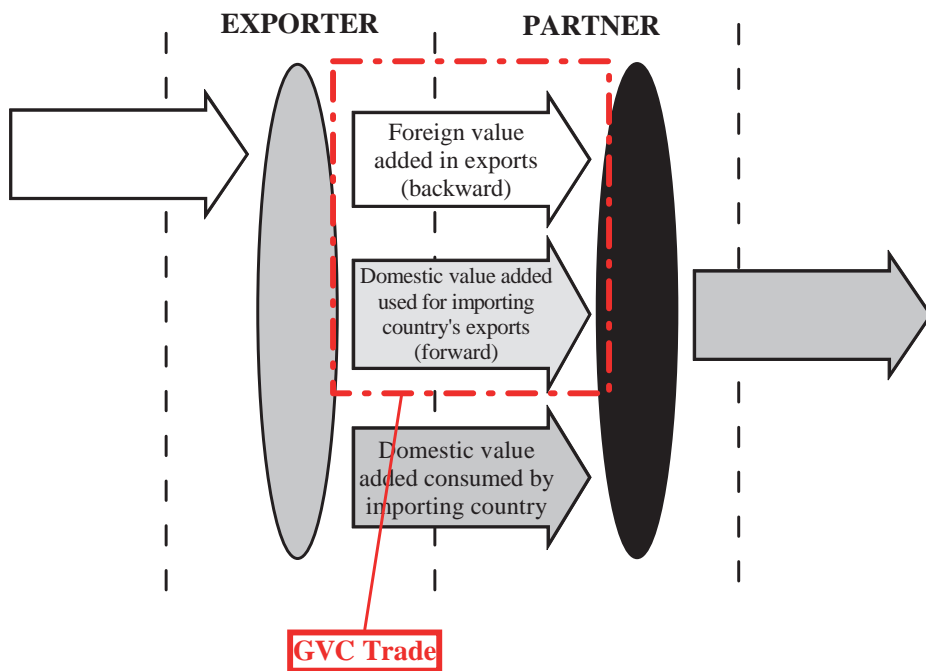
There is substantial evidence that trade did indeed become more sensitive to income growth at the close of the 20th century. Cheung and Guichard (2009) found that the long-run income elasticity of world trade almost doubled from 1.3 in the period 1975-1986 to 2.5 in the period 1986-2008. Escaith et al. (2010) found a similar increase in the income elasticity of trade in the 1990s, but suggested that it had stabilised by the early 2000s. Ceglowski (2014) found evidence of the same pattern in a study of US aggregate imports.

Scholars were quick to link the rise in the measured income elasticity of trade to the emergence of GVCs. Beginning in the 1980s, trade liberalisation and rapid improvements in communication and transportation technologies prompted companies in the electronics, automobile, and other industries to slice up their value chains, locating the production of various components or tasks internationally according to relative cost advantages (for a review, see Van Assche 2012). As this process unfolded, the share of total trade that took place within GVCs took off, changing the structure of trade relationships.

The new TiVA dataset compiled by the OECD and WTO makes it possible to articulate the place of GVC trade in world trade (De Backer and Miroudot 2014).¹ By combining input-output data for multiple countries with trade statistics, the dataset allows gross exports to be decomposed into three parts (Figure 1): (1) foreign value added that is used to produce a country's exports (*backward linkage*); (2) domestic value added that is used by a destination country to produce its exports (*forward linkage*); and (3) domestic value added that is directly consumed in the destination country.

1 An alternative dataset is the European Commission's WIOD data (Timmer, 2012).

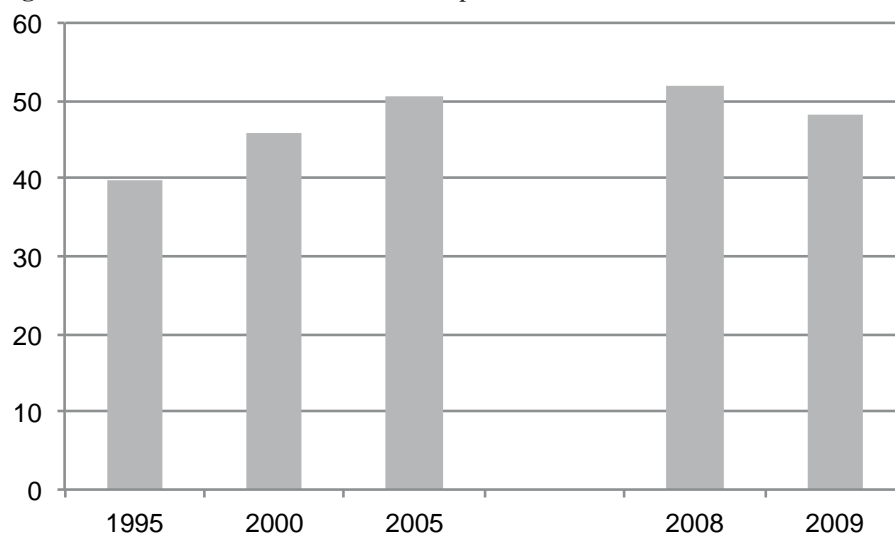
Figure 1 Gross export decomposition into GVC trade and regular trade



The first two parts reflect GVC trade, since they represent imported intermediates that are used for the production of another country's exports. The third part is a country's regular value added trade that is not part of GVCs.

How important is GVC trade? Between 1995 and 2008, GVC trade grew at an annualised rate of 11% compared to an 8% growth of regular value added trade. As a result, the share of GVC trade in total trade grew by more than 10 percentage points from 40% in 1995 to 52% in 2008, before declining slightly in 2009 (see Figure 2). Clearly, GVC production arrangements have become a key element of international trade over the last few decades.

Figure 2 GVC trade's share of world exports



Note: Authors' calculations using OECD-WTO TiVA data.

The period of rapid GVC trade growth coincided with an episode of rising income elasticities, making it a primary candidate for the structural change in the trade-income relationship. In what way might this have occurred? The literature has distinguished between three mechanisms: an adoption effect, a composition effect, and a supply chain effect. We consider these in turn.

Adoption effect

The first mechanism, which one might call an *adoption effect*, is simply the observation that an acceleration in the speed with which companies slice up their production across borders can substantially increase gross trade growth, even if value added production growth remains limited. During a transition period in which GVCs become more prevalent, this may *temporarily* raise measured elasticities of gross trade to income.

Composition effect

GVCs may have further increased the elasticity of trade with respect to income if GVC trade is particularly concentrated in durable goods industries. Trade in durable goods tends to have a higher sensitivity to income shocks than non-durables trade (see, among others, Ceglowski 2014 and Aziz and Li 2008). In economic downturns, households and companies disproportionately delay purchases of durable and capital goods while they await clearer evidence that the economic climate is improving. If GVC trade primarily expands in durable goods industries, it raises the share of goods with higher income elasticity in trade, therefore leading to a sustained increase in the aggregate income elasticity.

Supply chain effect

Finally, GVCs may have increased the sensitivity of trade with respect to income if characteristics of the production structure make such trade intrinsically more responsive to income movements than regular trade. Inventory dynamics within global value chains may be one driver that amplifies the volatility of GVC trade to income movements (Alessandria et al. 2010, Altomonte et al. 2012). The logic for such a *bullwhip effect* is the following: businesses typically face errors in their sales forecasts against which they hedge by accumulating buffer stocks of inventories. When a downstream firm is confronted with an unexpected drop in demand, it may attempt to smooth production by running down its inventories and suspending new purchases of imported inputs. The disproportionate falloff in the imports of inputs can lead to a higher sensitivity of GVC trade to foreign income shocks compared to regular trade.

3 Disentangling the effects

There are, then, several possible channels through which GVCs may have contributed to a rise in the income elasticity of trade. The challenge is to distinguish between

these channels. Aside from transitory adoption effects, is it because GVC trade is concentrated in sectors that are more sensitive to external demand fluctuations (the composition effect)? Or is it that GVC trade is inherently more elastic than regular trade (the supply chain effect)? Unfortunately, limitations of traditional trade data and newer value added trade datasets such as TiVA make it difficult to assess this. Trade data have the problem that they do not easily distinguish between GVC trade and regular trade. TiVA data suffer from the fact that they operate at a high level of industry aggregation and are only available for five non-consecutive years.

In Gangnes et al. (2014), we address the issue by exploiting data from China's Customs Statistics for the years 1992-2011, which distinguish between trade under two distinct customs regimes: the processing trade regime and the ordinary trade regime. Under processing trade, firms enjoy duty-free importation of inputs that are used in production, but face restrictions on selling to the domestic market. As a result, firms use it almost exclusively if they rely heavily on imported inputs and export their products, that is, if they are part of GVCs. Under ordinary trade, firms face duties on imported inputs but can sell their output locally. Firms that export under the ordinary trade regime therefore have more extensive domestic value chains.

A review of the data shows that Chinese exports exhibit trends that are similar to global trade. First, the share of processing trade (that is, GVC trade) in China's exports increased rapidly in the 1990s before stabilising in the early 2000s. Second, GVCs have primarily emerged in durable goods sectors, therefore altering the composition of Chinese exports. As the data in Table 1 indicate, in 2011 processing trade accounted for 84% of durable goods exports, but only 16% of non-durable goods exports. The rapid growth of durable goods processing trade has raised the share of durable goods in total trade from 42% in 1995 to 69% in 2011.

Table 1 China's exports, by sector, various years

	HS Codes	Share of total exports		Annualised growth rate	Processing exports share	
		1995	2011	1995-2011	1995	2011
DURABLES						
Machinery, electrical	84-85	18.6	44.3	22.4	28.3	64.2
Misc. manufacturing	90-97	9.6	9.2	15.6	13.7	8.9
Metals	72-83	8.1	7.0	14.9	8.0	2.2
Transportation	86-89	2.7	5.6	21.4	3.6	7.5
Stone and glass	68-71	3.0	2.5	14.7	2.0	1.6
Total durables	68-97	42.0	68.7	19.5	55.6	84.3
NON-DURABLES						
Textiles	50-63	24.2	12.7	11.3	20.9	4.9
Non-manufacturing	01-27	13.8	5.0	8.7	3.8	2.3
Chemical & allied industries	28-38	5.7	4.8	14.6	1.7	1.5
Plastics and rubbers	39-40	2.9	3.1	16.5	4.0	3.6
Footwear and headgear	64-67	5.5	2.8	11.1	8.1	1.7
Wood and wood products	44-49	2.2	1.5	13.2	1.2	1.0
Raw hides, skins, leathers & furs	41-43	3.8	1.5	9.2	4.7	0.7
Total non-durables	01-67	68.7	31.3	11.5	44.4	15.7
TOTAL		100.0	100.0	16.0	49.6	46.9

Source: Authors' calculations using China Customs Statistics data.

Using panel data that vary across industries, customs regimes and years, we estimated a standard export-demand model that relates trade volume to foreign income and relative prices (real exchange rates), with interaction terms for durable versus non-durable goods and for processing versus other trade.² Consistent with the literature, we find that Chinese exports of durables have substantially higher income elasticities than exports of non-durable goods exports. The income elasticity for durables is nearly four times

2 Our model is estimated in growth rates to avoid spurious regression, and it includes lagged terms of left- and right-hand side variables, a proxy for productivity growth, and industry or industry-regime fixed effects. Because the model is estimated in growth rates, the fixed effects will capture secular trade growth due, for example, to adoption effects.

higher than for non-durables (Table 2, column 2); for non-durables the elasticity to real GDP growth is 1.123, for durables it is $1.123 + 3.052 = 4.175$.

Table 2 Estimated income elasticities (impact), 1995-2009

Independent variable:	(1)	(2)	(3)
Real GDP growth	1.831***	1.123***	1.072**
Durable goods		3.052**	3.608**
Processing trade			0.096

Notes: The coefficients on real exchange rates, productivity, one-year time lags, cross-interaction terms and fixed effects are not shown. Significance: ***1% level, **5% level, * 10% level.

Source: Gangnes et al. (2014), p 484.

While these estimates could reflect the fact that durables have a higher income elasticity than non-durables, it is also possible that they arise from a supply chain effect – processing trade may have an inherently higher income elasticity than regular trade and happen to be concentrated in durables industries. The addition of a processing trade interaction term allows us to test whether processing trade has a higher income elasticity over and above the difference that can be explained by industry composition. The evidence suggests that it does not. Once we adjust for the industrial composition of trade, the results do not show that GVC trade has a higher long-run elasticity than trade taking place outside of GVCs (column 3).³

This is not to say that processing trade behaves at all times like ordinary trade. During the Great Recession of 2008-2009, for example, there is evidence that processing trade was disproportionately affected (Ma and Van Assche, 2011). As is shown in Table 3, within HS8-digit industries, the share of processing exports in total exports declined significantly from the first quarter of 2008 to the first quarter of 2009. This suggests that supply chain effects may appear during periods of particularly severe economic disruption.

³ Cross interaction effects of processing on durables and real GDP, not shown here, also failed to show a positive effect.

Table 3 China’s processing exports as a share of total exports (HS 8-digit level)

Variables	Number of observations	Mean	Standard error
Share of processing exports in total exports, 08Q1	4760	0.31	0.004
Share of processing exports in total exports, 09Q1	4760	0.29	0.004
Difference	9520	0.020***	0.003

Notes: * means significant at 10%; ** means significant at 5%; *** means significant at 1%.

Source: Ma and Van Assche (2011).

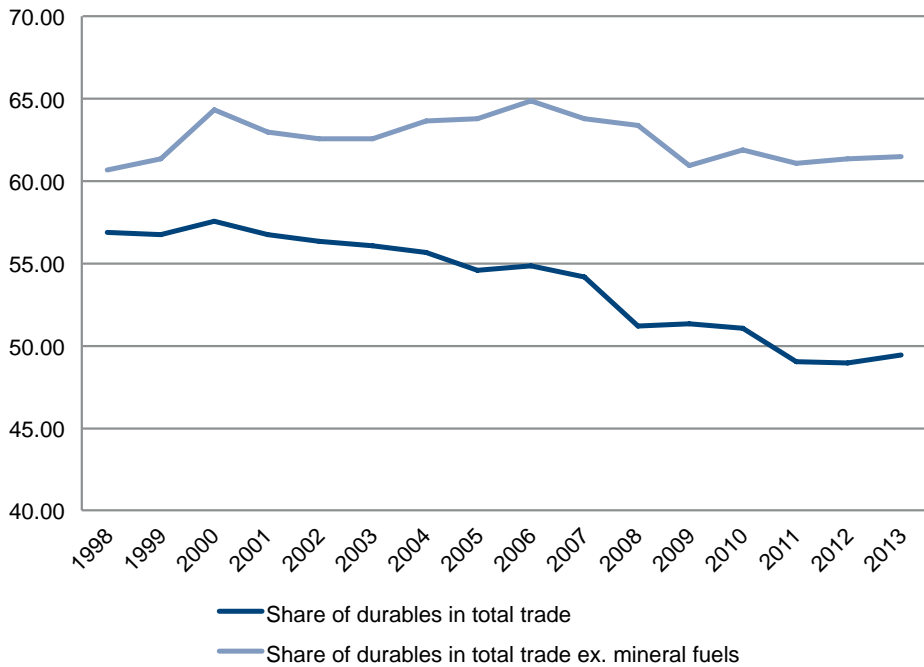
In sum, our research on China supports the idea that GVCs may have increased income elasticities by facilitating the growth of durable goods trade, but we find little evidence that trade within GVCs is inherently more income sensitive than other trade flows outside periods of extreme uncertainty.

4 Can GVCs explain a structural trade slowdown?

What can the distinction between alternative GVC effects on trade elasticities tell us about the recent trade slowdown? Here, we look for clues in recent trade movements and offer a few conjectures.

If in fact the responsiveness of trade to income growth has dropped in recent years, our results for China suggest that the first place to look is to a *composition effect* – the mix of world exports may have shifted towards industries with lower income elasticities (either because of short-term cyclical developments or longer-term changes). At first glance, the data seem to support this view. Figure 3 shows that the share of durable goods in world trade declined from a high of 58% in 2000 to about 49% in the 2012-2013 period.

Figure 3 Share of durable goods in overall trade, 1998-2013



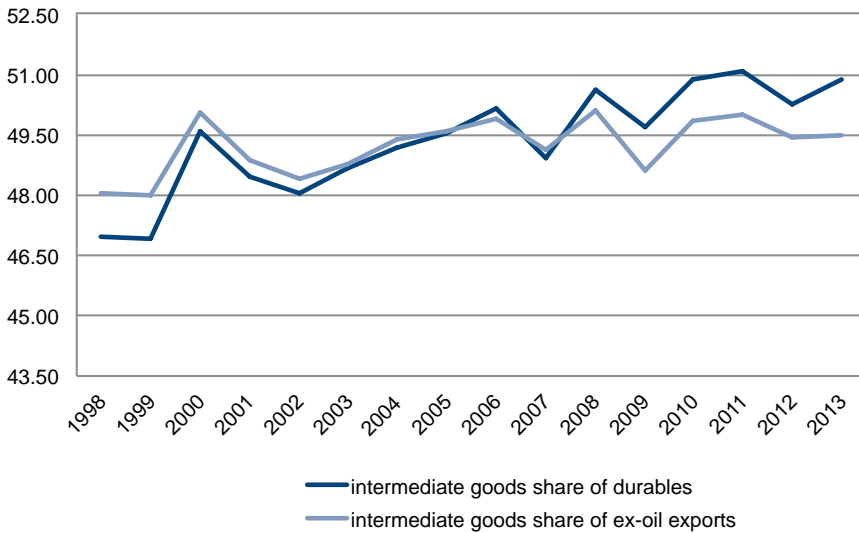
Note: Authors' calculations using BACI trade data.

A closer examination of the trade composition suggests, however, that this shift is largely due to an increase in the trade share of mineral fuels such as oil, which saw increasing prices during the pre-Crisis period. Once mineral fuels are excluded, the share of durable goods in world exports has remained roughly stable both in the past few years and in the period extending back to 2000. So, while the rising shares of lower-elasticity minerals trade might reduce overall measured trade sensitivity to income, this does not appear to reflect a fundamental shift in the composition of non-mineral exports away from durables.⁴

⁴ This indication that the durable/non-durable composition has remained relatively stable stands in contrast to the evidence from Boz et al. (2014) that the composition of final demand has shifted away from import-intensive goods. According to Bussiere et al. (2013), the latter include investment goods that have relatively high durable good shares.

Aside from a composition effect, could a lower income elasticity of trade reflect a pulling back from GVC production arrangements? Some have argued that such a process of ‘reshoring’ may be occurring as firms reconsider exposures and expenses associated with far-flung value chains, or because of changing regional cost conditions (Boz et al. 2014, Canadian Trade Commissioner 2014). A significant retreat from GVC arrangements would reduce measured responsiveness of trade to income temporarily through a reverse *adoption effect*. There might be additional effects on income elasticities if, contrary to our evidence for China, the supply chain characteristics of some GVC arrangements make related trade inherently more sensitive to income changes.

Figure 4 Share of intermediate goods in overall trade



Note: Authors’ calculations using BACI trade data.

A disproportionate retreat from GVCs, however, is also not evident in the data. As we have discussed in Section 2 above, the share of GVC trade increased significantly between 2000 and 2008 before falling back slightly during the Great Recession (Figure 2). Figure 4 shows that in the most recent period, the share of intermediate goods in both non-mineral exports and durable goods exports has remained stable, contrary to what one would expect if a disproportionate pull back from GVC arrangements were to blame for the drop in income elasticities.

Of course, it could be the case that measured elasticities have fallen because of a slowdown of the adoption of GVC production arrangements. And indeed the data in Figure 2 suggest that some slowing of the rate of GVC trade growth did occur after 2000. This is therefore a plausible explanation for at least part of the slowing down of gross trade growth over the past decade or so.

Considering the limited evidence for GVC-related explanations, what other structural mechanisms might explain the recent trade slowdown? One particularly interesting candidate is the effect on trade of heightened uncertainty in the post-recession era, which may have negatively affected overall trade. Taglioni and Zavacka (2013) show that there is a strong negative relationship between uncertainty and trade, and that this relationship is non-linear. When uncertainty is low, a marginal increase in uncertainty has little impact on trade. If it passes a threshold, however, it can lead to a significant decline in trade, both within and outside of GVCs. The heightened uncertainty is, of course, not likely to stay around forever.

5 Conclusion

Our intent in this chapter has been to evaluate possible explanations for the recent trade slowdown in the context of the existing literature on trade impacts of GVCs. In particular, we have reviewed the rationale and evidence for adoption, composition and supply chain explanations for the rising trade sensitivity to income over the past few decades, and we have asked what the literature might tell us about the recent slowdown. So far, there is little evidence that compositional factors besides oil price changes have played a significant role, or that there has been a significant pulling back from GVC arrangements. There is some evidence that the expansion in GVCs has been levelling off, and this may explain part of the decline in the income elasticity of trade.

The fact is that it is probably too soon to be asking the data to tell us much about the causes of the trade slowdown. Studies that document a flattening out or decline of income elasticities since the 2000s are intriguing but, as Constantinescu et al. (2015)

acknowledge, the unusually deep and widespread nature of the Great Recession may complicate the identification of longer-run relationships. Similar issues may confound identification among alternative explanations for structural change.

Changes in the extent or operation of GVCs may yet turn out to be part of the story. Whether this will lead to persistent changes in trade behaviour is far from clear. While data do suggest that the pace of adoption has tapered off, new waves of adoption could yet occur as technology and global integration evolve. It is certainly too soon to say that the trade-income relationship has permanently shifted onto a lower growth path.

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7 World trade and income remain exposed to gravity

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WTO; OECD

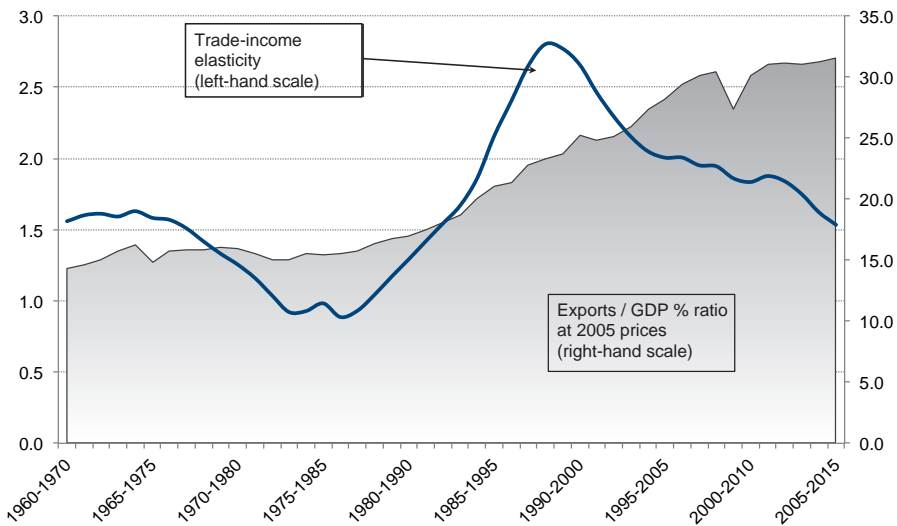
In the years following the signing of the Uruguay Round and the creation of the WTO, international trade grew much more rapidly than the world economy. This growth took place when the world economy itself was growing much more rapidly than in the previous decades in the wake of the internet and IT revolution. The trade-income elasticity was at its highest in the late 1995s, when an increase in GDP of 1% was associated with an increase in trade of almost 3% (Figure 1).²

To shed some light on the structural factors that explain the past and recent evolution of the trade-income elasticity, this chapter relies on the gravity model that is widely used in the trade literature. It has been very successful in the empirical analysis of trade (Anderson 2011) and has a solid theoretical foundation (Anderson 1979, Anderson and van Wincoop 2003). The gravity model establishes a relationship between trade and GDP and can provide a useful perspective on the evolution of the income-elasticity of trade, besides the short-term fluctuations caused by business cycles.

1 The authors thank Robert Koopman for his comments on earlier drafts; all remaining errors are the sole authors' responsibility. The opinion expressed here are personal and do not represent the position of the OECD or WTO secretariat, or their respective members.

2 The year-over-year elasticity was actually even higher, as the results on Figure 1 are smoothed to capture only the long-term trend. It should be noted that the turning point on Figure 1 depends on the duration of the rolling period. It is not meant to indicate a structural break taking place in a specific year.

Figure 1 World trade-GDP ratio and trade-income elasticity, 1970-2015



Notes: Merchandise exports only; world GDP and trade at constant 2005 prices; dollar figures for GDP are converted from domestic currencies using official exchange rates. Long-term elasticity is based on 10-year rolling period from 1960-1970 to 2005-2015 (2015 is based on forecasts).

Source: WTO and authors' calculations.

By analogy with Newton’s Law of Universal Gravitation, the model predicts that trade between two countries is proportional to their economic mass and inversely proportional to the square of the ‘distance’ separating them. In economic terms, this distance refers to all the ‘frictions’ impeding trade, such as transportation costs, transaction costs, custom duties and other restrictive trade policy measures, as well as a home bias. The geographic distance between two countries is generally well correlated with these trade frictions.

For two countries a and b , we can express the gravity equation as:

$$X_{ab} = \frac{Y_a Y_b}{Y d_{ab}^2} = \frac{s_a s_b Y}{d_{ab}^2} \tag{1}$$

where X_{ab} are exports from a to b , Y_a is a ’s economic size from the supply-side perspective (the mass of products supplied at origin a), Y_b is b ’s market size (the mass

of products demanded at destination b), Y is total income and d_{ab} is the economic distance between a and b (a measure of the trade frictions that impede pure free trade).³

While the gravity models used today in trade analysis are more sophisticated, this simple relationship is enough to capture the main forces that can help explain the recent evolution of trade, such as the convergence in income between developed and developing countries, the reduction in ‘distance’ or the emergence of global value chains.

1 A frictionless world: The role of the convergence in income

Following the notation in Anderson (2011), we define as $s_a = Y_a/Y$ the share of country a in world sales and $s_b = Y_b/Y$ the share of country b in world spending (equal to world sales). Because in a traditional Ricardian model of trade in final goods, total sales should equal total final demand, it is usual to approximate Y_a and Y_b by the respective country’s GDP.⁴ Using GDP has the additional advantage of providing an identical specification when measuring an economy from its supply side and its demand side.

The model does not have to be limited to two countries; we can define as $s_i = Y_i/Y$ the share of any country i in world income and generalise the model to N countries.

Equation (1) then becomes:

$$X_{ab} = \frac{Y_a Y_b}{Y d_{ab}^2} = \frac{s_a s_b Y}{d_{ab}^2} \quad (2)$$

3 Statisticians interpret these frictions as the ‘distance’ that separates the trade system from the maximum entropy state when trade is determined only by the relative size of the trade partners.

4 It remains an approximation because when trade is measured in gross terms, Y_a refers to the sales of country a and Y_b to the expenditures of country b , both concepts that are also in gross terms, as opposed to GDP which is a value added concept. It is only at the global level that total sales = total expenditures = total GDP. If we assume balanced trade, total sales are also equal to total expenditures for each country.

In the absence of any trade friction, goods and services have the same price everywhere and consumers in a and in b are expected to buy products in the same proportion based on their share of world income (entropy is maximised). We thus obtain a gravity equation where distance does not play any role. Exports from a to b are simply:

$$X_{ab} = s_a s_b Y \quad (3)$$

And trade is balanced (exports from a to b are equal to exports from b to a)

$$X_{ab} = X_{ba} \quad (4)$$

From (3) and (4), we can now deduce that the ratio of world trade to GDP (T/Y) in a frictionless two-country model is equal to:

$$\frac{T}{Y} = 2s_a s_b \quad (5)$$

With total trade, T , equal to exports of country a plus exports of country b .

Equation (3) implies that, in the simple gravity model (1), the trade-income elasticity equals 1 as long as trade frictions and the respective country shares remain constant.

$$\hat{T} = \hat{Y} \quad (6)$$

where \hat{T} ; \hat{Y} stand for the rate of growth of T and Y .

Equation (3) has several other interesting implications that can help us to better understand the relationship between trade and income growth.

1.1 Trade is maximised when economies are of similar size

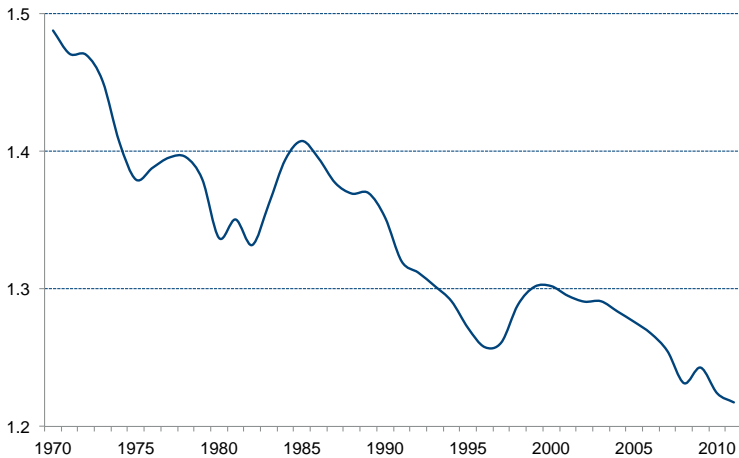
First, if we assume that trade is balanced, equation (3) implies that trade is maximised when the economic size of the two countries is the same. Asymmetries in the size of

countries lead to lower levels of trade. With two countries, trade is maximised for $s_a = s_b = 0.5$.⁵

This result also holds for N countries with each country representing a share of $1/N$ of world spending.

We observe (Figure 2) that income convergence has been a major economic driving force in the evolution of trade over the past four decades. With the emergence of large developing countries as key economic players and the slow growth in the industrialised world (particularly in Europe and in Japan), there has been a strong convergence in income between 1970 and today.

Figure 2 Coefficient of variation of GDP for selected G20 economies, 1970-2011



Note: GDP in 2005 US dollars measured at current PPP exchange rate. Convergence also exists, albeit more slowly, when GDP is measured at market exchange rates (see Table 1). Whether market exchange rates or PPPs are the best measures remains subject to debate. Market exchange rates are the implicit referents in a gravity model, but a microeconomic-based theory of consumer preference between traded and non-traded products should rely on purchasing power parities.

Source: Penn World Tables.

5 This implies in the very hypothetical frictionless case (5) that the trade ratio is also 0.5. This result is consistent with the frictionless hypothesis: when entropy is maximised (undifferentiated production, same preferences and no trade friction), the prior probabilities of purchasing a home or a foreign product are equal to 0.5 when country sizes are equal.

The past 15 years were dubbed the ‘Glorious Fifteen’ by *The Economist*, as income per person in the emerging world almost doubled between 2000 and 2009 and the average annual rate of growth over that decade was 7.6%, 4.5 percentage points higher than the rate seen in rich countries (Economist, 2015). Following the prediction of the gravity equation, this convergence in income has generated more trade and the share of developing countries in trade has increased. In the past 15 years, the share of developing countries in world exports of merchandises rose from 30% to 45%. The weight of South-South trade also dramatically increased during this period. While it represented less than 40% of South-North merchandise exports in 2000, South-South trade is now prevalent with 55% (Table 1).

Table 1 Developed and developing economies: GDP and North-South trade, 1990-2015

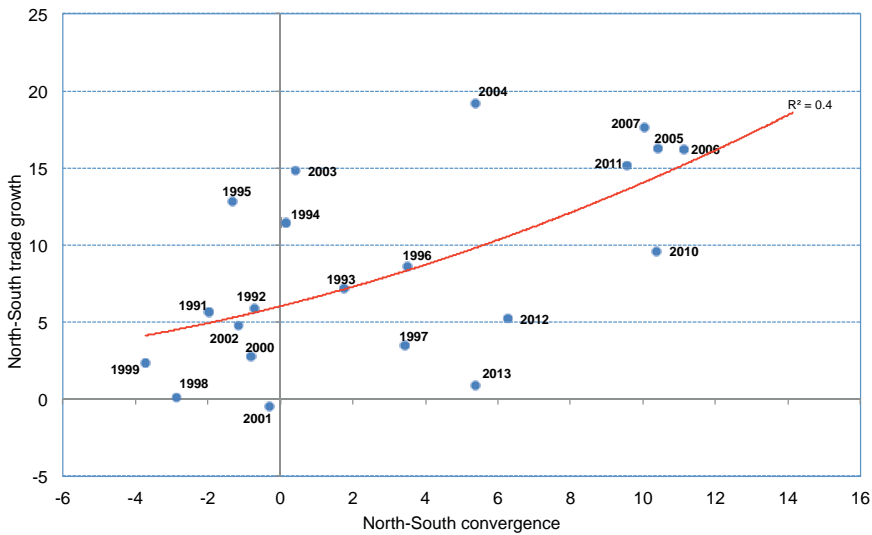
	US\$ trillion		Average annual growth rate (%)				
	1990	2013	1990-1995	1995-2000	2000-2005	2005-2010	2010-2013
GDP							
World	22.5	75.6	6.4	1.7	7.1	6.8	3.0
Developed economies	17.1	44.4	6.7	1.5	6.4	3.6	1.5
Developing economies	5.4	31.2	5.3	2.2	9.5	14.2	5.4
Trade							
World exports	3.4	18.3	8.1	4.6	10.3	7.8	4.2
North-North	1.9	6.3	5.9	5.2	7.9	3.0	2.6
South-South	0.3	4.6	15.9	5.3	16.4	15.4	6.7
North-South	0.5	3.1	11.1	-0.7	10.0	11.9	4.0
South-North	0.6	3.9	7.7	7.6	11.9	7.8	4.0

Notes: Developing economies including CIS, based on current US dollars. Dollar figures for GDP are converted from domestic currencies using official exchange rates.

Source: World Bank and WTO.

As expected from the gravity model, North-South trade has been positively correlated with the speed of convergence, although the correlation is low (0.4), even after eliminating the Great Trade Collapse of 2008-2009 (Figure 3).

Figure 3 North-South rate of convergence and trade growth, 1990-2013



Notes: Rate of convergence (horizontal axis) measured as the average annual change in the ratio of GDP of developed to developing countries; vertical axis shows the average annual variation in North-South trade; growth rates are smoothed using a three-year weighted moving average and the Crisis years (2008-2009) are removed from the sample.

Source: Authors' elaboration on the basis of World Bank and WTO data.

But this convergence has been slowing down. Since the Global Crisis, growth rates across the emerging world have slipped back towards those in advanced economies, even if they remain higher when measured either at market exchange rates (Table 1 and Figure 3) or in terms of the purchasing power parities released by the World Bank's International Comparison Programme (ICP). With this slowdown in convergence, the gravity equation predicts that trade will grow more slowly for a given rate of expansion of the world economy.

Box 1 presents the results of a simulation based on a gravity equation calibrated to reproduce the economic growth of two groups of countries made up of developed and developing economies between 1990 and 2015 and to simulate North-South trade on the basis of a simple gravity equation. This simulation of North-South trade is relatively close to what was actually observed for total trade in Figure 1. While the factors that influenced trade are much more complex than suggested by the simple gravity equation

used for the simulation, we see that with the successive phases of income divergence and income convergence, it reproduces the non-linear evolution of the trade elasticity.

Box 1 Economic convergence and North-South trade: A simple simulation exercise

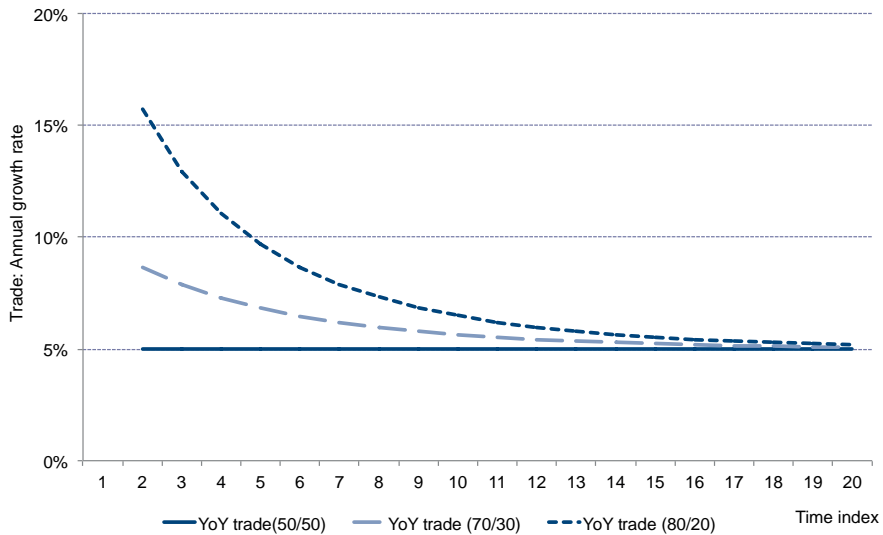
To illustrate the capacity for income convergence to explain the evolution of trade elasticity, a counter-factual simulation was developed, based on actual data on North-South trade and GDP between 1990 and 2013 (Table 1).

The starting point is a very simple simulation exercise using the gravity equation (1). A world economy growing at a constant 5% annual rate is composed of two countries. When those economies are of different size at the initial stage, they are made to converge progressively. The convergence cases are benchmarked against a situation where the two economies were initially of similar size (Figure 4).

When both countries are of same size (as in the 50/50 benchmark case of Figure 4) and trade frictions remain constant, equation (1) results in trade growing at 5% because, as expected from equation (6), the trade elasticity is constant and equal to 1. Trade growth (and therefore the world trade-GDP elasticity) is higher when the difference in initial size is greater (the 70/30 and 80/20 cases in Figure 4). The larger the initial gap in year 1 (the 80/20 case), the higher the world trade-income elasticity when convergence starts (year 2). When countries converge to a similar size (year 20 in Figure 4), the trade-income elasticity falls and converges to the steady-state value of 2.

If the convergence process stops at any time before the sizes are equal, the trade growth rate slows down to the benchmark one and elasticity stabilises at 1. Therefore, the slowdown in the economic convergence between developing and developed economies recorded after the 2008-2009 Crisis may also explain part of the decrease in the trade-income elasticity that was observed in this period.

Figure 4 Simulation of trade growth for different rates of convergence

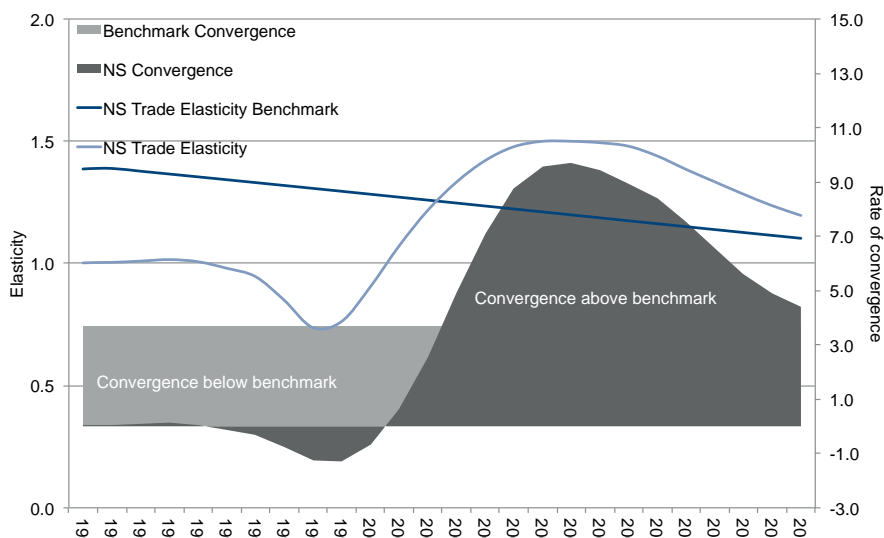


Source: Authors' elaboration based on simulated data.

This case was for illustration only, and the next step involves calibrating the simple model in order to simulate the evolution of North-South trade in the past decades. The world economy is made of two regions, North (developed economies) and South (developing countries). The simulation mimics the evolution of North-South bilateral trade according to a simple gravity equation, based on the observed GDP developments (filtering out short-term fluctuations by applying a Hodrick-Prescott filter) and calibrated for a constant trade resistance as measured in 2010. The results are compared against a benchmark situation where developing and developed country GDPs grow smoothly (note that the constant annual rate of growth is higher for developing countries due to convergence) from their initial 1990 value to their final one.

Comparing the simulation with the benchmark (Figure 5) shows the impact of the succession of decelerating/accelerating phases of GDP convergence between developed and developing countries on North-South trade elasticity.

Figure 5 North-South trade elasticity and economic convergence 1990-2015: Counterfactual simulations



Notes: Simulations based on (smoothed) year-to-year changes observed developed and developing countries GDP at market exchange rates; the hypothetical benchmark case simulates a constant rate of economic convergence between 1990 and 2015 GDP endpoints.

Source: Elaborated on the basis of annual data used to build Table 1.

Up to the year 2000, observed GDP convergence and the simulated North-South trade-income elasticity are low and far below the benchmark of monotonous convergence. Convergence speeds up after this date and the elasticity overtakes the benchmark value in 2003 (a phase of accelerating convergence). This process stops with the Global Crisis. Since then, the trade elasticity and income convergence have been going down, with the elasticity returning progressively to its benchmark value.

Trade can still be expected to continue to grow more rapidly than GDP in the future

based on further income convergence. However, it should be noted that what the gravity equation suggests is that trade is not maximised when GDP per capita is similar across countries, but when countries are of a similar economic size. Depending on their respective populations, two countries, a and b , can represent an equal share of world spending but have a different GDP per capita. For example, trade can be maximised between a large poor country and a small rich country, as long as their overall shares in world income are similar. Considering that the most populated countries are found in the South, a corollary of this conclusion is that trade may slow down with income convergence between developed and developing countries. The next section presents a well-known (Anderson 2011) property of the gravity model that may explain why the trade-to-income ratio tends to stabilise once developing countries have reached a certain level of total income.

1.2 Small countries are more open to trade

Considering that the Earth is a closed economy, what is measured as international trade depends in the end on the number of countries participating in the world economy. Their relative openness is also a matter of size, as we shall see. By definition, if we denote as j all the partners of a country ($i \neq j$), $\sum_j s_j = 1 - s_i$. Equation (3), describing the frictionless world, can be rewritten for all partners as:

$$\frac{\sum_j X_{ij}}{Y_i} = \sum_j s_i s_j Y = 1 - s_i \quad (7)$$

Equation (7) implies that the smaller the share of a country in world spending, the higher its level of openness.⁶ Because size is relative, world trade will tend to grow more rapidly when global growth is driven by smaller economies; this leverage effect diminishes with the convergence in the GDP of the trade partners, as in Figure 4.

⁶ Incidentally, this result shows that the trade-to-GDP ratio is not a good indicator of openness from a policy perspective, as it is determined by structural factors that are independent of policies.

Another implication relates to the number of trade partners. If the world is divided into a greater number of countries, there will be more trade independently of any change in income, simply due to the fact that smaller economies will have higher openness ratios. As a matter of fact, the historical tendency has been for an increase in the number of countries, based on the breakdown of colonial empires since the 1950s and the fall of the Soviet Union in the 1990s. Today, there are 193 United Nations member states, compared with only 51 original members in 1945. When the Soviet Union dissolved itself in the early 1990s, the Russian Federation remained with 11 member countries of the Commonwealth of Independent States, while 14 independent states were established from the former Soviet Republics. Other east European countries, such as Yugoslavia and Czechoslovakia, split into two or more national entities. More importantly, the demise of the Eastern bloc opened its members to international trade, after years of administered transactions under planned economy regimes.

The analysis of the Herfindahl index for geographical trade diversification, where a lower value corresponds to a wider geographical diversification of trade partners, confirms that trade now takes place with a higher number of partners (Table 2). The index dropped by 26% for the entire selection of 133 countries surveyed, by 18% for OECD countries and by 36% for non-Latin-American developing countries. The diversification process was not uniform and the Latin American region remained largely outside this geographical trend (the index fell by only 5%).

Table 2 Geographical diversification of trade (Herfindahl index), 1962-2006

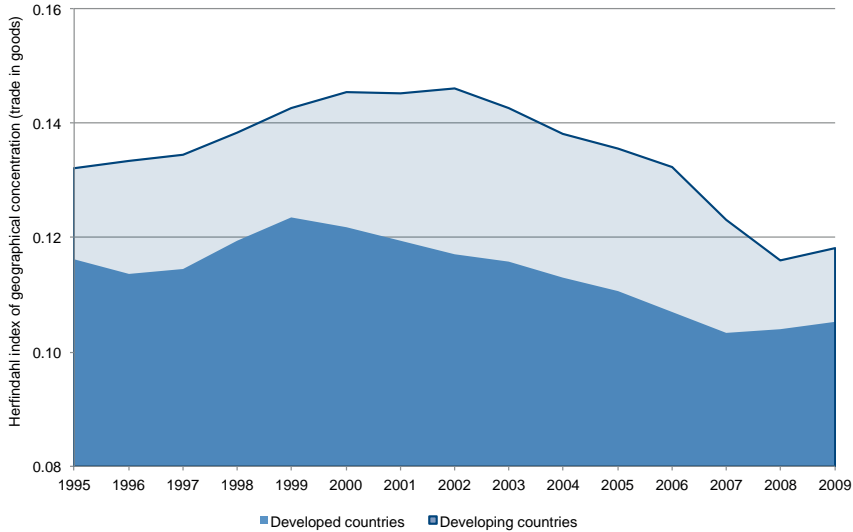
HIT	1962-1970	1971-1979	1980-1988	1989-1987	1998-2006
World	0.208	0.168	0.159	0.157	0.154
- OECD	0.151	0.141	0.134	0.132	0.125
- Latin America	0.229	0.205	0.219	0.223	0.217
- Other developing	0.227	0.169	0.149	0.147	0.146

Note: Trade index measured as the average of Herfindahl index for imports (HIM) and exports (HIX). HIT can vary between zero and unity with a larger number indicating less diversification.

Source: Adapted from Farshbaf (2012), HIM and HIX indices.

Figure 6 shows that the Herfindahl index is higher for developing countries, implying lower geographical diversification. Developed economies started diversifying their trade partners earlier than the developing countries, but the latter rapidly converged in the early 2000s. The Global Crisis induced a reverse of this trend, with a reduction in the number of trading partners for both groups of countries.

Figure 6 Herfindahl index, developed and developing countries, 1995-2009



Source: OECD macro trade indicators.

1.3 More specialisation means more trade

By introducing a product dimension into equation (3), it is also possible to deduce that the more countries are specialised in the production of specific goods and services, the more they will trade. This is a traditional result in Ricardian trade theory, but also an implication of the frictionless gravity world. Specialisation means that the share of a country in world sales for a given product k becomes more disconnected from its share in world spending. If we define as $b_j = E_j/Y$ the share of the partner country in world spending, as opposed to s_j its share in world sales, the difference $b_j - s_j$ increases international trade.

Anderson (2011) points out that world openness in the frictionless world can be expressed as:

$$\frac{\sum_j \sum_{i \neq j} X_{ij}}{Y} = 1 - \frac{1}{N} - Nr_{sb} \sqrt{\text{var}(s) \text{var}(b)} \quad (8)$$

where r_{bs} is the coefficient of correlation between b and s and var denotes the variance. As before, the number of countries ($1/N$) plays a role in world openness and the variance of b and s highlights the role of size similarity. But another determinant is the correlation between s and b , which is an inverse measure of specialisation (the lower the correlation, the higher the specialisation of countries).

The literature has identified a non-monotonic relationship between income levels and product diversification (measured, for example, by Herfindahl indexes at the HS6 level). Cadot *et al.* (2011) point out that when GDP per capita increases, there is first a diversification in exports up to a threshold of US\$25,000 PPP; above this income, concentration takes place again. This suggests that, as developing countries catch up in terms of GDP per capita, one can also expect from equation [8] more trade to be induced by the higher specialisation of developing economies.

2 Can trade frictions explain the shift to lower trade-income elasticities?

On the basis of the previous section, we can now explain why the trade-to-GDP ratio has increased over the past decades. Among those structural factors are the convergence in income, the higher number of countries actively participating in trade and the fact that they are becoming more specialised once they become more affluent. However, we cannot explain some of the short-term variations, and the slowdown in income convergence may not fully explain the recent drop in the trade-income elasticity. Although short-term fluctuations in the composition of demand are probably to blame, as we shall see later, the basic gravity model may still be helpful in understanding the recent trade dynamic. In this section, we look at the potential role of ‘distance’, the variable that we dropped from equation (1) to look at the frictionless world in Section 1.

The role of trade frictions is intuitive, and the past decades have seen a series of technological or institutional advances that have considerably reduced international transaction costs. The decisive invention for merchandise trade was the container, which can be traced back to the 1960s. Since then, progress in transportation, telecommunication and logistics have made trade easier, cheaper and more secure. Institutional changes contributed greatly to reducing frictions, with the end of the Cold War in the 1980s, the signature of the Uruguay Round in 1995 and the gradual adoption by most countries of more open economic policies.

However, it remains quite challenging to measure all of these trade frictions, as they cover a variety of costs faced by exporters and importers. One approach suggested by the gravity literature is to derive these trade costs from observed trade flows. With the help of the gravity equation, some theoretical foundation can be given to these trade costs in order to remove some of the ‘noise’ from the data and to provide an empirical assessment of d_{ab}^2 in equation (1).

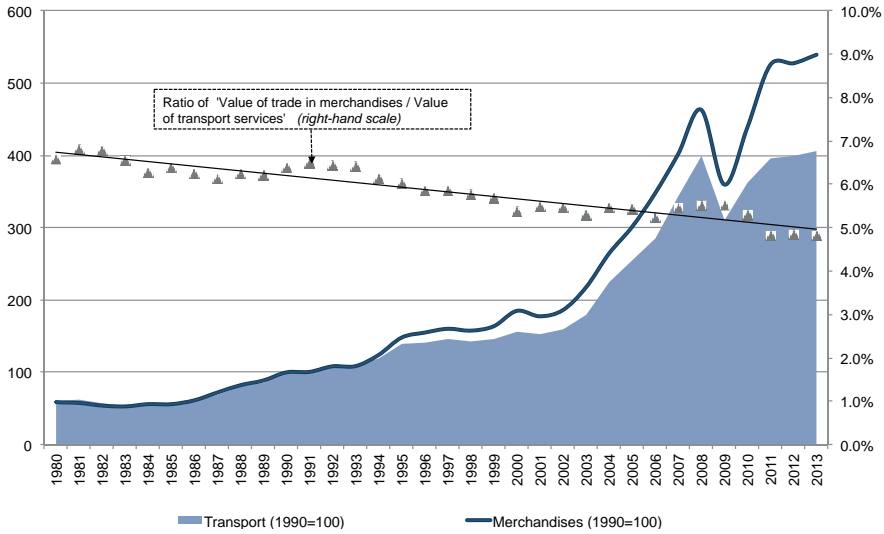
2.1 A slowdown in the overall reduction of trade costs

The North-South simulation in Figure 5 was calibrated using the trade resistance observed in 2010 and overestimates by 30% the trade observed in 1990. This indicates that trade frictions went down during those two decades. Average MFN tariffs applied by WTO members have declined 15% in the past 20 years; developing countries that, in general, had much higher tariffs reduced them by 22%. Today, tariffs in the 15%-25% range have declined considerably. In addition, sectoral and preferential agreements have further reduced the duties charged on international trade. For North-South trade, almost 80% of products exported by developing countries to developed countries were duty free in 2014, compared to less than 55% in 1995.⁷

Another component of trade resistance is transportation costs. Figure 7 shows that the average cost of transporting merchandises (right-hand scale) has been trending down in the past 20 years. This reduction has facilitated trade and most probably contributed to the rapid development of international trade in goods. After 2010, this trend was interrupted and the average cost rose again. Although it is too soon to know if this represents a structural break in the series, the rise in trade costs in the overall difficult context of an economic slowdown may have contributed to lower trade-income elasticity.

⁷ Based on preliminary data from ITC, UNCTAD and WTO.

Figure 7 Transportation services and trade in merchandises, 1980-2013



Notes: Left scale: Nominal value of world trade in merchandises and trade in transport services, normalised for 1990 = 100. Right scale: Ratio of transport services to merchandise values, in percentage (dotted line on the graph). As transportation services include also passengers – a sector in rapid expansion – the fall in the ratio of cost of shipment to merchandise value was probably steeper.

Source: Authors' elaboration on the basis of WTO data.

For a more formal treatment, let us modify equation (1) to reproduce the so-called structural gravity equation (Anderson 2011, Head and Mayer 2014). Assuming identical preferences or technologies across countries, the structural gravity equation is:

$$X_{ij} = \frac{Y_i Y_j}{Y} \left(\frac{t_{ij}}{P_j \Pi_i} \right)^{1-\sigma} \quad (9)$$

where t_{ij} is the bilateral trade cost between country i and country j , with $t_{ij} \geq 1$; the constant σ is the common elasticity of substitution across varieties of products.

The incidence of this bilateral trade cost on trade depends now on trade costs with other partners and is summarised in two 'multilateral resistance terms':

$$(\Pi_i)^{1-\sigma} = \sum_j \left(\frac{t_{ij}}{P_j} \right)^{1-\sigma} \frac{Y_j}{Y} \quad (10)$$

$$\left(P_j\right)^{1-\sigma} = \sum_i \left(\frac{t_{ij}}{\Pi_i}\right)^{1-\sigma} \frac{Y_i}{Y} \quad (11)$$

Π_i^k is the outward multilateral resistance and aggregates the incidence of all bilateral trade costs borne by the producers in country i . P_j^k is the inward multilateral resistance and accounts for the incidence of all bilateral trade costs on buyers in country j . These two multilateral resistance terms are unfortunately not directly observable.

Building on Head and Ries (2001), Novy (2013) suggests calculating trade ‘costs’ (or rather, ‘trade frictions’) in a way that does not require information on multilateral resistance. The trick is to multiply gravity equation (9) describing trade flows from i to j by the corresponding equation for trade from j to i . What is obtained is a measure of bilateral trade costs $t_{ij}t_{ji}$ relative to domestic trade costs $t_{ii}t_{jj}$. τ_{ij} is the geometric mean of barriers to trade in both directions and can be interpreted as a tariff equivalent summarising all existing trade frictions:

$$\tau_{ij} \equiv \left(\frac{t_{ij}t_{ji}}{t_{ii}t_{jj}}\right)^{\frac{1}{2}} - 1 = \left(\frac{X_{ii} \cdot X_{jj}}{X_{ij} \cdot X_{ji}}\right)^{\frac{1}{2(\sigma-1)}} - 1 \quad (12)$$

This measure was used by Jacks *et al.* (2011) to study the role of trade costs in explaining the growth of trade between 1870 and 2000. It is ‘top down’ in the sense that it infers trade frictions from observed patterns of trade and production. It captures the full range of cost factors affecting international trade (including unobservable trade costs and the ‘home bias’, i.e. a preference to consume homemade products, independently of price considerations).

Using a dataset of 40 countries representing 85% of world trade and production (the World Input-Output Database described in Timmer *et al.* 2014), Figure 8 provides some

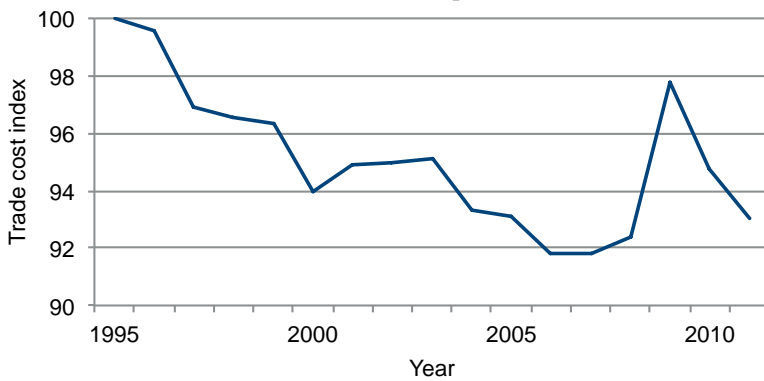
information on the recent evolution of trade frictions. They are calculated with the formula of equation (12) and expressed as an index where 1995 = 100.⁸

Figure 8 confirms that there was an important reduction in trade frictions in the 1990s that can be explained both by technological innovations and by important trade agreements such as the enlargement of the EU, the signing of the NAFTA and the creation of the WTO after the conclusion of the Uruguay Round. Interestingly, the process stopped at the beginning of the 2000s and this break is consistent with what we observed in Figure 1. There is a second period where trade frictions fall around 2005, with the lowest level reached in 2006. Trade frictions then increase (starting before the financial crisis) and an important peak is observed in 2008-2009 with the Great Trade Collapse. In 2011, the last year in the dataset, trade frictions are just back to their 2005 levels.

It should be kept in mind that this trade frictions index reflects any type of transaction cost, including the reluctance of companies to trade in the middle of a financial crisis or the 'home bias' (such as the trend observed among some consumers to buy local products). It cannot be interpreted as a surge in protectionism. Nevertheless, it indicates that at the beginning and in the second half of the 2000s, the historical trend of decreasing resistance to trade was interrupted, a key factor in explaining the slower growth of trade.

8 With such an index, the level of trade frictions does not depend on the value of σ , the elasticity of substitution between varieties of products. This parameter is difficult to measure empirically and depends on the composition of trade (more on this in the next section).

Figure 8 Trade frictions index for all WIOD reporters, 1995-2011 (1995=100)



Notes: Including goods and services; the geometric mean of bilateral trade frictions among the 40 countries covered in the dataset is weighted using the geometric mean of the GDP of the two partners.

Source: Authors' calculations based on WIOD data.

2.2 Goods versus services: A composition effect?

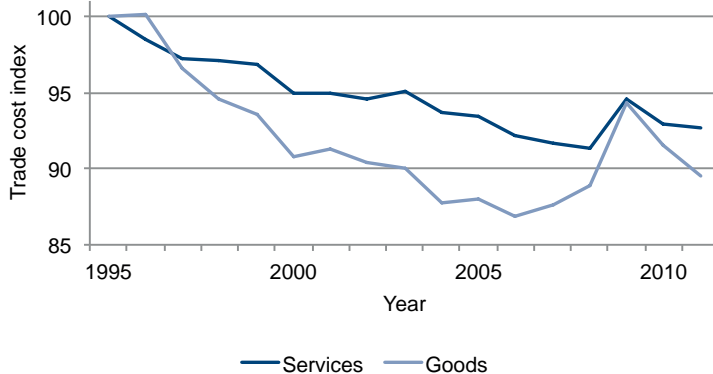
Services were for a long time regarded as 'non-tradable' (Broussolle 2014). For example, when calculating effective rates of protection in the 1970s, intermediate consumption of services was included in sectoral value added as primary factors rather than counted as inputs (the 'Corden formula'). But in fact many services are tradable and there is a shift to services in trade consistent with the shift of GDP towards services activities. Jensen and Kletzer (2006) have developed an index on the tradability of services based on the geographic concentration of services activities in the US. Their results indicate that the degree of tradability varies across activities, but that half of services activities are potentially tradable.

However, trade resistance for services is much higher than for goods (Miroudot *et al.* 2013). Services are generally highly regulated activities and estimates of ad valorem equivalents of the barriers faced by foreign service suppliers are generally high (Jafari and Tarr 2014). Many tradable services are thus not traded much in practice because of barriers. Using the same methodology as for Figure 8, but this time with a separate calculation for goods and services, Figure 9 highlights that starting from 1995 (where

the index is equal to 100), trade frictions for services are decreasing even less than for goods. Only in 2009, with the Global Crisis and the trade collapse, is the level of trade frictions the same (meaning that the Crisis had a similar impact on goods and services).

A trade version of Baumol's cost disease (the argument that by moving towards services that are less productive activities, post-industrial economies are condemned to slower productivity growth) would be that by shifting their supply base towards services that are subject to higher trade frictions, those economies will trade less. It could explain a long-term trend towards lower growth rates in trade (as long as trade in costs in services are not decreasing).

Figure 9 Trade frictions index for goods and services, 1995-2011 (all WIOD reporters, 1995=100)



Note: The geometric mean of bilateral trade frictions among the 40 countries covered in the dataset is weighted using the geometric mean of the GDP of the two partners.

Source: Authors' calculations based on WIOD data.

Services may affect the gravity equation not only through higher trade costs, but also through a different elasticity of substitution (the σ in equation 9). At the aggregate level, this elasticity of substitution depends on the mix of goods and services consumed and whether varieties are more or less substitutable. The impact should be analysed as part of a broader set of demand-side effects.

2.3 Other demand-side effects

As illustrated in Figure 1, the aggregate world trade-GDP elasticity has been higher than 1 in the past decades and nearly reached 3 in the mid-1990s. This aggregate elasticity results from a complex interaction between the demand for imports (trade-income elasticity) and the export-GDP multiplier.

The dynamic of demand for imports depends on many factors. Some are of a short-term nature, as the relative composition of final demand between private and public consumption and fixed investment depends on the business cycle. Those short-term effects have been extensively analysed in attempts to explain the Great Trade Collapse of 2008-2009 and the sluggish recovery (Ollivaud and Schweltnus 2015). But other demand aspects are of a long-term structural nature. One of these is the evolution of national income, and another is the evolution of the purchasing power of this national revenue on the international market. When looking at a long-term relationship between income and the demand for imported goods, another phenomenon is the composition effect between tradable and non-tradable products when household per capita income increases. When income rises, Engel's law indicates that, once basic necessities are fulfilled, additional household consumption privileges superior products, in particular services like education, health and leisure/cultural activities. With the exception of tourism, most of these services are not (easily) tradable. Thus the impact on trade of an increase in per capita income is ambiguous. We should expect a high elasticity when income is low, but a smaller one when income increases over a threshold. Investment will intuitively follow a similar pattern, but for different reasons – low-income countries have limited technological capabilities and need to import most of their capital goods; this dependency is expected to decrease when the economy develops then stabilise. This relationship does not hold for public consumption of imported goods and services, which is expected to remain relatively stable across time or increase with the reduction of trade frictions (e.g. due to international agreements on public procurement).

An assumption in the traditional gravity equation is that preferences are homothetic. Consumers may have a higher or lower income, but they consume goods and services in the same proportion. This assumption does not hold when looking at trade between rich and poor economies. Consumers in poor countries will typically spend a higher share of their income on food than consumers in rich countries (Engel's law). As explained by Caron *et al.* (2014), the prevalence of non-homothetic preferences has an impact on aggregate trade-to-GDP ratios through two channels. First, if we assume that high-income countries have a comparative advantage in income-elastic products (i.e. goods and services for which consumption is very sensitive to the level of income), both poor and rich countries tend to consume more of their own goods than the gravity model would predict under homothetic preferences. Non-homothetic preferences can be one explanation for the home bias observed in trade. Second, if trade costs are larger for the low income-elasticity products or if trade is more sensitive to trade costs for such goods, the trade-to-GDP ratio will tend to be lower for poor countries.

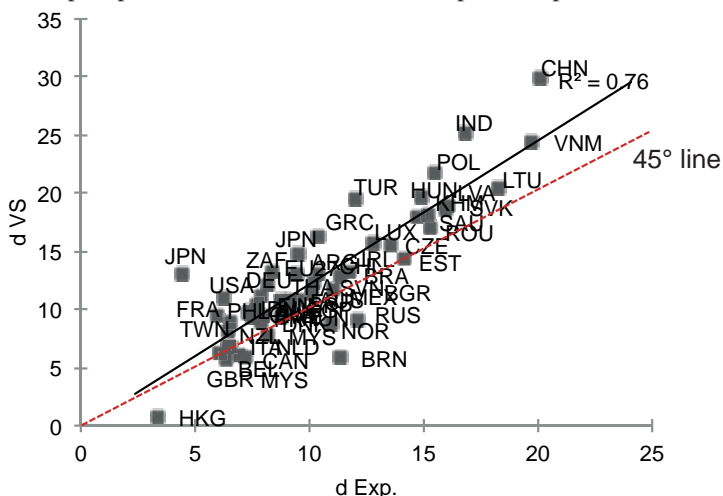
3 The role of global value chains

The emergence of global value chains (GVC) has transformed the traditional way we analyse trade, in particular trade-growth-development linkages. The fragmentation of manufactured production across international supply chains and the higher incidence of foreign inputs in domestic production call also for revising the way we analyse the trade-income relationship. Our equation (1) refers implicitly to a world where countries export final goods in order to import final goods.

Yet, the emergence of global value chains requires looking at trade from the supply side. Importing for producing (either for the domestic market or for exports) or exporting inputs that will be further processed and re-exported by the importing country is a dominant economic reality in the 21st century. Thanks to GVC trade, China has transformed its economy. In 1990 it produced less than 3% of global manufacturing output by value; its share now is nearly a quarter. The network of supply chains that

criss-cross Southeast Asia makes almost half of the world's goods (Economist 2015). Figure 10 shows, on its vertical axis, the evolution of the vertical specialisation (VS) index measured as the proportion of imports in the value of exports.

Figure 10 Export performance and reliance on imported inputs, 1995-2008



Note: Horizontal axis: annual growth of exports at current price; vertical axis: change in vertical specialization index VS. The solid diagonal line is the 45° line where exports increased in line with VS; the dotted line shows the linear regression linking the change in VS with the change in exports.

Source: Authors' elaboration based on OECD-WTO TIVA database.

We claim, following Escaith et al. (2010), that GVCs played a considerable role in the trade creation that is captured by the sudden rise of the trade elasticity in the 1990s seen in Figure 1. When trade is increasingly composed of intermediate products that are exchanged within production networks (global value chains), traditional trade statistics used to measure trade-income elasticities suffer from a double-counting bias: an input imbedded into goods for processing will cross several borders before reaching its final destination. In addition, gross exports may not reflect adequately the economic value that the exporter created, considering that the commercial valuation retained by customs administration includes the value of all the imported parts and components (including intermediate services) used in the production of this export. Thus, GVCs inflate the accounting value of trade.

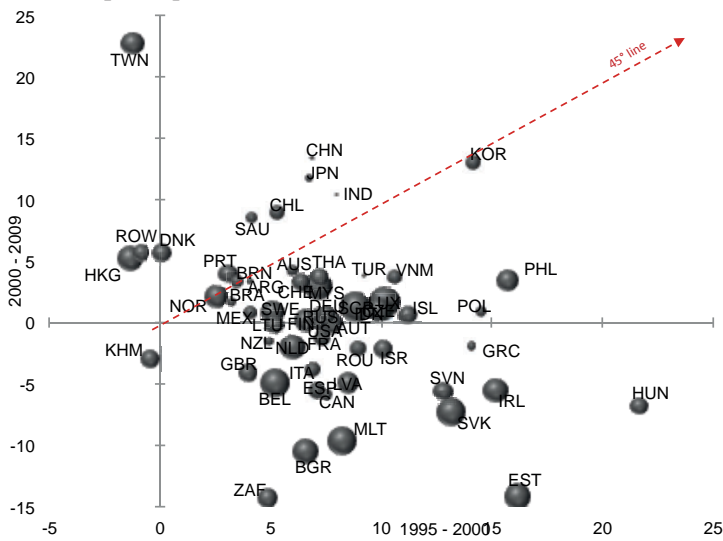
But, more importantly from an economic perspective, GVCs are trade creators, especially for developing countries, by promoting bilateral trade in intermediate goods and services that would not have been possible in a traditional ‘Ricardian’ model of final goods. Globalised firms active in GVC trade are no longer importing inputs for assembly for local sales; they are importing inputs that they process and re-export in the form of goods, parts, components, and services used in some other part of the world. As seen in Figure 10, successful exporters between 1995 and 2008 (those who stand on the right-hand side of the horizontal axis) are also economies who increased more their reliance on imported inputs, as measured by VS, and stand above the 45° line.

3.1 The spread of GVCs

Countries’ integration in GVCs increased rapidly between 1995 and 2000, and the pace of progress has been slower afterwards (Figure 11). The participation index measures the import content of exports (or VS) plus the share of domestic value added exports that is further processed by importing countries. Most countries lie below the 45° diagonal, evidencing a lower progression during the eight years that followed 2000 than during the five years that preceded it. A year-to-year average would even accentuate this difference. Most of the economies that stand above the 45° line and are still increasing their vertical specialisation linkages in the 2000s are located in Asia, with the exception of Denmark, Portugal and Saudi Arabia.

This slowing-down of GVC expansion is consistent with the results found in Figure 1, indicating a return of trade elasticity towards its long-term trend after a ‘bubble’ between 1995 and 2000. Yet, the end of the bubble is not a sign of de-globalisation - Figure 1 showed clearly that if the elasticity is going down, the trade-to-GDP ratio returned rapidly to its maximum level after the 2008-2009 Crisis and keeps increasing (albeit at a slower pace).

Figure 11 GVC participation index, 1995-2008



Note: The horizontal axis shows the evolution (in percentage points) of the index between 1995 and 2000, while the vertical axis indicates the change between 2000 and 2008. Points lying on the 45° line indicate similar rates of growth. The size of the bubble refers to the value of the index in 1995.

Source: Escaith and Gaudin (2014), based on OECD-WTO TiVA database.

The propagation of global value chains is therefore a strong candidate for explaining the bubble observed in Figure 1. In order to check more precisely for the influence of global value chains in the change in trade elasticity, we introduce a value added version of the gravity model.

3.2 Value added gravity

The trade literature has recently put an emphasis on trade in value added. One way to measure trade in value added is to decompose gross exports and identify the domestic contribution in exports (Koopman *et al.* 2014). Another approach, followed by Johnson and Noguera (2012), consists of measuring bilateral value added trade flows. Starting from final consumption in country *j*, they look at the origin of value added in country *i*, not only through the direct exports between country *i* and country *j* but also through inputs produced in *i* and then exported to country *k* to be further processed and shipped

to country j . The same input can also transit through other countries l before reaching j . At the end, ‘exports of value added’ account for all the value added generated in country i and ending up in final consumption in country j .

In order to understand how trade frictions are affected by global value chains, we can use a gravity equation for value added trade, building on the work of Noguera (2012). To derive a value added gravity equation, Noguera starts from equations similar to (9), (10) and (11), but these equations have to be different for final products and intermediate inputs. In a GVC world, inputs are traded and incorporated in the value of exports. As a consequence, trade takes place between i and j also through inputs found in final exports of country k and through inputs from k further processed in l before reaching j .

The value added gravity equation is then obtained through a first-order log-linear Taylor approximation. It expresses the change in bilateral value added trade flows, \hat{V}_{ij} , as a function of changes in economic mass variables (\hat{Y}), bilateral trade costs (\hat{t}), multilateral resistance terms ($\hat{\Pi}$ and \hat{P}), and the global input-output structure (with parameters s_{ikj} and ϕ_{iklj}):

$$\hat{V}_{ij} = \sum_k s_{ikj} [\hat{Y}_k + \hat{Y}_j + \hat{Y} + (1-\sigma)(\hat{t}_{kj} - \hat{\Pi}_k - \hat{P}_j)] + \sum_k \sum_l \phi_{iklj} [\hat{Y}_k - \hat{Y} + (1-\sigma)(\hat{t}_{kl} - \hat{\Pi}_k - \hat{P}_l)] \quad (11)$$

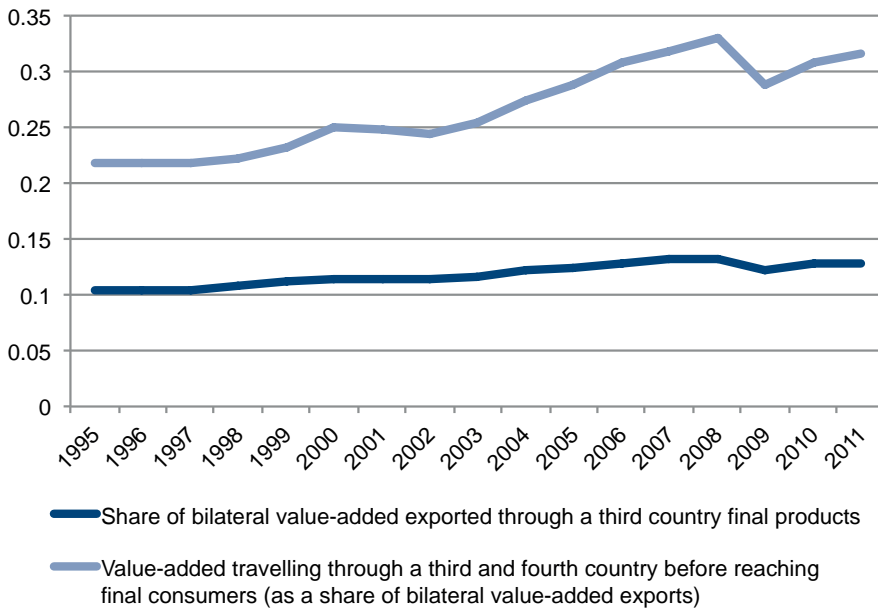
In the absence of intermediate products, the above equation simplifies into a linear version of equation (9), in particular because there is no country k different from i (and no country l either). What is different in equation (11) is that bilateral trade is a function of the economic mass of all countries k (including country i) and the trade costs between these countries k and other countries l through which the inputs can transit as part of the global value chain.

The incidence of the economic mass and trade costs (and multilateral resistance terms) from these k and l countries depends on the input-output structure of the world economy. The first parameter, s_{ikj} , indicates the share of value added from country i to country j embodied in a country k 's final product to country j . The second parameter, ϕ_{iklj} , is

the value added from country i embodied in intermediate inputs produced in country k which, after travelling through possibly many countries l , are ultimately absorbed as final demand in country j , relative to the value added exports from i to j .

Using the WIOD dataset, Figure 12 shows the evolution of s_{ikj} and ϕ_{iklj} over time (an average across reporters and partners) when countries k and l are different from i and j . Over time, the contribution of economic mass variables and trade frictions from third countries has increased as determinants of bilateral trade flows.

Figure 12 Value-added gravity parameters, 1995-2011



Note: Simple average of s_{ikj} and ϕ_{iklj} across 40 countries for k and l different from i and j .

Source: Authors' calculations based on the WIOD dataset.

Equation (11) is important to understand the role of global value chains in changing the relationship between trade and income. In gross terms, there is potentially an overestimation of trade (exports or imports) because of the double-counting of inputs. This double-counting does not exist in GDP, where only the contribution of net trade is measured ($X-M$). When estimating the gravity equation in value added terms, the measure of value added trade is consistent with the definition of GDP as the sum of

sectoral value added. What we can learn from the value added gravity equation is not that trade frictions are systematically higher in a GVC world, nor that the impact of economic mass is higher or lower, but that the determinants of trade go beyond bilateral variables. Third countries providing inputs, and the relationship between these third countries and other countries through which inputs transit, influence bilateral trade flows. The overall impact depends on the coefficients of the global input-output structure, but there is no reason to assume that trade frictions are systematically higher or lower.

This is consistent with the scenario of a GVC bubble where first companies have interpreted the decrease in bilateral trade frictions as an opportunity for lower costs through the offshoring of activities and the fragmentation of production, but where the complex interactions between trade frictions in various countries that equation (11) tentatively describes have may not have always brought the expected economic benefits for companies. They have then adjusted their strategies and, after a period of adjustment, the trade-income elasticity reverts to its long-term trend.

4 Conclusion

Contrary to the most pessimistic forecasts, the world economy did not enter a phase of de-globalisation after the 2008-2009 Global Crisis and the resulting Great Trade Collapse. While the trade-income elasticity has been returning to its pre-1990s long-term values, the world economy is much more open to trade today than it was 25 years ago. We have shown in this chapter that part of the slowdown in trade can be attributed to a slowdown in the rate of economic convergence between developed and developing countries, after a phase of high growth differentials from the mid-1990s to the mid-2000s.

The rise of global value chains was another factor that contributed to this phenomenon. GVCs impacted trade through several angles. First, production fragmentation increased trade in intermediate goods, leading to a significant amount of double-counting.

Second, GVCs created trade opportunities for (small) developing countries that would not have existed in a traditional Ricardian trade in final goods. Finally, by boosting the industrialisation process of labour-abundant developing countries, GVCs created the conditions for the faster economic growth that caused the rapid convergence mentioned above. On a more qualitative note, GVCs were also functional in fostering a greater specialisation in product varieties, itself a factor increasing trade among countries with similar resource endowments.

Behind the rise of GVCs is the reduction of trade costs, be they monetary (tariffs, transportation), cognitive or administrative (convergence of consumer preferences, market intelligence, common industrial norms, trade facilitation, etc.). There was a significant reduction in trade frictions in the 1990s, explained both by technological innovations and by important trade agreements.

On the other hand, other factors such as demand-switching worked in the opposite direction. With a rise in income, household consumption of services such as housing, health and education increases more rapidly than demand for goods (Engel's law). Most of these services are less tradable than merchandise and the trade-in-services frictions in a gravity model tend to be higher than for goods.

After the so-called 'Glorious Fifteen' that saw the emergence of large developing countries and the appearance of new key players in the world economy, the slowdown in trade was to be expected, independently of the 2008-2009 Crisis. Actually, this slowdown is mainly due to 'good reasons' (a reduced gap in economic size between industrialised and emerging countries, higher per capita income and higher demand for services). The weight of 'negative' factors, such as increased perception of economic and geo-political risks, should not be minimised, but it was not a decisive driving factor in this slowdown, nor were the so-called 're-shoring' or 'near-shoring' movements (near-shoring does not affect the trade figures, even if it implies higher resistance to trade over long distances).

This relative optimism remains conditional on the stability of the macroeconomic global environment. As Figure 1 indicated, the trade-income elasticity may fall below its long-term value in times of economic stagnation, as was the case in the 1980s' stagflation years. Other factors may also induce a (temporary) reduction of trade in commodities: higher self-sufficiency in energy consumption (shale oil, but also new energy sources), and the end of the commodity 'super-cycle' when China moved away from an investment-led economic growth pattern towards a more balanced pattern.

Although in the long run, rising income in the developing countries will induce a shift towards less trade-intensive products such as services, there is still a long march ahead towards this post-industrialisation frontier for many developing countries. Per capita income in emerging countries is still far below the average for industrial countries and many developing countries are still far from having fully integrated into the most dynamic modalities of world trade, in particular GVCs and services. Those countries that are suffering from high trading costs are also the main beneficiaries of the Trade Facilitation Agreement. By many estimates, trade costs remain quite sizeable. Even for a 'representative rich country' for example, Anderson and van Wincoop (2004) have estimated that the ad valorem equivalent of trade costs could be as high as 170%. As shown by Arvis et al. (2013), customs formalities and trade procedures that result in unnecessary delays or complexities to traders constitute an important component of these costs. We show that trade resistance declined less in the case of services than for goods. Even in developed countries, there are still important barriers to trade in services (OECD 2014). The WTO Agreement on Trade Facilitation, concluded in Bali in December 2013, represents an important milestone for trade frictions by creating an international framework for reducing the costs related to custom procedures. An agenda to reduce other non-tariff barriers would bring trade closer to its frictionless level.

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8 A value-added trade perspective on recent patterns in world trade

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The discussion about structural changes in world trade since the Great Trade Collapse is mainly based on the development of gross trade per unit of GDP. This is partly historical, because the System of National Accounts is based on gross trade.¹ From an analytical perspective, however, an understanding of structural patterns in world trade requires that we go one step deeper. Gross trade concepts involve double-counting of trade flows, because imported intermediates used in the production of exports are counted again when the exporter sends his exports across a border (Koopman et al. 2014). Trade in value added avoids these double-counting issues and accounts only for the value added embedded in intermediate input, which allows a better understanding of how global value chains (GVCs) operate. Focusing on trade in value added may thus reveal the undercurrents of specialisation and competitiveness that shape the globalisation pattern.

Our contribution to the debate on the global trade slowdown is to use trade in value-added statistics to assess the recent trade dynamics. We focus on three claims in the recent literature on structural changes in world trade patterns:

- The trade slowdown is structural in nature and not caused by cyclical factors such as changes in the composition of GDP over the business cycle.

¹ The gross trade concept has its own merit. Gross trade is important for margin services like transport, trade and insurance that are often based on the volume and value of total trade.

- A structural fall in long-term trade elasticities is caused by a slowdown in foreign outsourcing (offshoring). This especially affects trade by the US and China.
- The fall in world trade elasticity is caused by a combination of regional shifts:
 - an increase of the total import share for regions with a low trade elasticity;
 - an increase in relative GDP growth of regions with a low trade elasticity; and
 - decreased import elasticities in some regions.

We use data from the World Input-Output Database (WIOD) project over the period 1995-2011 (Timmer 2012), which includes five years of the Global Crisis, if we allow for the fact that 2007 demarcated the start of the Crisis in some countries (Laeven and Valencia 2012). A limitation with value-added trade statistics is that they are based on input-output tables that only become available with a time lag. The most recent value-added trade statistics are available up to 2011. For the most recent period, we therefore use supplementary data from CPB's World Trade Monitor (WTM) database.

A look at the recent literature

After world trade bounced back from the Great Trade Collapse of 2008–2009, the growth of global trade was only 3% in 2012-2013, against an average of 6-7% in the preceding 35 years. Recently, various papers have discussed this slowdown, with the major point of discussion being whether it is cyclical or structural. Structural elements could include a decline in GVC trade, a surge in protectionism, changes in the trade composition (services versus goods) or a shift between demand components (consumption versus investment).

Constantinescu *et al.* (2014, 2015) claim that the decline of GVCs is an important explanation for the trade slowdown. They argue that the large trade-to-GDP elasticities in the 1990s were due to the increasing fragmentation of production driven primarily by the US and China. Since the mid-2000s, the importance of foreign inputs for production in China (particularly of US origin) has levelled off, suggesting that the growth of international fragmentation of production lines is stalling. While this is a structural

factor, the ratio of trade to GDP could still increase if GVC patterns evolve in other regions in the world. Ferrantino and Taglioni (2014) approximate GVC trade essentially by 'imported intermediate goods'. They show that a fall in GVC trade may have driven the Great Trade Collapse; GVC trade has decreased more than total trade has. However, in the last few years the share of GVC in gross world trade has returned to the levels that prevailed before the Great Trade Collapse. Boz *et al.* (2014) conclude that GVC trade cannot be an important driver of the recent slowdown in trade and that regional demand factors explain at least half of the slowdown. This is cautiously supported by a paper from the European Commission (2015). All papers suggest that increased protectionism could also have contributed (albeit marginally) to the slowdown, but because of the intrinsic difficulties of measuring protectionism and the lack of recent data, to date no paper has been able to draw definitive conclusions on its role.

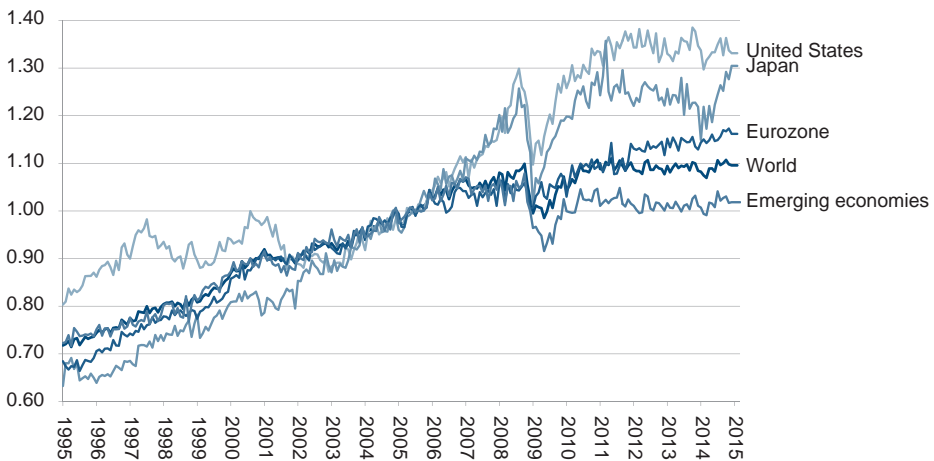
Gross and value-added trade

Remarkably, all papers address the slowdown in global trade using the traditional statistical data on trade. The literature on trade in value added shows that traditional gross trade statistics can present a misleading picture of international trade relations, in particular for countries that are highly integrated in global supply chains (Johnson and Noguera 2012, Koopman *et al.* 2014, Lejour *et al.* 2014). The internationalisation of the supply chain into global value chains has led to complex, integrated trade networks, which do not show up in traditional trade statistics. The value added composition of final exports no longer reflects domestic value added. An important share of value added comes from third countries via intermediate inputs. Thus, traditional gross trade statistics usually overstate real trade flows and are less suitable to analyse GVC trade. When intermediate inputs cross borders more than once (and sometimes they do so several times), there is a double-counting issue. Value added previously embedded in the intermediate input is counted every time there is a cross-border movement. Francois *et al.* (2013), using GTAP data, show that this type of trade overstatement is larger for manufacturing than for commercial services.

Global trade slowdown since 2008?

For an up-to-date snapshot of relative trade growth, we use the ratio of the export volume over the industrial production volume. Trade intensity measured in this way is a gross trade indicator, but it has the advantage that we can use monthly data from CPB's WTM database, which is available up to the first quarter of 2015.² Figure 1 depicts this indicator for the world total and four regions.

Figure 1 Trade intensity: Merchandise export volume over volume of industrial production, 1995-2015Q1, by region, monthly indices (2005=100)



Note: Emerging economies includes Central and Eastern Europe, Asia except Japan, Latin America, Africa and the Middle East (see CPB 2013).

Source: Own calculations using the WTM database.

All regions experienced a set-back in their trade intensity ratio in 2008-2009, but by 2011 the world average had regained its 2008 level and has stabilised since then. This implies that world trade intensity has stagnated in recent years. In emerging

2 Industrial production volume is weighted, seasonally and working-day adjusted, with reference 2005=100; it does not include construction activities. World export volumes are seasonally adjusted, also with reference 2005=100 (cf. documentation for the CPB World Trade Monitor (CPB 2015)). The relative trade ratio does not account for services trade and it does not inform about changes in the composition of merchandise trade.

countries, trade intensity has structurally dropped by around 5%, but here again we see a stabilisation since 2012. The three other large trade blocs experienced increasing trade intensity after 2008. The Eurozone had a small dip in trade intensity, but during the last five years its trade intensity consistently rose to a level that is now about 9% higher than in 2010.³ The US experienced a 20% fall in trade intensity after the third quarter of 2008, but a very quick recovery and further growth up to 2012. Since then, the US trade intensity has been falling mildly.

For a more comprehensive picture, we analyse the trade intensity relative to the gross domestic product. We calculate the trade intensity in terms of gross trade and in terms of value added trade, using WIOD data.⁴ These data also include services, which has a significantly lower elasticity to trade than manufacturing (Ariu 2014). Since 2008, the ratio of world exports growth to global GDP growth has declined compared to the levels that prevailed just before the Great Trade Collapse. For ease of comparison, the trade intensity indicator of Figure 1 is plotted in each of the four panels. It may approximate for the missing GVC indicators for the period 2012-2014.⁵

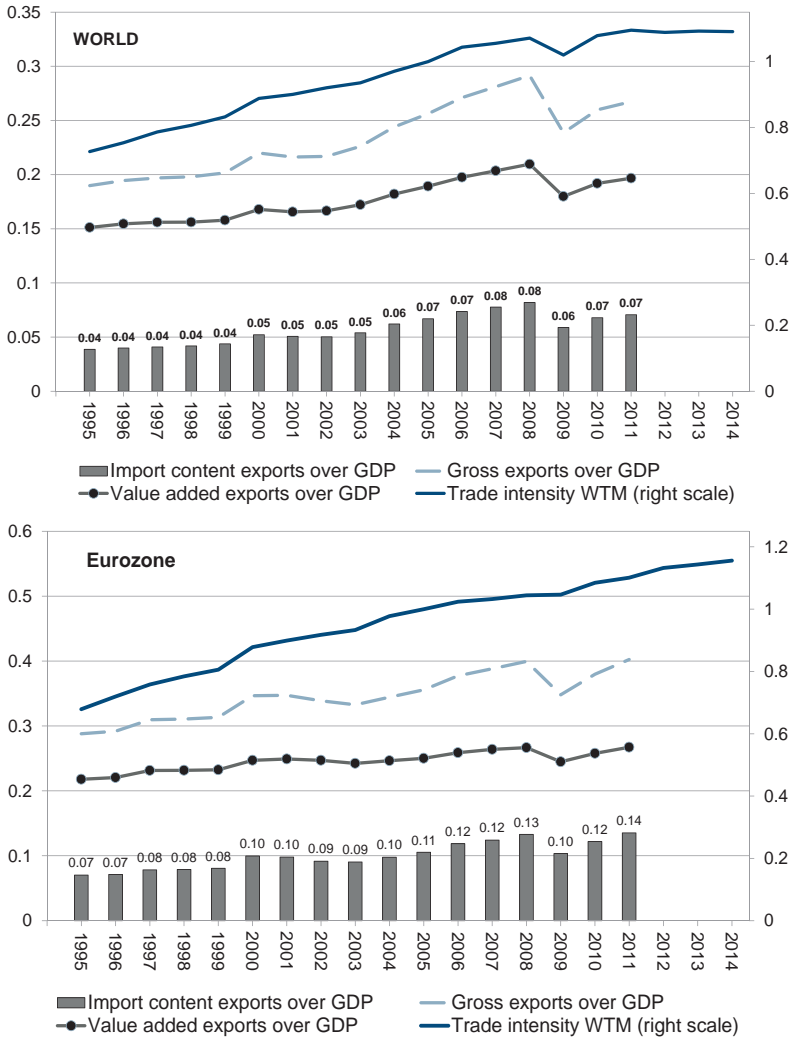
For the world total, the two GDP-related indicators show that trade intensity in 2011 had not yet returned to the pre-2008 levels. The slowdown is most pronounced and persistent for the emerging economies; this holds for all three trade-intensity indicators. Note also that in this region the decline had already started before 2008. Both for the Eurozone and for the US, the GDP-related indicators display a forceful recovery of trade intensity up to 2011. The WTM trade intensity indicator for the Eurozone suggests a further growth in the later years, while for the US a stabilisation occurs.

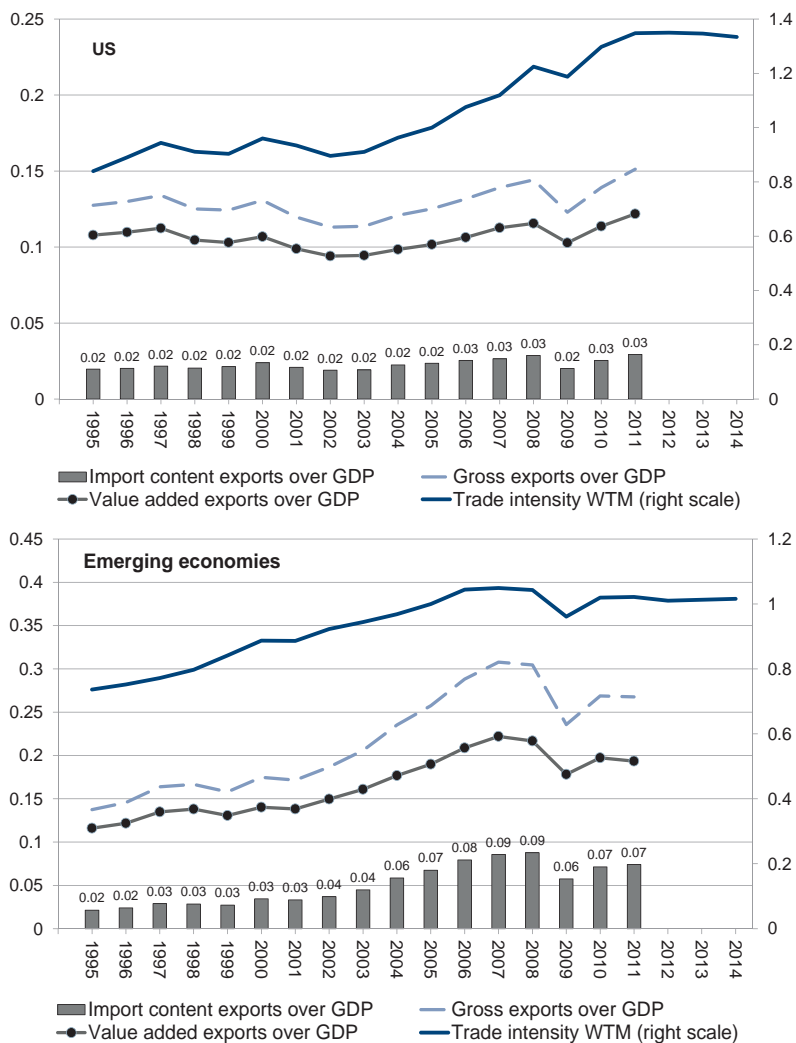
3 The small 2008-2009 dip in trade intensity is due to the fact that the large dip in exports went along with a similar dip in industrial production. This again relates to the open character of the EU economy.

4 For comparability reasons we use the US dollar values from the original database.

5 Note that the WTM trade intensity indicator of Figure 1 compares merchandise exports with industrial production, which is much smaller than the GDP denominator in Figure 2, so that the WTM trade intensity has a higher value. In the panel for emerging economies, China has the largest weight.

Figure 2 Three indicators for trade intensity by region: Gross exports over GDP, value-added exports over GDP, and WTM trade intensity (merchandise exports volume over industrial production volume)





Note: Emerging economies include Central and Eastern Europe, Asia except Japan, Latin America, Africa and the Middle East (see CPB 2013).

Source: Own calculations using the WIOD database and the WTM database.

The bars in the four panels of Figure 2 shows the import content of exports, an indicator of trade via global value chains. For the US, we only see a recovery of this indicator to its 2008 level, whereas in the Eurozone it has grown above this level. In the emerging economies and in the world total, the import content of trade appears to have dropped to 2005 levels.

A fall in long-term trade elasticities?

Using an error-correction model, Constantinescu et al. (2014) find that a fall in the long-term trade elasticity explains the global trade slowdown. We have investigated whether this holds when looking at value added trade. As a first measure we use a three-year moving average of the annual elasticities.⁶

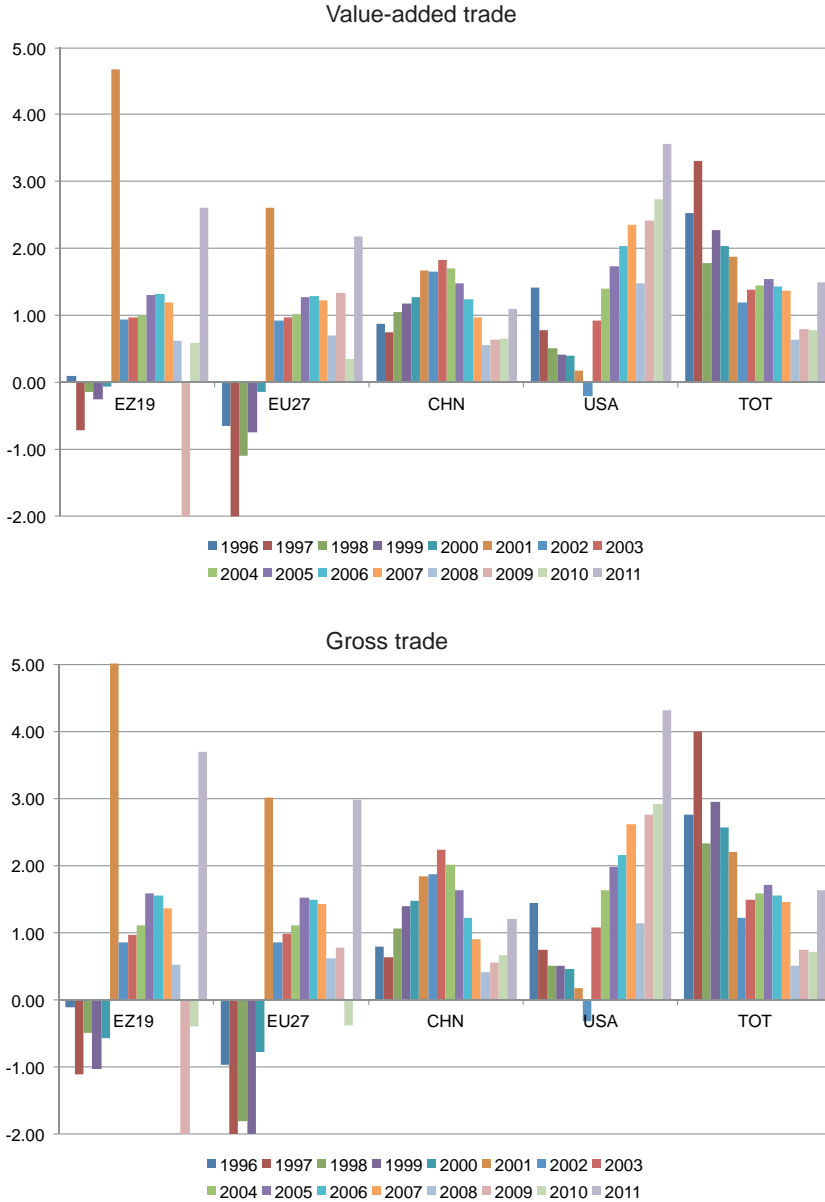
Figure 3 shows that the gross and value added trade elasticities have the same time patterns, although as expected, the gross trade values are generally higher and more volatile.⁷ Global (TOT) elasticities did indeed decrease in the period 1995-2011, with a rebound in the final year. This trend, however, disguises very heterogeneous regional trends. China has a bump-shape pattern. The US trade elasticity fell until 2002, after which a steep increase occurred. In Europe, the trends have been quite volatile around the 1997 and 2008 crises.

Figure 4 compares three- and five-year averages for the long-term trade elasticities. How we calculate the long-term trade elasticity appears to matter for the Eurozone (EZ19) and the EU (EU27). With respect to the three-year averages we see that the European trade elasticity is declining, while using five-year averages we observe a slight increase in the trade elasticity in Europe.

6 The annual trade elasticities display high volatility due to large swings during or after international crises (e.g. 1997 and 2008-2010). Most papers therefore use multi-year averages to smooth the series, but the selection and length of the estimation period also affects the pattern.

7 In what follows we only present the value added values, but both measures show very similar patterns.

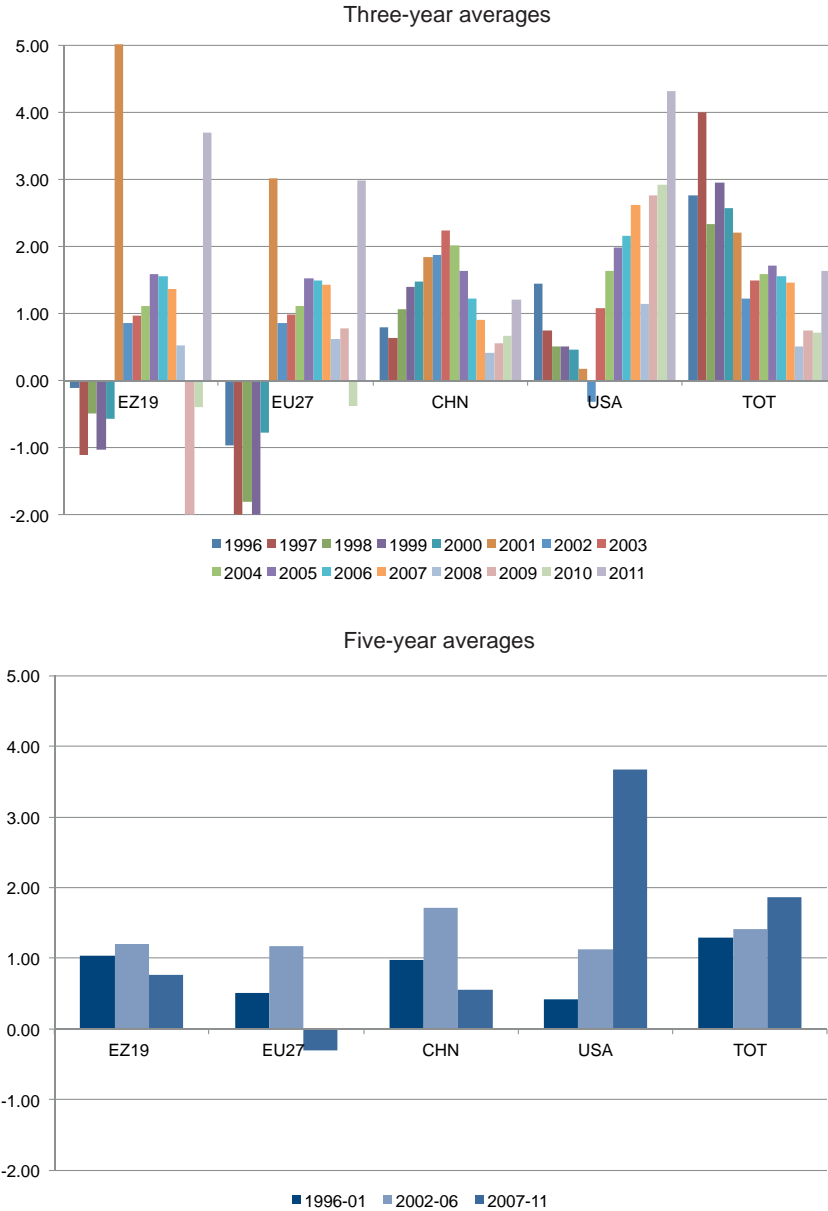
Figure 3 Annual trade elasticities with respect to GDP, three-year moving averages, value added trade (top panel) and gross trade (bottom panel), 1995-2011



Notes: EZ19 are the Eurozone members and TOT is the world. Some values for the EZ and EU exceed the lower and higher boundaries in the graph.

Source: Own calculations using the WIOD database.

Figure 4 Elasticities of value-added exports with respect to GDP, three-year averages (top panel) and five-year averages (bottom panel)



Notes: Some values for the EU exceed the lower boundary in the graph.

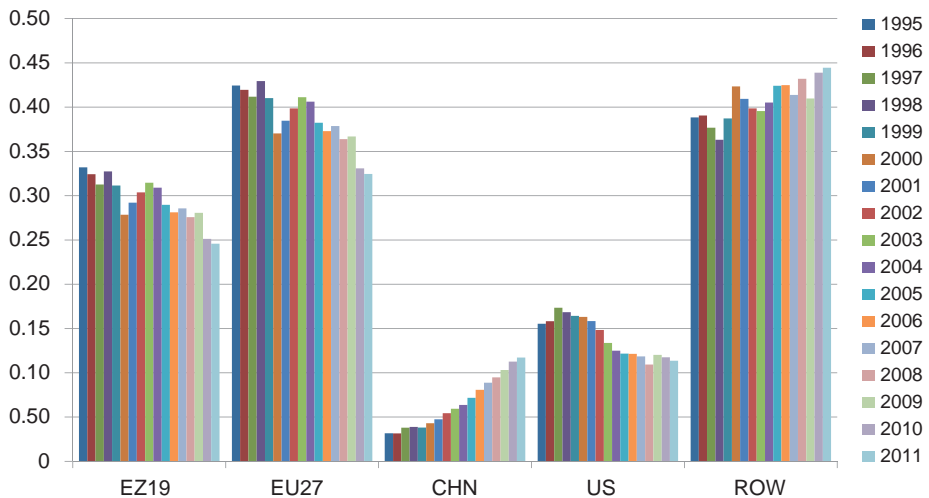
Source: Own calculations using the WIOD database.

In general, we obtain similar results for the world (TOT) as those in the studies by Constantinescu *et al.* (2014) and the European Commission (2015). However, in our results the US trade elasticity is clearly increasing, while the EC study identifies a falling pattern.⁸

Is the fall in world trade elasticity caused by a combination of regional changes?

Figure 5 shows that the shares in total value-added trade have been steadily decreasing for the Eurozone (EZ19), the EU (EU27) and the US, while they are increasing for China and the rest of the world (ROW). Since the latter two regions have lower trade elasticities (cf. Figure 4), the composition changes in world trade may have a negative impact on world trade elasticities.

Figure 5 Regional shares of total world value-added trade



Notes: Rest of the World (ROW) includes all regions except EU-27, China and USA.

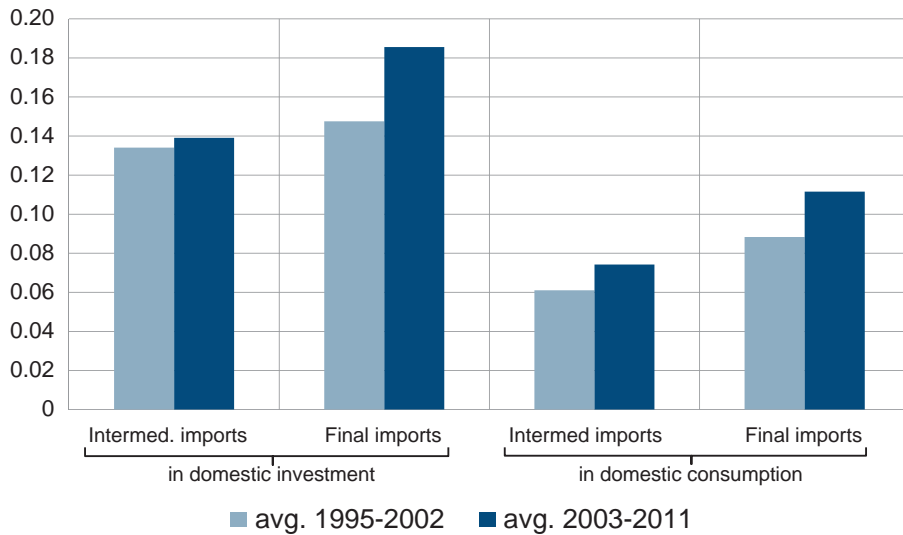
Source: Own calculations using the WIOD database.

⁸ The difference cannot be explained by the fact that the European Commission (2015) study uses WEO data for PPP-adjusted GDP. Our results were confirmed when we used the same WEO data or the World Trade Monitor data.

Is the trade slowdown structural or cyclical?

Constantinescu *et al.* (2014, p. 25) argue that the decreasing long-term trade elasticity is due to structural rather than cyclical factors. However, we find evidence that cyclical changes in the composition of final demand are responsible for at least a substantial part of the trade slowdown. This has to do with the varying composition of GDP over the business cycle – in the downswing the share of consumption is higher than in the upswing. This has consequences for international trade because –as shown in Figure 6 – consumption generates considerably less final and intermediate imports than investment.⁹

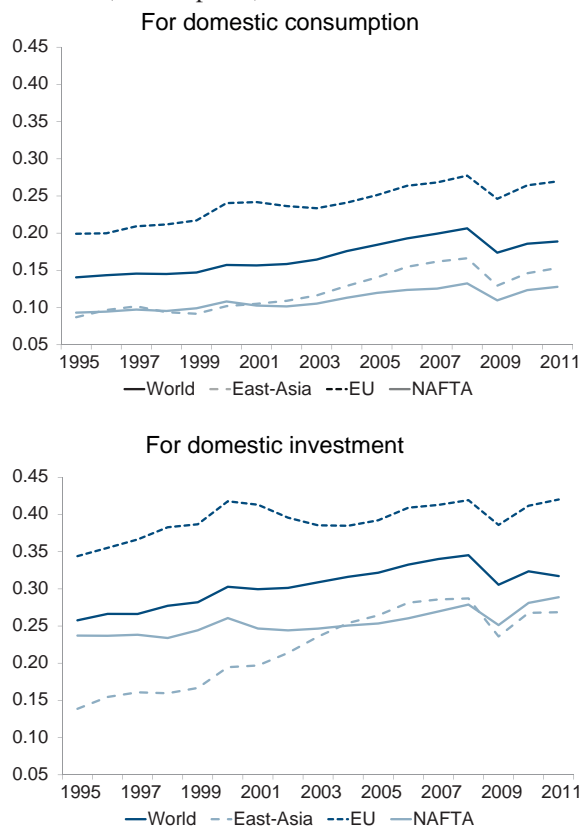
Figure 6 Share of final and intermediary imports in domestic investment and in domestic consumption , world average, 1995-2011



Source: Own calculations using the WIOD database.

⁹ Per unit, domestic investments require more trade than domestic consumption. Imports for domestic investment tend to be more in the form of final imports (such as ships, trains, machines and airplanes). Note that these lumpy final imports in their turn are product bundles based on often complex global value chains before they reach their final destination.

Figure 7 Imports for domestic consumption (top panel) and imports for domestic investments (bottom panel), 1995-2011



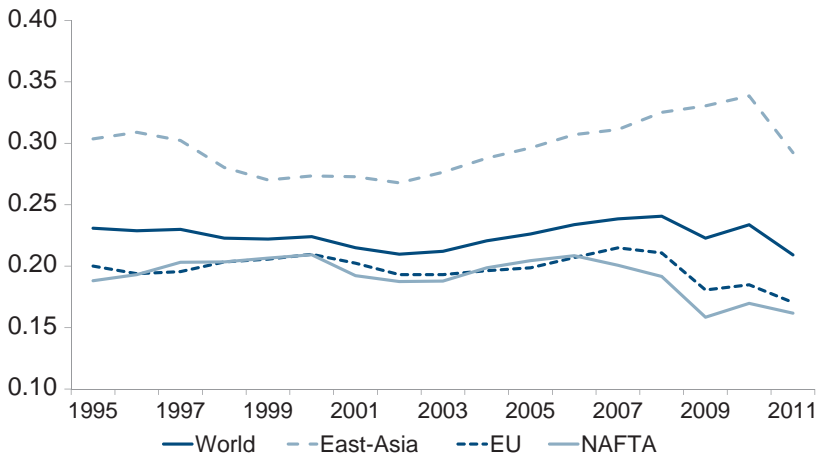
Note: East-Asia consists of China, Japan, Korea and Taiwan. NAFTA is Canada, Mexico and the US.
 Source: Own calculations using WIOD database.

Using WIOD data on trade in value-added, we have also calculated these indicators for three major trade regions over the period 1995-2011. The results are depicted in Figure 7. In all three trade areas, the cumulative import requirements per unit of domestic investment are consistently larger than those for consumption.¹⁰ Figure 8 further shows that the ratio of domestic investment over GDP indeed went down during the last

¹⁰ Figure 7 shows that the import requirements per unit of domestic investment in East Asia almost doubled during the observation period (1995-2011).

crisis in all regions, starting with the NAFTA region in 2006, the EU in 2008 and East Asia in 2011. All other things being equal, the falling investment shares during the recession years after 2008 must in itself be responsible for a substantial part of the trade slowdown.¹¹

Figure 8 Ratio of domestic investment over GDP, 1995-2011



Note: East-Asia includes China, Japan, Korea and Taiwan. NAFTA is Canada, Mexico and the US.

Source: Own calculations using WIOD database.

So, contrary to Constantinescu *et al.* (2014) but in line with Boz *et al.* (2014), we conclude that the trade slowdown is at least partly of a cyclical nature. Once the investment share in GDP increases again, the trade elasticity will presumably go up as well.¹²

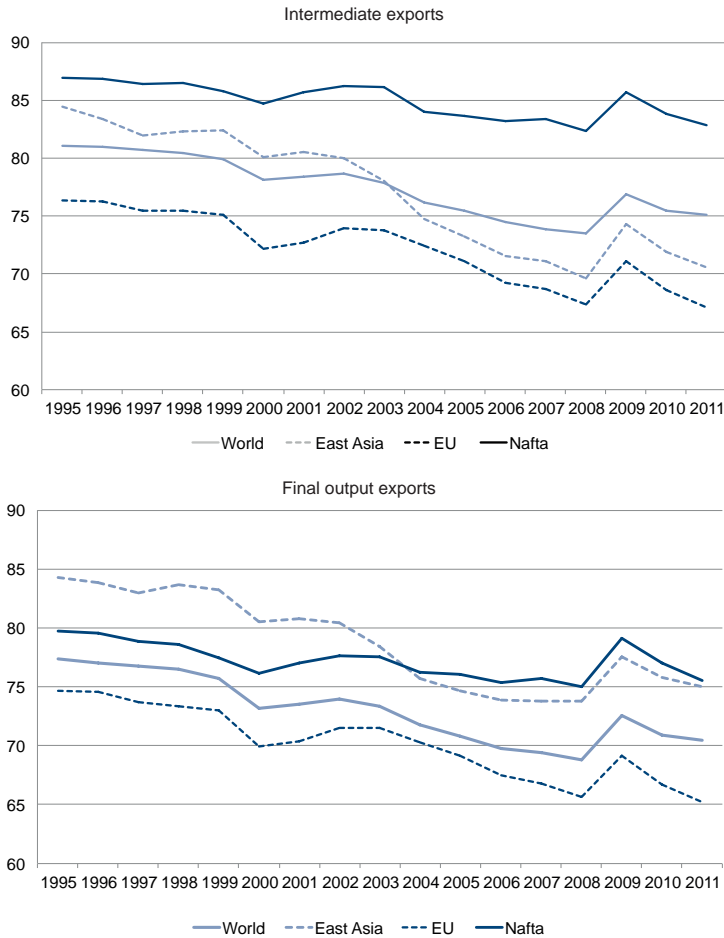
The cyclical analysis requires that we also consider the import contents of domestic exports. The globalisation process of the past 15 years has led to falling domestic value-added shares in both intermediate exports and final output exports. This has occurred in

11 This conclusion assumes that nothing happens with other domestic final demand categories (i.e. government demand and exports). We deal with the trade intensity of exports later on.

12 As a sideline we note that Figure 6 shows that the share of intermediate imports per unit of domestic consumption has risen more over the past 15 years than for domestic investment. This would imply that the cyclical impact of GDP composition on trade elasticities has become smaller over time.

all regions, as Figure 9 shows. The Great Trade Collapse of 2008-2009 was a hiccup in the secular trend towards more foreign content in exports. However, the figure shows that at least in Europe and East Asia, the trend towards falling domestic contents is continuing. The steepness of the curves suggest that it is only a matter of time before new heights in foreign value-added shares could be reached. This would be a sign of further developments in GVC trade.

Figure 9 Domestic value-added share of intermediate exports (left) and domestic value-added share in final output exports (right), by region, 1995-2011



Note: East-Asia includes China, Japan, Korea and Taiwan. NAFTA is Canada, Mexico and the US.

Source: Authors' calculations based on WIOD database.

From the value added trade data, we can conclude that vertical specialisation has largely recovered from the Great Recession, particularly in Europe. For the NAFTA region, for final exports in East Asia and for the rest of the world, restoration of the previous trend seems to be more hesitant. Future data will reveal whether the slowdown of the global vertical specialisation process in these regions is structural rather than cyclical. The more recent data (Figure 1) hint towards a cyclical interpretation, at least for the NAFTA region.

Conclusions

We have focused on three claims in the recent literature on structural changes in world trade patterns.

- We conclude that world trade elasticity has fallen due to a combination of regional and cyclical changes during the Global Crisis. One cyclical factor is the lower cumulative trade intensity of consumer goods compared to investment goods.
- Using value added trade data, we find no evidence for a structural trade slowdown. In contrast, foreign value added shares in final exports in Europe and East Asia are trending towards new peaks.
- The regional changes are caused by an increase of the total import share for regions with a low trade elasticity and decreased import elasticities in some regions.

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9 On the gravity of world trade's slowdown

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As time elapses, it is becoming increasingly clear that the trend in world trade growth is below what it used to be before the 2008-2009 Global Crisis. The shaky trade outcomes resulting from the Crisis, with a deep fall in 2009 and a subsequent rebound, do not make it easy to characterise any underlying structural trend. Still, yearly rates of growth in volume in the order of magnitude of 2% to 3%, as consistently observed for world trade since 2012, are in stark contrast to the 7.7% average growth registered over the period 2002-2007. Even the recent slow pace of GDP growth falls short of explaining this trend. While the volume of world trade frequently grew twice as fast as world GDP before the Crisis, its growth has been comparable, and often lower, in the recent period.

Macroeconomic approaches have been favoured so far in analysing these recent trends, which seems logical given the questions surrounding the cyclical nature of observed outcomes. Yet, trade flows are set at the product level, between pairs of countries. Accordingly, a disaggregated analysis may be helpful to better understand the extent to which these outcomes are in line with structural determinants, whether specific patterns emerged across partners and sectors, and whether significant composition effects were at play.

Since the development of global value chains (GVCs) was a defining feature of the rapid development of world trade before the Crisis, it is also natural to wonder whether this phenomenon may be part of the explanation, as already hinted at by Ferrantino and Taglioni (2014) and Constantinescu et al. (2014). Both analyses show that the rise

of GVCs, which had driven the growth of world trade during the 1990s and the 2000s, has stopped playing this role since the 2008-2009 Crisis. However, such country-level trade analyses may be blurred by composition effects, especially in a period when countries' export capacities and import demands have experienced contrasting changes. In what follows, we focus instead on bilateral trade flows at the sector level. A gravity equation is used to provide a benchmark for bilateral trade relationships and their sector-level behaviour in response to specific shocks. Deviations from this benchmark are then used to interpret the recent slowdown, including the possible role played by GVC participation. Before putting this methodology into practice, we first glance at empirical evidence on the recent trade slowdown, in relation to GVC participation.

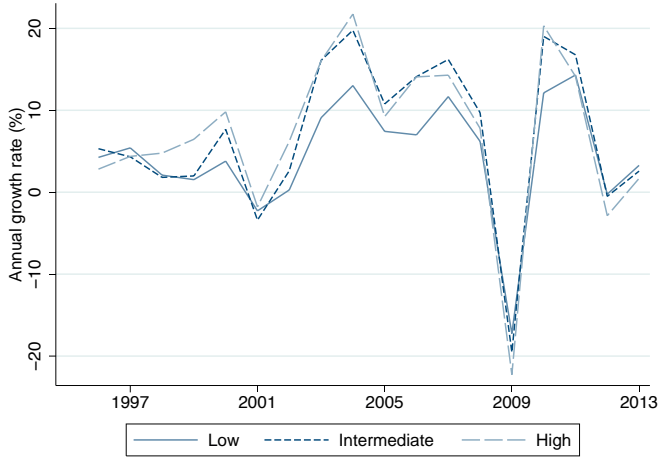
1 Bilateral trade and participation in GVCs: A first glance

Increasingly, products are transformed in one country before being exported to another where they undergo another transformation, often followed by another export and transformation stage. The corresponding development of GVCs transformed international trade over the last quarter of a century. For exports of a given country in a specific sector, GVC participation can be reflected either through the use of foreign inputs in its exports (backward participation) or the use of its exports as imported inputs incorporated in another country's exports (forward participation). Following *inter alia* Koopman et al. (2014), the OECD has built an index measuring GVC participation along these two dimensions (Backer and Miroudot 2013). In view of putting trade outcomes into perspective, we used this index's values from 2008, the last year before the Crisis seriously disrupted trade flows, to classify bilateral trade flows at the sector level into three categories. GVC participation is considered 'high' if both the exporter and the importer exhibit a GVC participation index in this sector above the world median,¹ as 'intermediate' if only one of them is above the median, and 'low' otherwise.

1 The world median is computed based on all country-sector participation index values, for all sectors.

Computing trade growth separately for these three categories gives striking results – in almost all cases until 2008, trade growth turned out to be larger for flows with high or intermediate GVC participation than for those with low participation (Figure 1). However, the reverse is observed for the last two available years (2012 and 2013).

Figure 1 Trade growth by level of GVC participation



Source: Authors' calculations based on BACI (CEPII) and OECD dataset on GVCs (Backer and Miroudot 2013).

Suggestive as this is, these stylised facts may also reflect a composition effect if unrelated sector- or country-specific trends happen to be correlated with GVC participation. To shed further light on the relationship between GVC participation and trade growth, we thus estimate a very general gravity equation of the form:

$$\Delta \ln X_{ijkt} = \Theta_{ijt} + \Psi_{kt} + \lambda_1 \text{interm}_{GVC_{ijk}} + \lambda_2 \text{high}_{GVC_{ijk}} + u_{ijkt} \quad (1)$$

where X_{ijkt} refers to exports in value from country i to country j of product k during year t ; Θ_{ijt} represents a set of yearly country-pair fixed effects taking into account any change in country i 's supply capacity, in country j 's demand, or in bilateral trade costs between these two countries; Ψ_{kt} refers to a set of year-sector fixed effects accounting for sector-specific shocks, for instance of a technological nature; and u_{ijkt} is an error term. The influence of GVC participation is assessed using the above-described characterisation, based on the OECD index. In practice, a dummy variable is used to

denote intermediate GVC participation (as opposed to low participation, the default), and another for high GVC participation. As an alternative, the logarithm of the index of GVC participation for the corresponding trade flow is used as a cardinal variable ($\ln(GVC_{ijk})$).² The estimation results, shown in Table 1, suggest that while GVCs used to boost significantly trade growth before the Crisis, this effect vanished after 2008. While this very general specification leaves many questions unanswered, these results are consistent with GVCs playing a role in the recent trade slowdown.

Table 1 Relationship between participation in GVCs and year-on-year growth of bilateral trade

	Period: 1996-2008		Period: 2009-2011		Period: 2012-2013	
Intermediate GVC (dummy)	0.002		0.003		-0.002	
	(0.86)		(0.90)		(-0.52)	
High GVC (dummy)	0.006***		-0.003		-0.001	
	(2.64)		(-0.61)		(-0.15)	
GVC participation index (ln)		0.003***		-0.001		0.002
		(5.97)		(-1.12)		(1.30)
Constant	0.090***	0.102***	0.009***	0.005	-0.011***	-0.007*
	(65.00)	(62.24)	(2.91)	(1.61)	(-3.09)	(-1.83)
R-squared	0.20	0.20	0.40	0.40	0.15	0.15
N	169,013	167,999	39,003	38,769	26,002	25,846

Notes: ***: significance level = 1%; * : 10% level. T-Students in parenthesis (standard errors are clustered at the country pair-sector level). Estimations are carried out at the sector level, and weighted by the number of non-zero, product-level trade flows with each sector (on average over the estimation period). All regressions include sector-year and origin-destination-year fixed effects. The sample includes the 80 largest countries by trade value in 2008, with EU countries considered individually. Source: Authors' estimates based on BACI (CEPII) and OECD dataset on GVCs (Backer and Miroudot 2013).

2 A gravity-based analysis of trade growth

Achieving a better understanding of recent developments requires an analysis of trade determinants, for which a gravity equation is the most convenient way to proceed. The

2 In practice, the product of each partner's OECD GVC participation index in sector k is used to compute this bilateral, sector-specific index.

traditional gravity equation can rest on a variety of structural models (for a review, see Head and Mayer 2014). Some versions include specific conclusions as to the trade-to-income ratio at the world level. Anderson (2011), for instance, emphasises that in a simple framework where trade frictions are assumed away, “the world is more open the more similar in size and the more specialised the countries are”. However, more complex set-ups do not provide straightforward conclusions as to the level of, or the change in, the world’s openness ratio.³ While there is no reason to conclude that it should systematically increase with income level, nor can it be established that this ratio should be constant, for several reasons. One is that export supply factors may not be exactly proportional to output or GDP, for instance because of changes in the proportion of exporting firms, or because of the changing share of tradable products in total output.⁴ Another noteworthy reason is that import demand is not bound to be proportional to income either.

Our objective here is not to identify the parameters of a given structural model, but rather to address practical questions about recent trade outcomes. Accordingly, we rely upon a rather general version of the gravity equation:

$$\ln X_{ijkt} = a_{ijk} + b_k \ln S_{ikt} + c_k \ln M_{jkt} + d_k Z_{ijkt} + e_{kt} + u_{ijkt} \quad (2)$$

where X_{ijkt} refers, again, to exports in value from country i to country j of product k during year t , S_{ikt} is an indicator of country i ’s supply capacity in sector k , and M_{jkt} is an indicator of country j ’s demand in sector k . Z refers to additional variables which may influence trade flows, such as the existence of a free trade agreement. a , b , c , d and e (with respective indices) are parameters to be estimated. This standard form assumes any determinant of trade specific to country-pair (i, j) in sector k to be constant over time.

3 See, for instance, Baier and Bergstrand (2001) and Eaton et al. (2011) for analyses of the determinants of global trade growth based on bilateral data and gravity equations.

4 As a matter of fact, the openness ratio differs significantly across countries, so that slower growth in the most open countries might also slow down world trade disproportionately. It might also be the case that a subset of bilateral trade flows accounted for a disproportionate share of the trade slowdown.

Dealing with recent years implies severe data limitations when attempting to measure sector-wise supply and demand capacities, since even output or value added figures by sector are usually not available for a large set of countries before two to three years. We thus use economy-wide variables and measure supply capacity as manufacturing GDP, and demand through GDP.

Importantly, this specification also includes year fixed effects, capturing any time-varying factor influencing world trade uniformly – the ‘gravitational un-constant’, as Baldwin and Taglioni (2006) put it. Little attention is often granted to these effects, beyond controlling them so as to avoid interfering with other terms in the equation. This is not enough in the present case, as changes in worldwide determinants of international trade may explain the recent slowdown. The exact nature of these year-specific effects depends upon the underlying structural model, and its determinants are not well known. They include slow-motion determinants, such as transaction costs and weighted averages of real income growth in world income, but also price levels, which evolve far more quickly, as well as, in most models, the value of world income. Given the limited number of degrees of freedom in the data used to identify the form of this ‘gravitational un-constant’, we rely upon a parsimonious modelling, where only the world GDP in value and its deflator⁵ are taken into account:

$$e_{kt} = a'_k + b'_k \ln(p_{\cdot t}) + c'_k \ln(y_{\cdot t}) + v_{kt} \quad (3)$$

where v_{kt} is an error term, and a' , b' and c' are parameters to be estimated. These two equations jointly provide a framework to analyse trade determinants at the bilateral level, over time. However, a difficulty when relying on this framework to analyse recent developments is that the gravity equation is generally thought of as describing the

5 For the sake of consistency, this deflator is expressed in current dollars, obtained with market exchange rates. We added to this specification a Herfindahl index of GDP concentration across the world, to echo the above-mentioned argument about the positive impact of the similarity of country sizes on the level of world trade. The argument was supported by our estimates, but it did not add much to the goodness of fit, while increasing the model’s degrees of freedom in a context where only a limited number of observations are available. For this reason, it is not shown in the results presented here.

structural determinants of trade, as opposed to its cyclical variability. In addition, time to ship as well as contractual relationships may impose additional delays on trade, so that changes in determinants may influence trade with a lag (e.g. Leibovici and Waugh 2015).

We therefore extend the estimation framework using an error-correction model (ECM) specification, based on equations (2) and (3). The corresponding estimating equations are:

$$\Delta \ln X_{ijkt} = \alpha_{ijk} + \beta_k \Delta \ln S_{ikt} + \gamma_k \ln M_{jkt} + \delta_k \ln S_{ikt-1} + \zeta_k M_{jkt-1} + \zeta_k \Delta Z_{ijkt} + \chi_k Z_{ikt-1} + \eta_k \ln X_{ijkt-1} + \epsilon_{kt} + v_{ijkt} \quad (4)$$

$$\epsilon_{kt} = \alpha'_k + \beta'_k \ln(p_{\cdot t}) + \gamma'_k \ln(y_{\cdot t}) + \beta'_k \ln(p_{\cdot t-1}) + \gamma'_k \ln(y_{\cdot t-1}) + v'_t \quad (5)$$

with notations similar to those used before. With this model, the short-term elasticity of exports to supply capacity (i.e. to manufacturing GDP in this case) is β_k and the long-term elasticity is $-\delta_k/\eta_k$. Similarly, γ_k and $-\zeta_k/\eta_k$ are the elasticities with regards to demand capacity (i.e. GDP). Short- and long-run elasticities of world trade to world GDP and to its deflator can also be calculated based on (5). Since it is a priori better suited to coping with the kind of short-term variations at stake here, we use this latter specification in what follows.

To analyse the recent slowdown, we estimate this two-stage model over the period 1996-2008. Eight sectors are considered, a classification guided by our willingness to use the above-mentioned OECD's indicator of participation in GVCs. Sector-specific elasticities resulting from these estimates are shown by sector in Table 1.⁶ For most sectors and on average, the sum of estimated elasticities with respect to exporters' and importers' GDP is close to 1 in the short term, but well beyond this level in the long term (1.71 on average), meaning that GDP growth differentials across sectors and countries are reflected more than proportionately in trade flows. In addition, the

⁶ More detailed results are available upon request.

gravitational un-constant also varies with the world GDP value and with its deflator. Accordingly, the implied elasticity of world trade (in value) with respect to world GDP (in value) is conditional upon changes in the world GDP deflator. Over the estimation period, the world GDP deflator increased at a rate equal to 45% of the growth rate of world GDP in value.⁷ For the sake of illustration, let us assume that this proportion between the growth rates of world GDP value and the deflator holds, and let us consider the hypothetical case where the world economy grows in value in a uniform way (i.e. each country's GDP and manufacturing GDP's value grow at the same rate as world GDP). In such a case, the elasticity of trade with respect to GDP would be the sum of the elasticities with respect to exporters' manufacturing GDP, to importers' GDP and to world GDP, plus 45% of the elasticity with respect to the world GDP deflator. In the short term, this conditional trade-to-GDP elasticity is estimated to equal 1.48 ($0.31+0.78+1.01-0.45*1.38$); in the long term, it is 1.72.

Whether at the disaggregate level or at the worldwide level, these estimates show that, throughout the estimating period, the norm has not been for trade to grow in line with world GDP, but rather as a multiple of the GDP growth rate. This result is obtained controlling for the entry into force of new FTAs (estimated to increase trade by 3% in the short term and 22% in the long term). Different explanations may be put forward for this trend, such as declining transport and transaction costs, or pro-trade policies aimed at supporting exports but also frequently at easing imports, at a time when the potential benefits from participation in GVCs were increasingly obvious for a number of developing countries (Baldwin 2012). However, adding a linear time trend to the estimations above does not alter the results significantly, suggesting that this trade-income nexus is more than a coincidence, even though disentangling the corresponding main channels and mechanisms is outside the scope of this chapter.

⁷ The average world GDP yearly growth rate was 5.8%, compared with 2.6% for world GDP deflator. The ratio between these growth rates remained similar over the period 2008-2013, at 51%.

Table 2 Estimated pre-Crisis elasticities of trade

	Elasticity wrt exporter's manuf. GDP		Elasticity wrt importer's GDP		Conditional, total trade-to- GDP elasticity	
	Short term	Long term	Short term	Long term	Short term	Long term
Food	0.24	0.45	0.66	0.76	0.01	1.49
Textile	0.23	0.60	0.72	0.69	1.15	0.67
Wood-Paper	0.20	0.78	0.77	0.94	2.02	1.33
Chemicals	0.31	0.77	0.46	0.56	0.49	1.79
Metals	0.19	0.83	0.78	0.89	2.95	2.41
Machinery	0.48	1.17	0.79	0.93	1.27	1.94
Transport	0.39	0.95	1.24	1.12	2.02	2.20
Electrical- Optical	0.43	1.22	0.85	0.95	1.93	1.85
Average	0.31	0.85	0.78	0.86	1.48	1.72

Note: Two-stage estimates, based on (4) and (5), for the period 1996-2008. All variables are expressed in value. The sample includes the 80 largest countries by trade value in 2008. Estimations are carried out at the sector level (eight sectors, see Figure 4), and weighted by the number of non-zero, product-level trade flows with each sector (on average over the estimation period). The conditional, total elasticity is computed according to assumptions described in the text.

Source: Authors' estimates based on BACI (CEPII), GeoDist (CEPII), WDI (World Bank) and OECD dataset on GVCs (Backer and Miroudot 2013).

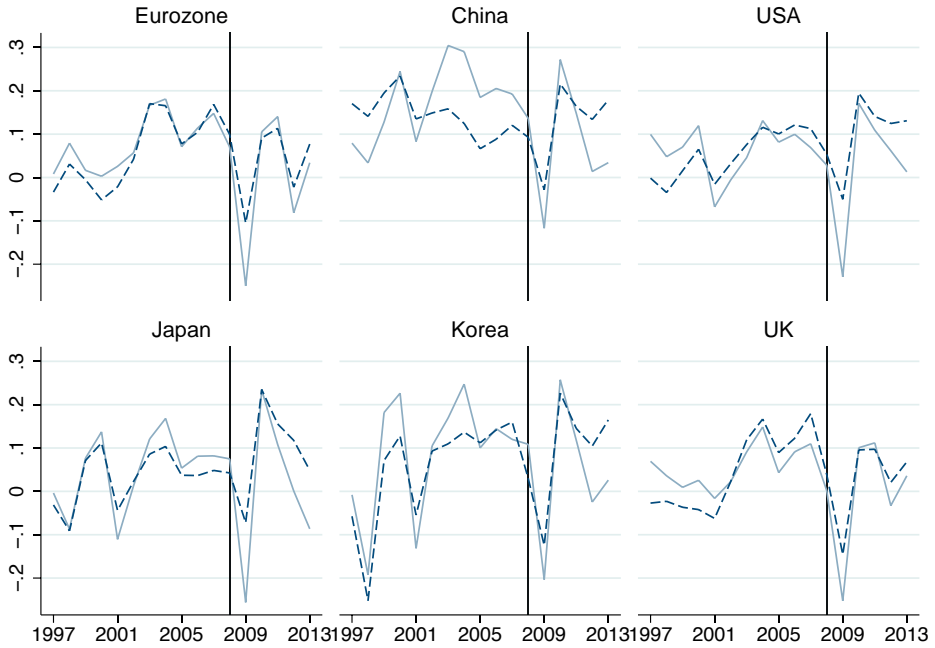
3 Post-Crisis outcomes fall short of predictions based on the pre-Crisis trade model

Comparable elasticity estimations for the Crisis and post-Crisis periods would lack robustness, given the limited number of observations available. Instead, we use out-of-sample predictions to analyse whether a structural break may have occurred. Based on observed changes in GDP and in its deflator (at the country and world level, and for manufacturing in the case of exporters), these predictions are carried out for the second-stage estimation of the yearly gravitational un-constant, and then to first-stage estimates, based on predicted yearly fixed effects. These predictions are made at the sector level, by country-pair (predicted and observed values of trade growth at the individual flow level exhibit a correlation coefficient of 56% before 2008, and 36% afterwards). To illustrate how this model fits with trade outcomes observed after 2008, predictions and observations were then aggregated.

At the world level, our model predicts an average yearly growth of trade in value of 8.1% over the period 2012-2013. This is significantly less than the model's average yearly prediction for 2002-2008 (10.6%), but slightly more than for the period 1996-2008 (6.7%). The dollar value of world trade actually stagnated in 2012-2013, in stark contrast to its average actual yearly growth over 2002-2008 (11.5%), and even between 1996 and 2008 (8.5%). Accordingly, the slowdown in world trade is far from being explained by its determinants. According to our pre-Crisis model, slower growth explains a decline of 2.5 points in the yearly growth rate in value compared to the immediate pre-Crisis period, when the total decline amounted to 11.5 points.

Disaggregation by country shows that observed trade growth fell short of what the model predicted in most countries. This is the case for 18 of the 20 largest countries (counting the Eurozone as one), Mexico and India being the only exceptions. The six largest trading countries all exhibit a negative prediction-to-realisation gap (Figure 2). The most striking feature is probably the very large gap observed for China – growth was as much as 15 percentage points lower than predicted by our model, while the opposite held for the country in the early 2000s, with observed trade growth then substantially outperforming model predictions. This result presumably reflects the ongoing rebalancing of the Chinese economy towards domestic consumption, and more generally the ongoing structural change of Chinese foreign trade, in which normal exports by Chinese companies are now the most dynamic component, while processing trade by foreign companies is significantly slowing down (e.g. Lemoine et al. 2015).

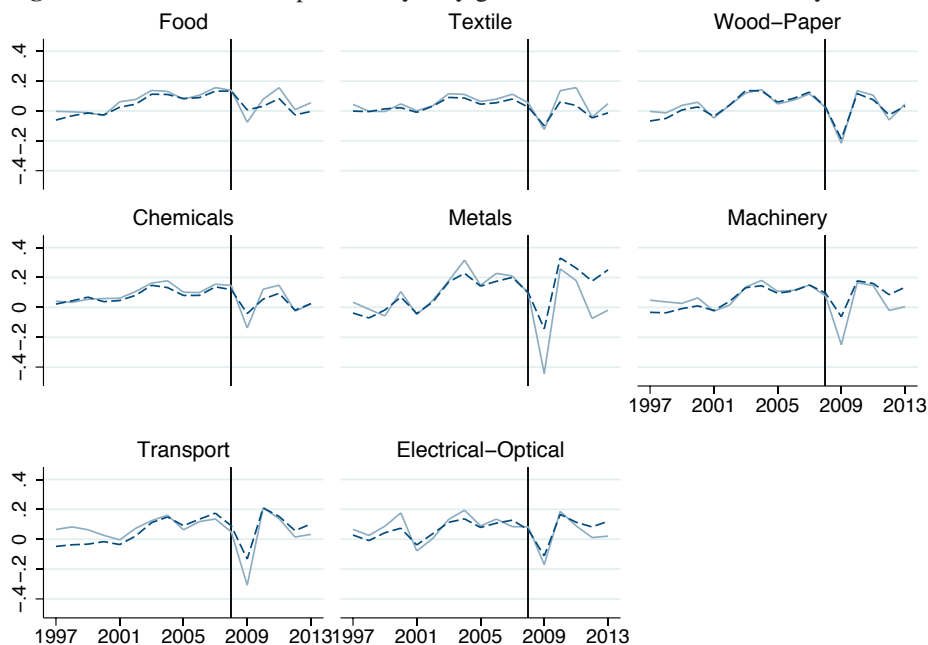
Figure 2 Observed and predicted yearly growth rates of trade in value, by country



Note: The solid lighter line represents the observed yearly growth rate of trade in value (computed as the mean between import and export growth rates). The darker dashed line represents the predicted growth rate, according to our model. The vertical line materialises the year 2008, the last used in the estimation sample. The first six countries are shown (taking the Eurozone as a single country), ranked by decreasing importance in world trade in value in 2013. Annual growth rates are computed as log-differences in value.

The prediction-to-realisation gaps also differ significantly across sectors, with the poor trade growth for metals, machinery and electrical and optical equipments standing out compared to the model's predictions (Figure 3).

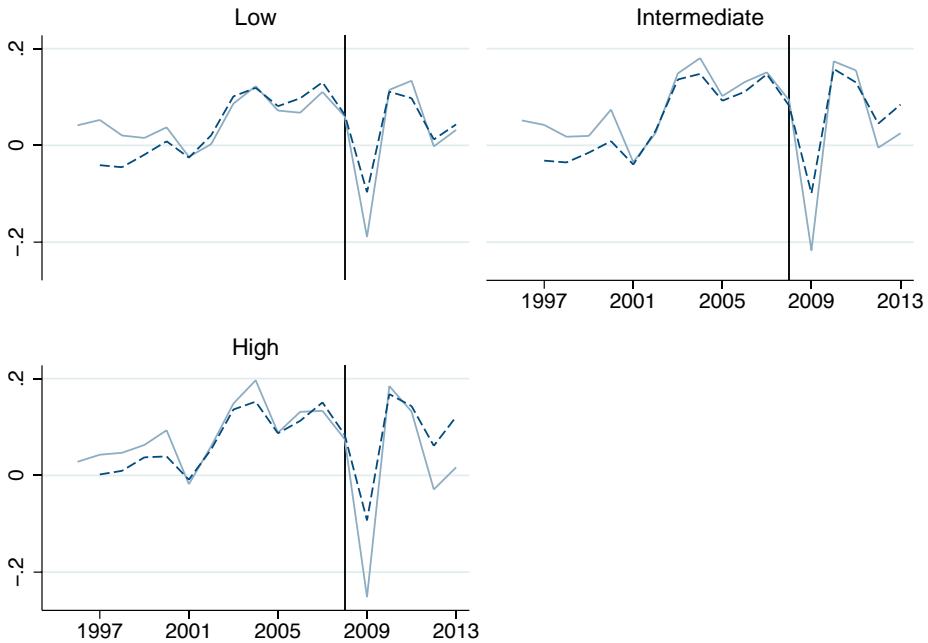
Figure 3 Observed and predicted yearly growth rates of trade in value, by sector



Note: See Figure 2.

In order to analyse the potential relationship with GVCs, we then aggregate the figures separately for three categories of trade flows, defined by level of participation in GVCs according to the above-described typology. For years 2012 and 2013, our main subject of interest here, the gap between predicted and observed trade growth differs strikingly across these three categories (Figure 4). While the model does a pretty good job of predicting trade values for flows with low participation in GVCs, it strongly over-predicts trade growth when participation in GVCs is intermediate or high, by 5.5% and 9.7% on average over these two years, respectively. Put differently, observed trade growth in 2012 and 2013 appears to be in line with its structural determinants for flows with low GVC participation, but it was consistently lower than might have been expected in other cases, especially when GVC participation was high. This result is all the more striking given that flows with intermediate or high GVC participation tended to exhibit higher-than-predicted trade growth before the Crisis, especially between 2002 and 2007, while the opposite was true for trade flows with low GVC participation.

Figure 4 Observed and predicted yearly growth rates of world trade in value, by level of GVC participation



Note: see Figure 3.

To assess whether these differences are significant, we carry out econometric estimations of the determinants of this gap between predicted and observed trade growth, at the individual country pair-sector level. The results show that GVC participation indeed led to lower observed trade growth compared to what could be expected based on the above-estimated model (Table 3). For 2012-2013, the yearly gap was estimated to be -5.6% for intermediate GVC participation and -9.9% for high GVC participation (column 2). This contrasts with the years from 1996 to 2008, when low GVC participation was associated with below-predicted trade growth and no significant deviation was found for intermediate or high GVC participation. Using a cardinal index instead of dummies to characterise GVC participation (columns 4 and 7) confirms this correlation, since higher GVC participation is associated with more negative gaps.

Protectionist measures might also contribute to this slowdown. While no detailed, consistent evaluation of the potential trade-restrictiveness impact of such measures is available, Evenett (2014) tracks their use since the Crisis period. Dummies signalling the existence of at least one such new measure are thus included in all our estimates, without resulting in any significant correlation after the Crisis.⁸ While this cannot be considered as a proof of the innocuousness of these measures, no hint is found of their impact being significant.

Country-specific developments might have played a significant role in these outcomes. Two such developments stand out – the above-mentioned rebalancing of the Chinese economy, and the Eurozone Crisis. Accordingly, a robustness check is carried out using dummies to control for potentially specific trends for imports or exports of each of these areas (columns 3 and 5). The conclusions about the correlation between the trade slowdown and GVC participation are not substantially altered.⁹

8 The positive correlation found before the Crisis may be interpreted as a sign of endogeneity, protectionist measures being more abundant in sectors where imports were previously most dynamic.

9 Finding a positive effect for Eurozone exports might come as a surprise. What that means is not that Eurozone exports grew more rapidly than others exports did, but only that they decelerated less than might have been expected based on the poor GDP growth record of Eurozone countries. Symmetric remarks hold for China where, despite its dynamism compared to other countries, trade growth did not match what could have been expected based on the country's growth.

Table 3 Determinants of the gap between observed and predicted trade growth

	Period: 2012-2013			Period: 1996-2008			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
GVC participation index (ln)				-0.007** (-2.54)	-0.006 (-2.12)		0.001 (1.51)
Low GVC (dummy)		-0.019 (-1.28)	-0.023 (-1.17)			-0.010*** (-3.82)	
Intermediate GVC (dummy)		-0.056*** (-4.48)	-0.047*** (-3.08)			0.004 (1.02)	
High GVC (dummy)		-0.099*** (-7.28)	-0.097*** (-5.47)			-0.001 (-0.39)	
Protectionist measures (dummy)		0.012 (1.12)	0.012 (1.07)	0.011 (1.06)	0.010 (0.90)	0.007*** (2.24)	0.007*** (2.60)
China, imports (dummy)			-0.081** (-2.38)		-0.084** (-2.35)		
China, exports (dummy)			-0.049** (-2.22)		-0.049** (-2.16)		
Eurozone, imports (dummy)			-0.008 (-0.56)		-0.014 (-1.00)		
Eurozone, exports (dummy)			0.043*** (2.84)		0.042*** (2.74)		
Constant	-0.078 (-9.77)			-0.090 (-6.23)	-0.082 (-4.63)		
R-squared	0	0.084	0.102	0.002	0.022	0.001	0.001
N	42,212	23,652	23,652	23,652	23,652	141,912	141,912

Note: Year fixed effects included in each case. OLS estimates, standard errors clustered by country pair. 'High' and 'intermediate' are dummy variables referring to the level of participation in GVCs, as measured by the OECD. 'GVC participation index' refers to the logarithm of the OECD GVC participation index (with zeros replaced by its minimum value). 'Protectionist measure' is a dummy for the existence of at least one new protectionist measure taken by the importer in the sector during the Crisis period (2008-2013), according to the Global Trade Alert database. For the sake of consistency with aggregate developments, all regressions are weighted by the lagged trade value. The estimating equation for column (2), for instance, is: $gap_{ijkt} = \alpha GVC_{ijk} + \beta protection_{ijk} + u_{ijkt}$, where u_{ijkt} is an error term.

4 Concluding remarks

Using a gravity model allows casual observations about the recent trade slowdown to be put into perspective, with a benchmark analysis of its structural determinants. Our analysis shows that trade growth since 2012 indeed fell short of what a pre-Crisis structural model of trade growth would have predicted. Lower GDP growth compared to the pre-Crisis period thus explains part, but not all, of the recent trade slowdown. Further examination shows that this structural change is not evenly shared. Compared to what might have been expected based on GDP growth rates, the slowdown was especially severe for Chinese imports, and worldwide in metal products, machinery and electrical and optical equipments. More generally, the slowdown proved more pronounced for trade flows where participation in GVCs was more widespread. Beyond the rebalancing and structural change of the Chinese economy, the recent trade slowdown thus seems to reflect an inflexion in the development of GVCs. While the underlying determinants remain to be identified, a few elements of interpretation can be put forward. First, financial stress may have increased the uncertainty associated with foreign trade relationships, for example through more difficult access to trade finance or through decreased confidence in the financial health of trading partners. Second, the Crisis period, as well as specific events such as the Japanese earthquake and the Thai flooding in 2011, may have led a number of firms to reconsider the cost of finely splitting their value chains across countries. In addition, it is likely that the development of GVCs has been facing declining returns, as the low-hanging fruit had already been picked before the Crisis. Although we could not find any significant hint of their influence based on available measures, protectionist policies may also be part of the explanation, to the extent that processing trade is likely to be disproportionately sensitive to transaction costs.

The recent slowdown may therefore mark the end of an era where the spread of GVCs significantly boosted world trade. GVCs are now widespread, meaning that less scope exists for their future development. The slowdown also underlines the sensitivity of

world trade and of associated efficiency gains to transaction costs and to uncertainty, which calls for renewed attention to the need to make trade rules and trading conditions as transparent and fair as possible.

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10 The relationship between trade and economic growth and a slowdown of exports in Korea

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1 Introduction

The world economy, which has been in recession since the 2008 Global Crisis, is showing signs of a slight recovery, with a recent strengthening of the US economy. However, world trade, which in the past grew faster than world output, still remains stagnant. In particular, the contribution of world trade to the world output growth has been declining since 2010. Some trade economists are cautiously arguing that the relationship between world trade and world output growth is changing.

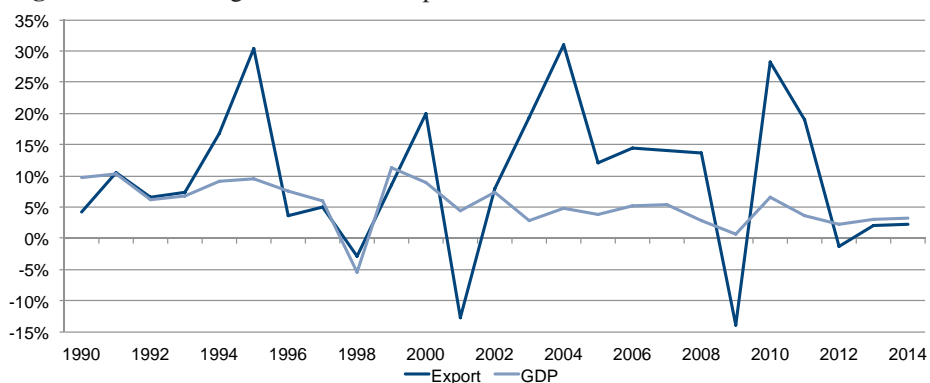
Various studies are in progress to analyse this lag in world trade (e.g. Constantinescu *et al.* 2015). There seem to be two major factors that are attributed to the recent stagnation in the world trade growth. First, there is a rather general understanding that the trade slowdown is a cyclical phenomenon. Such an extended recession in the world economy is naturally causing contracted trade flows. Second, a structural argument considers the role of major trading nations such as China in world trade. China, the world's largest trading nation, is now trying to focus more on its domestic market than on processing trade. In addition, Chinese enterprises are trying to produce intermediate goods (materials, parts and components) domestically instead of importing them. The negative impacts of the changes taking place in China on its imports from trading partners seem to be contributing at least in part to the recent slow growth of world

trade. It would be difficult to clearly distinguish the effects of these two factors. Rather, the slowdown in the growth of world trade is likely to be the result of the combined influences of both factors.

This chapter investigates the recent developments in the relationship between trade and economic growth and the export performance of Korea. As Korea's economic growth has been highly dependent on exports for the last half century, the chapter examines whether there have been changes in the contribution of exports to Korea's economic growth. It also analyses the recent slowdown of Korea's exports, separating the causes into cyclical and structural factors.

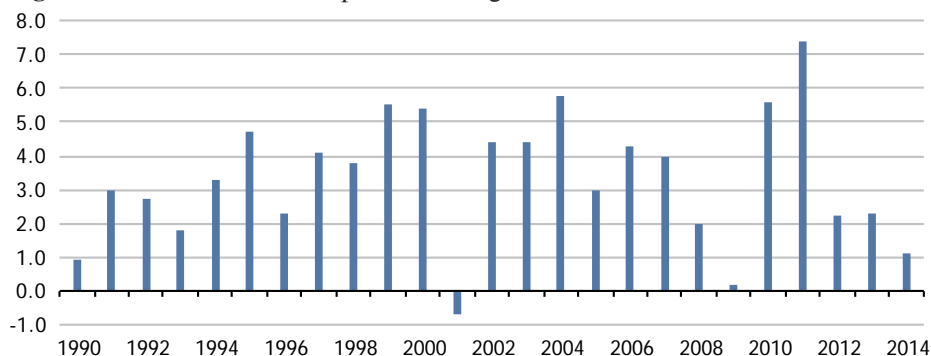
2 Evolution of the relationship between exports and economic growth in Korea

As shown in Figure 1, exports drove Korea's economic growth in the 1990s and until the beginning of 2010s. As one can infer from the fact that the growth of exports fell more than economic growth did in 2001 and 2009, Korea has definitely been depending on exports for its economic growth. However, something different can be observed since 2012. Exports have been shrinking, or growing at a very low rate, even as the economy has continued to grow at modest rate. This clearly suggests that exports are no longer driving economic growth in Korea.

Figure 1 Annual growth rates of exports and the GDP of Korea, 1990-2014

Sources: Korea International Trade Association (KITA), Bank of Korea.

Figure 2 illustrates how the contribution of exports to economic growth in Korea has declined rapidly since 2012. The same phenomenon is observed in the world economy. The decreasing income elasticity of world trade could also be interpreted as a similar phenomenon (Constantinescu *et al.* 2015). What, then, could be the reason for the recent decline in the contribution of exports to economic growth in Korea? The fundamental reason for the slowdown in Korea's export growth is the reduced demand for imports from Korea's major trading partners, most of which are still facing difficulties in making a full economic recovery from the Global Crisis.

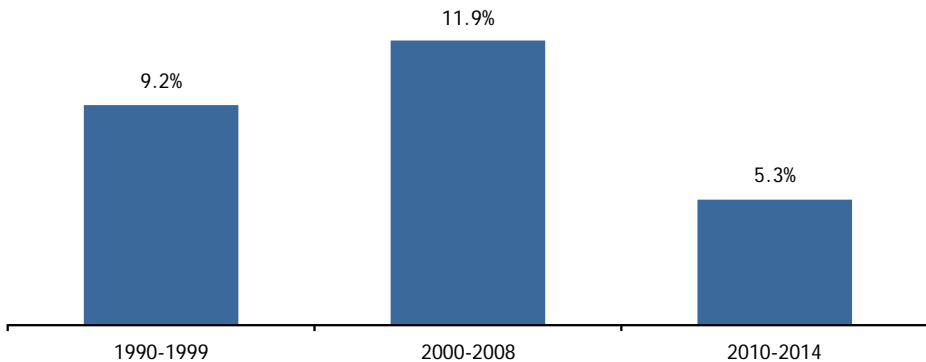
Figure 2 Contribution of exports to GDP growth in Korea, 1990-2014

Source: Bank of Korea.

3 Slowdown of Korea's exports

Figure 3 shows that Korea's average annual growth rate of exports of 5.3% since 2010 is a significant decline compared to rates of 11.9% in the 2000s and 9.2% in the 1990s. In addition, there are some differences in Korea's export performance across its major export markets. Figures 4A and 4B show that Korean exports to the US and the EU have increased since 2012, while its exports to Japan and China stagnated during the same period. The performance of Korea's exports to the US and the EU seems to rely on business fluctuations in the respective economies. In particular, Korea's exports to the US have accelerated since the US economy began to recover and the KORUS FTA has been implemented faithfully (since March 2012). In contrast, the growth of Korea's exports to China has slowed noticeably since 2011, and the export volume actually decreased in 2014.¹ Similarly, Korea's exports to Japan have declined drastically since 2012.²

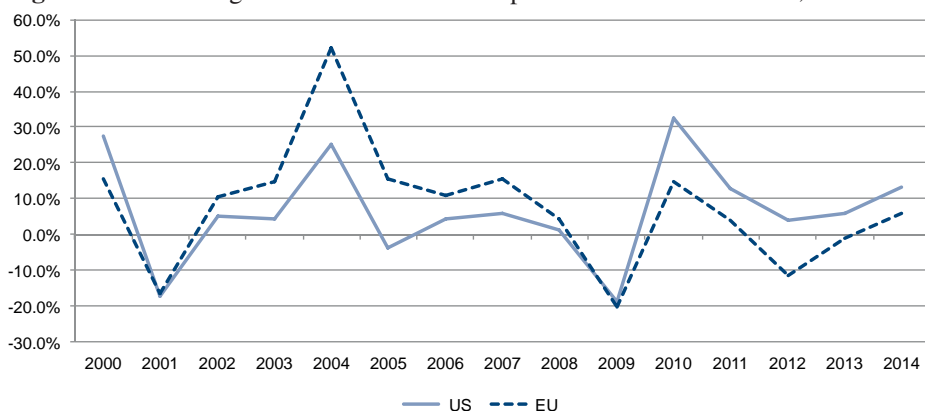
Figure 3 Average annual export growth rates in Korea, 1990-2014



Source: Author's calculations using Bank of Korea data.

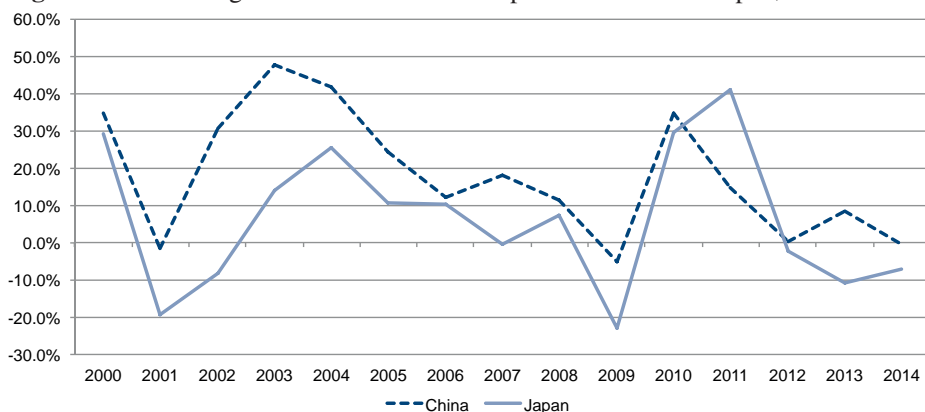
- 1 The recent slowdown of Korea's exports to China can be attributed to various factors, including slow growth of the Chinese economy, industrial restructuring in China and the increased focus on the domestic market by the Chinese government (IIT 2014a).
- 2 The decrease in Korea's exports to Japan since 2012 may be the result of a combination of factors such as a weak yen and increased intra-firm trade between parent companies in Japan and their overseas subsidiaries established through FDIs (IIT 2014d).

Figure 4a Annual growth rates of Korea's exports to the US and the EU, 2000-2014



Source: KITA.

Figure 4b Annual growth rates of Korea's exports to China and Japan, 2000-2014



Source: KITA.

The Institute for International Trade (IIT)³ has found signs of a decoupling of China's exports to the world and Korea's exports to China in 2014 (IIT 2014c). Until recently, China's exports to the world were positively correlated with its imports from Korea. China used to import large volumes of intermediate goods from Korea, which were then processed to manufacture final products for its exports. These intermediate goods

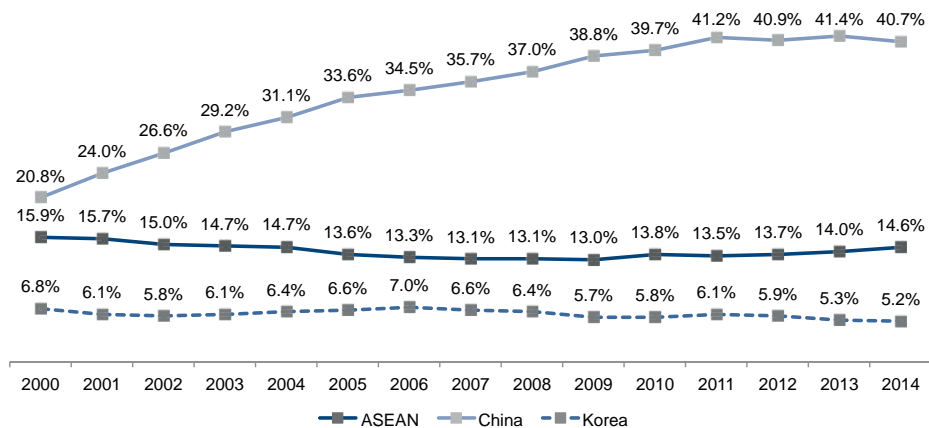
3 The Institute for International Trade (IIT) is the internal research unit of the KITA, Korea.

included petrochemical as well as petroleum products, display, machinery and plastic products, and computer parts.

Looking at 2014, however, the statistics show that while China's exports to the world are increasing, Korea's exports of these major intermediate goods to China have decreased. This phenomenon can be seen mainly as a result of China's recent industrial restructuring – China's industrial upgrading may be causing import substitution of intermediate goods, which is leading to a decrease in Korea's exports of these goods to China. Recently, even Korean firms operating in China have been reducing their imports of Korean intermediate goods, and are probably substituting imports from Korea with goods produced in China (ITT 2014c). This may be another reason why the increase in China's overall exports is not increasing China's imports from Korea.

IIT also argues that a structural change in Korea's exports to Japan is taking place (ITT 2014d). It is well known that Japanese firms are increasingly investing in China and the ASEAN region, especially after the Fukushima accident in 2011. These overseas subsidiaries of Japanese firms are producing intermediate goods (advanced materials, parts and components) locally and sending them back to Japan. This is causing a decrease in Korea's exports of intermediate goods to Japan. IIT's analysis has revealed that this phenomenon is more conspicuous in transportation machineries, electrical and electronic products, machineries, steel and metals, and foodstuffs (ITT 2014d). Figure 5 shows that Korea's share in Japan's imports of manufactured goods has declined since 2012, while the share of imports from the ASEAN region is increasing.

Figure 5 Shares of major trading partners in Japan's imports of manufactured goods, 2000-2014



Source: Author's calculations using UN Comtrade data.

4 Conclusion

The role of trade in the Korean economy seems to have changed in recent years, and several features of this can be identified. First, the contribution of exports to economic growth has been constantly decreasing and exports have not been the driving force behind economic growth since 2012. Also, the growth rate of exports is on a declining trend and there are certain regions where Korean exports are stagnating or even decreasing. The performance of Korea's exports to major trading partners shows that there is a strong cyclical effect for the US and EU markets.

However, with regards to the performance of its exports to China and Japan, structural effects seem to dominate. The domestic production of intermediate goods by Chinese companies is causing Korea's exports to China to fall. At the same time, Japanese manufacturing firms are producing intermediate goods locally in their overseas subsidiaries established through foreign direct investment in China and the ASEAN

region. Japanese imports from the country's overseas subsidiaries are causing a decrease in Korea's exports of intermediate goods to Japan.

With the expansion of global value chains (GVCs), world trade growth has been strengthened. However, recent structural changes in large trading countries such as China and Japan seem to be weakening this effect and consequently slowing down the growth of world trade. It is still difficult to generalise from this new phenomenon, which has been observed over only a rather short period. Whether this trend continues in the future should be closely monitored.

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11 Growth and structural change in trade: Evidence from Japan

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1 Introduction

In the 1990s, the volume of world trade grew twice as fast as world GDP. Many economists asserted that the reason for this lay in the cross-border dispersion of component production and the worldwide development of value chains, which changed the structure of trade and dramatically increased the volume (Jones and Kierzkowski 2001). However, this disparity in growth rates did not last long; between 2009 and 2012 the growth rate of world trade declined to only 2.3%, which was a full 1% below the GDP growth rate. It should be noted, though, that after the 1990s there were dramatic cross-country variations in trade growth rates. Furthermore, the global evolution of value chains (which are thought to have increased trade) may also have varied widely by region. During this time, Japanese firms fragmented their production processes by working with other East Asian countries, particularly China. This expansion of global value chains (GVC) prompted a substitution of foreign goods for exports as well as a substitution of offshore outsourcing for domestic procurements, which greatly impacted Japan's trade. This study endeavours to compare Japan's trade dynamics with those of the rest of the world and to show how they are being affected by the rapid change in firms' export and import strategies.

2 Changes in Japan's Trade: Estimation with an ECM

Escaith et al. (2010) and Constantinescu et al. (2014) explored the relationship between income and trade volume with error correction models (ECMs), the estimation of which revealed both the short- and long-term elasticities between the variables as well as the error term's speed of adjustment. The ECM estimated by Constantinescu et al. (2014) shows that the long-term elasticity of world trade to GDP fell from over 2 in the 1990s to less than 1 after the Global Crisis in 2008, implying that world trade declined in the 2000s.

Countries' trade elasticities may vary, however, if they reflect the different degrees of production fragmentation within those nations. In the Japanese manufacturing industry in particular, numerous firms have moved their production plants to other Asian countries (mostly ASEAN countries and China). The fragmentation of Japanese firms' manufacturing has changed the nation's trade structure: (i) intermediate goods were exported to countries in which Japanese firms processed and assembled final goods; and (ii) the export of final goods made in Japan was partly replaced by goods made in other Asian countries. Due to this structural change, the relationship between trade and income in Japan may not be the same as in the rest of the world.

Using the method set forth by Constantinescu et al. (2014), we empirically examine the relationship between trade and income in Japan by estimating their elasticity. The equation we use to do this can be written as follows:

$$\Delta \ln x_t = \alpha + \beta \Delta \ln y_t + \gamma \ln x_{t-1} + \delta \ln y_{t-1} + \varepsilon_t,$$

where x_t denotes either exports or imports and y_t denotes either world GDP (excluding Japan) or Japan's GDP. β and $-\gamma$ are the short-term elasticity of trade to GDP and the speed of adjustment, respectively. δ/γ represents the long-term elasticity of trade to GDP.

In order to compare Japan with the rest of the world, we estimate the equation twice and thereby obtain both the global trade elasticity and Japan's export and import elasticities. Furthermore, we also divide our observation period into two sub-periods – 1988-2000 and 2001-2010 – in order to examine the historical changes in elasticities. The annual trade data are from the Research Institute of Economy, Trade and Industry's (RIETI) Trade Industry Database (RIETI-TID)¹ and the GDP data are from the IMF's World Economic Outlook Database. Due to limitations in the data, we use nominal figures.² It should also be noted that we exclude primary goods, such as crude oil, from the estimation.

Table 1 presents the estimated short- and long-term export and import elasticities of world trade. It reveals that in both periods, the long-term elasticity exceeded 1 for both exports and imports, and that in the second period, both elasticities (1.141 for exports and 1.147 for imports) fell below their level of the first period (1.999 and 2.272, respectively). The results of our estimation, which are based on trade values and nominal GDP, are similar to those of Constantinescu et al. (2014), which are based on trade volume and real income.

Table 2 shows the estimated short- and long-term elasticities of Japanese exports (column 1) and imports (column 2). We find that the long-term export elasticity was 0.896 in the first period and 0.735 in the second period, indicating a decline. Japan's long-term import elasticity, on the other hand, was consistently greater than 1 and showed an increasing trend, growing from 1.200 in the first period to 1.833 in the second.

1 RIETI-TID covers all traded commodities and classifies the trade data according to each production stage (<http://www.rieti.go.jp/en/projects/rieti-tid/index.html>).

2 Constantinescu et al. (2014) estimated their ECM using quarterly data, but the IMF does not report such figures, and as a result, we were forced to use annual data.

Table 1 Elasticity of world trade

Period	World exports			World imports		
	1988-2012	1988-2000	2001-2012	1988-2012	1988-2000	2001-2012
Δ World GDP	1.526*** [8.152]	1.221*** [3.665]	1.923*** [12.558]	1.475*** [7.484]	1.125** [3.247]	1.892** [11.025]
Export_World (-1)	-0.199 [-1.435]	-0.124 [-0.630]	-0.501** [-3.004]			
GDP_World (-1)	0.262 [1.362]	0.247 [0.891]	0.572** [2.856]	0.288 [1.509]	0.207 [0.755]	0.589** [2.735]
Import_World (-1)						
_cons	-1.073 [-1.246]	-1.504 [-1.106]	-1.755** [-2.422]	-0.213 [-1.556]	-0.091 [-0.457]	-0.513** [-2.837]
N	25	13	12	25	13	12
Adj--R-squared	0.735	0.542	0.943	0.696	0.446	0.927
Long-term Elasticity	1.317	1.992	1.142	1.352	2.275	1.148

Notes: Figures in parentheses are t-statistics. *, **, and *** represent the statistical significance at 10%, 5%, and 1%, respectively.

Table 2 Elasticity of Japanese exports and imports

Period	Japanese exports			Japanese imports		
	1988-2012	1988-2000	2001-2012	1988-2012	1988-2000	2001-2012
$\Delta(\text{GDP_World} - \text{GDP_Japan})$	1.179*** [4.029]	0.470 [0.832]	1.955*** [7.417]			
$(\text{GDP_World} - \text{GDP_Japan}) (-1)$	0.456*** [2.997]	0.439 [1.064]	0.565*** [4.561]			
Export_Japan (-1)	-0.619*** [-3.248]	-0.490 [-1.325]	-0.769*** [-4.424]			
$\Delta\text{GDP_Japan}$				0.822*** [3.057]	0.464 [1.357]	1.266*** [2.444]
GDP_Japan (-1)				0.295 [1.510]	0.486* [1.902]	0.67 [1.340]
Import_Japan (-1)				-0.128 [-1.505]	-0.405* [-2.008]	-0.366 [-1.520]
_cons	-0.924* [-1.837]	-1.461 [-0.695]	-1.192* [-2.267]	-1.709 [-1.335]	-1.831 [-1.344]	-3.46 [-1.085]
N	25	13	12	25	13	12
Adj--R-squared	0.542	0.023	0.897	0.272	0.365	0.236
Long-term Elasticity	0.737	0.896	0.735	2.305	1.200	1.831

Notes: Figures in parentheses are t-statistics. *, **, and *** represent the statistical significance at 10%, 5%, and 1%, respectively.

Our estimation results reveal a sharp contrast between Japan's trade elasticities and those of the rest of the world – not only is the elasticity of Japan's exports lower than that of the world, but its import elasticity is higher, even rising in the second period. This strongly suggests that Japan's trade structure has changed drastically after the 2000s.

3 Globalisation of Japanese firms and change in Japan's trade structure

3.1 Exports versus overseas production

It is widely accepted that firms are heterogeneous in terms of productivity and that only the most productive export.³ It has also been theoretically and empirically demonstrated that firms with higher productivity are inclined to produce their goods in foreign nations rather than exporting them (Helpman et al. 2004). Furthermore, many empirical studies have confirmed that more productive Japanese firms have made this very transition by developing their production plants in foreign countries (Wakasugi et al. 2014). Consequently, this recent globalisation of Japanese firms may have lowered the country's export elasticity.

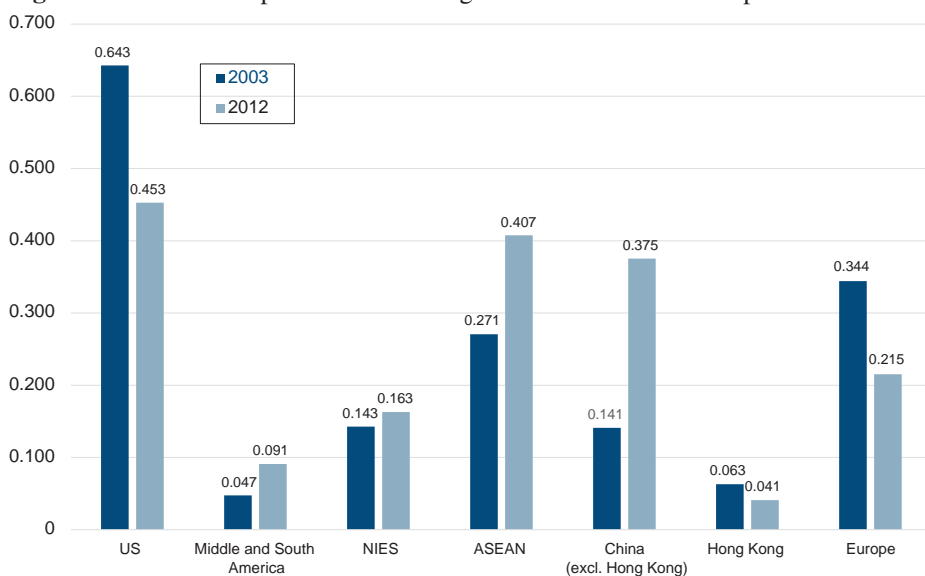
Figure 1 shows the ratio of sales by foreign subsidiaries to exports among Japanese manufacturing firms in 2003 and 2012. The figures were calculated using data from the Basic Survey of Overseas Business Activities by the Ministry of Economy, Trade and Industry (METI).⁴ During this period, Japanese firms continuously developed their foreign production by replacing their exports, thereby raising the aforementioned ratio by 8%. However, special attention should be paid to the interregional variations in these ratios; on one hand, the ratio of sales by overseas subsidiaries in China (excluding Hong

3 See Melitz (2003) for a theoretical analysis and Bernard and Jensen (2004) for an empirical examination.

4 The Basic Survey of Overseas Business Activities is a comprehensive survey of Japanese manufacturing firms' foreign business activities. The survey includes data on the exports and foreign sales of firms that manufacture their goods overseas.

Kong) and ASEAN countries (Thailand, Malaysia, Indonesia, and the Philippines) to exports grew rapidly, but on the other hand, the shift from overseas production in the US and Europe cannot be observed.

Figure 1 Ratio of Japanese firms' foreign subsidiaries' sales to exports



Source: Authors' calculations based on data from METI's Basic Survey of Overseas Business Activities.

The difference in the ratio of foreign sales to exports among OECD and Asian countries reflects not only their economic growth but also a rapid expansion in Asian countries' production capacities. Asian countries grew both economically and as an export platform for developed countries. The Japanese manufacturing sector's shift from exporting to overseas production in Asia (especially in China), which intensified the triangular trade between Japan, other Asian countries and the West, is thought to have contributed to Japan's comparatively low export elasticity.

3.2 Offshore outsourcing and imports

In the 2000s, Japanese firms rapidly developed their supply chains to Asian countries and outsourced parts of their production processes.⁵ Table 3 shows the ratio of Japanese firms' foreign to domestic procurements, which is calculated with data from METI's Basic Survey of Japanese Business Structure and Activities. In order to find the quantity of intermediate goods purchased by Japanese firms, we divided the sources by the domestic and overseas suppliers. We find that since 1997, the firms have increased their purchases of foreign intermediate goods while decreasing their domestic purchases, resulting in a structural change in imports.⁶ The ratio of domestic to overseas procurements (reported in column 1 of Table 3) increased, and in particular, the share of intermediates from Asia rose dramatically from 48% to 59% (column 2). These figures suggest that the procurement of intermediate goods from Asian countries, which was caused by the expansion in offshore outsourcing, was a significant factor in Japan's increasing import elasticity in the 2000s (presented in Section 2).

Table 3 Japanese firms' foreign and domestic procurement

	(1) Foreign/Domestic	(2) Fraction of Asia
1997–2000	0.142	0.479
2000–2005	0.159	0.548
2006–2012	0.186	0.590

Note: Figures exclude imports from the Middle East.

Source: Authors' calculations based on data from METI's Basic Survey of Japanese Business Structure and Activities.

5 See Tomiura (2007) and Wakasugi et al. (2010) for more information on Japan's offshore outsourcing.

6 Middle East countries (i.e. Japan's main suppliers of crude oil) are excluded.

4 Gross trade and trade in value added

Up to this point, we have utilised gross trade data that were based on customs statistics. It should be noted, however, that the prevailing global production process (i.e. global value chains) boosts gross trade by moving intermediate and final goods between production processes that are fragmented across borders. The Trade in Value Added (TiVA) database was developed by the OECD and WTO in 2013 to address this issue; this database calculates value added to trade goods and attributes it to the countries that generated the value.⁷ In order to illustrate the difference between these trade figures, let us examine a hypothetical case. Suppose that a firm producing goods domestically moves part of its production plant to a foreign country; if the firm exports intermediate goods, such as parts and components, to the foreign factory and then imports the final goods, gross imports will be greater than the value added because the international shipping is calculated as an import.⁸ In contrast, if the entire production process remains within the firm's home country, then the figures will be equal.⁹ A comparison of gross trade and TiVA indicates that trade has increased.

Table 4 displays the difference in the ratio of Japan's gross trade and TiVA with various countries from 1995 to 2009. The upper panel (A) and the lower panel (B) present the ratio of gross export to value added embodied by foreign final demand and the ratio of gross import to foreign value added embodied by Japan's final demand, respectively.

7 In March 2013, the OECD and WTO jointly produced the TiVA database, which is derived from OECD [Input Output Tables](#) linked together using the Bilateral Trade Database for goods by industry and end-use category and estimates of bilateral trade flows for services.

8 Since 2000, some researchers have noted that the discrepancy between gross trade and TiVA may be caused by the fragmentation of production and vertical trading chains. Hummels et al. (2001) and Yi (2003) insist that production processes have increasingly come to involve a sequential, vertical trading chain that stretches across many countries, with each country specialising in a particular stage of a good's production sequence. In addition, Bems et al. (2011) point out that "growth in vertical specialisation accounts for 30% of the growth in OECD countries' exports."

9 As the expansion of GVCs slows, their trade-boosting effect diminishes due to the substitution of local production for exports. Constantinescu et al. (2014) cite the decreasing share of intermediate goods among imports as one of the reasons for the fall in world import elasticity.

With regard to the US and EU, the discrepancy in the two ratios is small (i.e. close to 1), and in several years TiVA even exceeded gross exports because the value added figure (embodied by the US's and EU's final demands) accounted for both direct and indirect exports of value added by Japan. On the other hand, both the upper and the lower panels reveal that Japan's gross trade with China, Taiwan, Hong Kong, the ASEAN countries, and Korea largely exceeded its value added. One of the major contributing factors to this discrepancy was the return trade of intermediate goods, which expanded the vertical trade between Japan and the other Asian countries.

However, recently there has been a significant change in the return trade in Asia; the discrepancy between gross trade and TiVA expanded until 2005, when actually it began to shrink. Although it is certain that the fall in Japanese export elasticity and rise in Japanese import elasticity were caused by the expansion of Japanese firms' GVCs, it does not entirely account for this trend. If the rapid shift of production processes from Japan to other Asian countries raised the local production of intermediate goods (which would have replaced Japan's exports of intermediates and increased Japan's imports of value added goods), it would have further reduced the gap between gross trade and TiVA. Consequently, this reduction foreshadowed the changes in Japan's trade structure (the larger the scale of firms' overseas production, the greater the changes to the structure).

Table 4 Discrepancy between gross trade and TIVA

	Total	US	EU27	China	Chinese Taipei	Hong Kong, China	ASEAN Countries	Korea	OECD
				Japan's gross export/Foreign value added embodied in Japan's final demand (A)					
1995	1.098	1.004	0.984	1.057	1.679	1.421	1.384	1.332	1.029
2000	1.137	0.984	1.000	1.235	1.746	1.219	1.627	1.647	1.039
2005	1.187	0.943	0.984	1.709	1.715	1.235	1.562	1.747	1.041
2009	1.199	0.932	0.963	1.739	1.895	1.210	1.600	1.971	1.045
				Japan's gross import/Foreign value added embodied in Japan's final demand (B)					
1995	1.118	1.049	0.997	1.130	1.421	1.341	1.370	1.283	1.065
2000	1.162	1.066	1.050	1.238	1.694	1.151	1.440	1.453	1.105
2005	1.213	1.108	1.049	1.702	1.378	1.046	1.414	1.435	1.122
2009	1.206	1.100	1.070	1.568	1.380	1.071	1.343	1.457	1.129

Source: Authors' calculations based on the OECD's TIVA database.

5 Conclusion

Japanese firms have fragmented their production processes by opening subsidiaries throughout other East Asian countries (especially China), thereby enlarging their GVCs. The rapid increases in foreign direct investment, the offshore outsourcing of Japanese manufacturing firms, and overseas production accelerated this fragmentation and distinguished Japan's trade structure from those of Western countries. Although world trade appears to have stagnated in recent years, Japanese trade has enjoyed a perceptible upswing.

The results of our ECM estimation revealed that Japan had lower export and higher import elasticities than the rest of the world. In this study, we also investigated the changes in Japan's trade structure and concluded that the development of overseas production replaced Japan's exports while outsourcing boosted Japanese imports. We also found that the expansion of vertical trade between Japan and other Asian countries generated the growth in Japan's gross trade and thereby the early discrepancy between gross trade and TiVA, which fell as the other countries became more developed and expanded their production capacities. This structural change in Japan's trade during the 2000s sheds light on the recent reduction in world gross trade, although TiVA may not have decreased on a global scale.

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12 The global trade slowdown: Lessons from the East Asian electronics industry

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Introduction

Constantinescu et al. (2015), in important work, investigate the relationship between world trade and world GDP. They report that over the period 1986-2000, a 1% increase in world real GDP was associated with a 2.2% increase in the volume of world trade. This elasticity is nearly twice as large as the elasticities they find for the periods 1970-1985 and 2001-2013. This chapter seeks to shed light on this changing relationship using evidence from Asian value chains. Many other explanations for the recent trade slowdown, such as weak trade finance or factors outside of Asia, are left for other authors to investigate. The discussion below suggests that trade within the crucial value chain for the electronics industry in East Asia is unlikely to grow as rapidly going forward.

Lessons from the East Asian electronics industry

The date 1986 highlighted by Constantinescu et al. (2015) is familiar to students of East Asian supply chains. Following the 1985 Plaza Accord, the Japanese yen appreciated by 60% relative to the US dollar. Japanese multinational corporations (MNCs) lost price competitiveness and began in 1986 to transfer factories to other Asian economies. They continued to produce sophisticated parts and components domestically, and

exported these to lower-wage countries for assembly. MNCs in other countries soon followed this pattern, and trade in intermediate goods within the region surged.

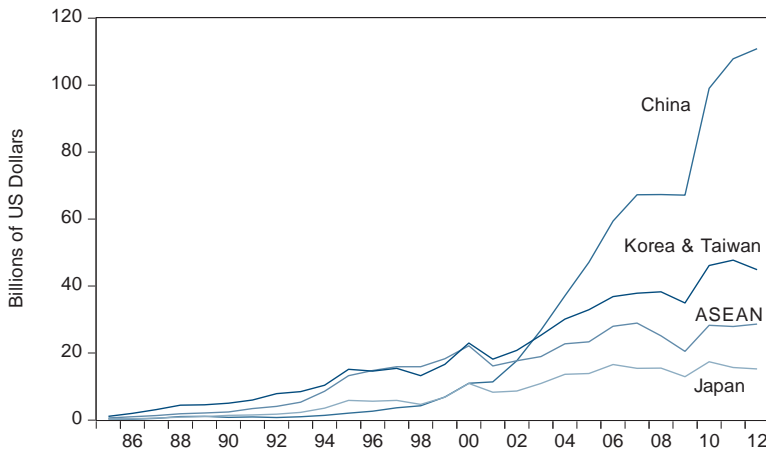
The date 2001 is also familiar to students of Asian value chains. This year marked China's WTO accession. It is widely believed that joining the WTO gave foreign investors confidence that China would sustain an FDI-friendly environment through fair and coherent enforcement of the relevant laws and regulations (e.g. Chen 2008). FDI flooded into the country, and China became the final assembly point for regional value chains. Whereas before China's WTO accession, intermediate goods crisscrossed the region, with value being added in several countries, in recent years more and more production has been concentrated in industrial clusters within China.

These patterns are clear in the electronics industry. Since the 1980s, the leading product category exported between East Asian economies has been electronic parts and components (EP&C) such as electronic integrated circuits and semiconductor devices.¹ Figure 1a shows EP&C exports from East Asia to ASEAN supply chain countries (Malaysia, the Philippines and Thailand), China, Japan and the newly industrialised economies (NIEs) of South Korea and Taiwan. Immediately after the Plaza Accord, Japanese MNCs sought to cut costs by relocating labour-intensive activities to South Korea and Taiwan. They continued to produce sophisticated parts and components in Japan and exported these to the NIEs. Figure 1a shows a rapid increase in EP&C flowing to South Korea and Taiwan after 1986. However, as wages increased in the NIEs and as their exchange rates appreciated, MNCs increasingly established production modules in ASEAN supply chain countries and shipped intermediate goods there (Yoshitomi 2003). Figure 1a indicates that parts and components flows from East Asia to Malaysia, the Philippines and Thailand surged in the 1990s. China's WTO accession in 2001 then gave foreign investors confidence that China would respect the rule of law. Figure 1a

¹ East Asia here includes China, Indonesia, Japan, Malaysia, the Philippines, Singapore, South Korea, Taiwan and Thailand. Electronic parts and components correspond to the HS classification numbers 8540-8542.

shows that EP&C flows from East Asia to China then increased by a factor of ten after 2001.

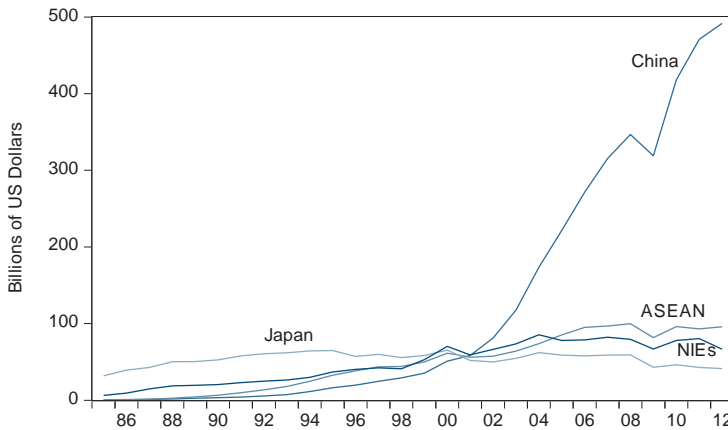
Figure 1a. The value of electronics parts and components exports from East Asia to individual countries and regions



Notes: Electronic Parts and Components correspond to the HS classification numbers 8540-8542. East Asia includes China, Indonesia, Japan, Malaysia, the Philippines, Singapore, South Korea, Taiwan, and Thailand.

Source: CEPII-CHELEM database.

Figure 1b. The value of final electronics goods from East Asian countries and regions to the rest of the world.



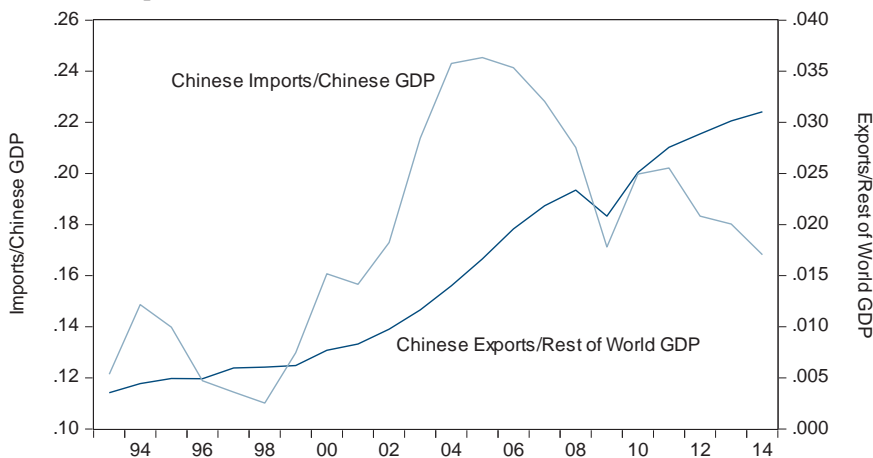
Notes: Final electronics goods correspond to the SITC classification numbers 75 and 761-4. ASEAN includes Malaysia, the Philippines, and Thailand. The NIEs include South Korea and Taiwan.

Source: CEPII-CHELEM database.

While EP&C represents the most exported product category within East Asia, final electronics goods such as computers and mobile phones represent the most exported product category from East Asia to the rest of the world.² Figure 1b presents data on final electronics goods exports from East Asian countries and regions to the rest of the world. The figure indicates that after 2000, China's exports multiplied many times and reached \$500 billion in 2012. This value dwarfs the surge in electronics parts and components imports into China, which equalled \$110 billion in 2012.

Figure 1 thus suggests that China's exports have grown more rapidly than China's imports. Figure 2 plots China's exports relative to rest of the world GDP and China's imports relative to Chinese GDP. The figure indicates that China's exports continue to grow rapidly relative to GDP while China's import-to-GDP ratio has been shrinking since 2005.

Figure 2. Chinese exports relative to rest of the world GDP (right scale) and Chinese imports relative to Chinese GDP (left scale).



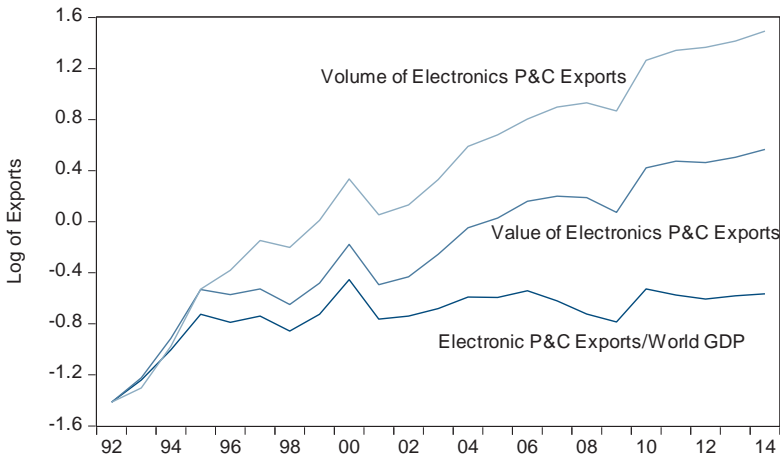
Note: The figure presents exports and imports from China's two primary customs regimes (ordinary trade and processing trade).

Sources: China Customs Statistics and CEPPII-CHELEM database.

2 East Asia is defined as in footnote 1. Final electronics goods correspond to the SITC classification numbers 75 and 761-4.

EP&C is the largest import category into China and the most traded category among East Asian countries. To shed light on why China's imports relative to GDP in Figure 2 are shrinking and on how regional value chains are evolving, Figure 3 presents data on the exports of these intermediate goods from East Asian economies that are upstream from China. The data start in 1992, because this is when data on a price deflator for EP&C become available.³ The figure shows that East Asian electronic parts and components exports increased rapidly relative to world GDP from 1992 until 2000. They then decreased relative to GDP between 2001 and 2014.

Figure 3. Electronics parts and components exports from upstream East Asian economies



Notes and sources: Electronic parts and components correspond to the HS classification numbers 8540-8542. East Asian economies that are upstream from China include Japan, Malaysia, the Philippines, South Korea, Taiwan, and Thailand. Data on the value of exports between 1992-2012 from upstream economies to the world are measured in US dollars. They are obtained from the CEPII-CHELEM database. For 2012 through 2014, all available data on exports from HS categories 8540-8542 by upstream East Asian countries data in US dollars are collected from the CEIC database. These data are used to calculate growth rates between 2012 and 2014 for electronic parts and components exports from upstream countries, and the growth rates are applied to the CEPII-CHELEM data from 2012 to impute values for 2013 and 2014. Volume data are obtained by deflating the value data using the U.S. Bureau of Labor Statistics import price index for electronic integrated circuits and micro assemblies and parts thereof. Similar volume data are obtained when the value data are deflated using the U.S. Bureau of Labor Statistics import price index for semiconductor devices, light-emitting diodes, mounted piezoelectric crystals, and parts thereof. Data relative to world GDP are obtained by dividing the value of electronics parts and components exports measured in U.S. dollars by the value of world GDP also measured in US dollars. World GDP data are obtained from the CEPII-CHELEM database.

3 See the notes and sources listed in Table 3 for detailed descriptions of the data used.

In volume terms, however, Figure 3 shows that East Asian EP&C exports have increased (logarithmically) by more than 150% since 2001. This surge in the volume of exports is not reflected in value terms or relative to GDP because the prices of semiconductors and integrated circuits and other inputs into computers and mobile phones keep falling. Price competition in this sector is cutthroat, and suppliers face continual pressure from branded manufacturers to produce inputs at lower cost.

Can we expect the pricing pressure on electronic components suppliers to ease in the future? Low-cost vendors such as Lenovo, Xiaomi and ASUS are capturing increasing shares of the world market for smartphones, tablets and computers. For instance, the International Data Corporation (IDC) finds that Lenovo and Xiaomi were the third and fourth leading suppliers of smartphones to the world in 2014Q3.⁴ IDC also reports that consumer electronics makers are increasing their focus on emerging markets. Consumers in emerging markets, with lower average income and wealth relative to consumers in advanced economies, tend to be sensitive to price. Thus price competition is likely to remain intense, implying that manufacturers of final goods are likely to continue demanding price concessions from suppliers.

Will China's final electronics goods exports continue to grow as rapidly? For computers (SITC category 752), the value of China's exports to the US increased by a factor of 38 between 1996 and 2013 and the share of total US imports coming from China increased from 4% to 66%. For phones (SITC category 764), the value of China's exports to the US increased by a factor of 32 between 1996 and 2013 and the share of imports coming from China increased from 11% to 57%.⁵ It is unlikely that the US market will continue increasing imports from China at this rate. Other advanced economies such as Europe and Japan are stagnant, and this will limit China's ability to continue increasing exports to these locations. While emerging markets such as India have the capacity to absorb more electronics goods, consumers in these markets tend to demand goods that are at

4 Detailed data are available at www.idc.com.

5 These data come from the US Census Bureau website (www.census.gov).

lower price points within each category. Going forward it therefore seems unlikely that the value of final electronics exports from China or their ratio to rest of the world's GDP can continue to grow as rapidly as they have up until 2014.

From the consumer's point of view, these trends are positive. If the prices of electronics parts and components continue to fall, this will reduce the prices they pay for mobile phones and tablet computers. If demand in the rest of the world for final electronics goods does not keep growing rapidly, branded manufacturers will redirect their output to consumers in China. China's consumption relative to GDP remains far lower than the corresponding values for other countries at similar levels of development. Thus moving away from exporting final goods and producing for the domestic market instead would be beneficial to China.

Conclusion

Constantinescu et al. (2015) find that the response of world trade to world GDP was nearly twice as great during the period 1986-2000 as it was during the periods 1970-1985 and 2001-2013. This chapter has considered how trends in the East Asian electronics industry have contributed to this pattern.

Production fragmentation began in earnest in the region following the 1985 Plaza Accord. Japanese multinationals, confronted with a 60% appreciation of the yen, relocated labour-intensive production to lower-wage countries. Intricate production networks soon developed in the region, with firms producing intermediate goods, such as hard disk drives, using inputs from other firms and countries and shipping the intermediate goods to other firms or countries for assembly into final goods and re-export. The Plaza Accord was thus followed by a large increase in exports between East Asian countries. After China joined the WTO, however, more and more production in the region became centred within industrial clusters in China. China's WTO accession was therefore followed by a slowing of export growth in the region.

China's exports of final electronics goods have continued to grow rapidly relative to GDP, while its imports of EP&C and other goods relative to GDP have stagnated. One reason for this is that the prices of EP&C continue to tumble. Intense competition in this sector forces suppliers to slash prices.

Going forward, it is likely that both China's imports of parts and components and also its exports of final electronics goods will not keep growing as rapidly as they have done relative to GDP. To the extent that this implies lower prices for electronics goods and more final goods flowing to Chinese consumers, it will be a welcome development for the global economy.

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13 China's trade flows: Some conjectures

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1 Introduction

China has been one of the key players in the growth of world trade over the past 20 years, with the volume and value of its exports taking on a dramatically heightened role in the decade before the Great Recession. During that period, export volume growth repeatedly hit 20%, far outstripping growth of the world economy. Chinese import growth was similarly rapid, although it exceeded Chinese growth by a smaller margin.

One key reason for this rapid growth, particularly in exports, was the liberalisation of trade – reinforced by China's accession to the WTO – such that China was able to exploit its comparative advantage. However, this is unlikely to be the sole explanation, given the sheer speed of growth. Other factors include, first, the fact that measures of gross trade flows are unlikely to be representative of trade in value added, given the rapid development of an East Asian global value chain centred on China; and second, the growth experienced thus far is transitional - at some point, China will no longer be able to continue taking a larger and larger share of world exports.

¹ Paper prepared for Prospects for Trade Growth, edited by Bernard Hoekman (VoxEU). I thank Yin-Wong Cheung and Xingwang Qian for allowing me to draw on joint work, Shaghil Ahmed for providing data, and Arthur Kroeber, Xingwang Qian and Willem Thorbecke for providing comments. All remaining errors are solely the author's responsibility.

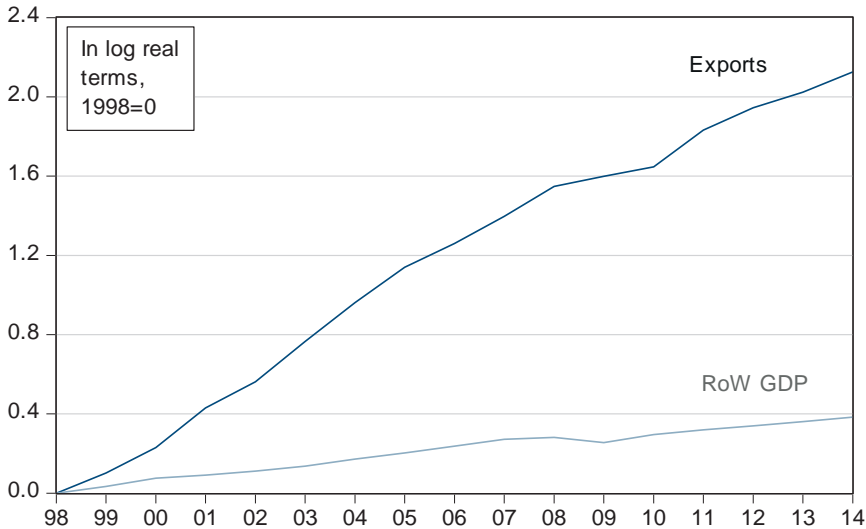
What are the prospects for China's trade with the rest of the world? This is perhaps one of the central questions of international economic relations. In some ways, it is a question that is hardly amenable to rigorous assessment, precisely because of the numerous imponderables: Will world economic output revert to the pre-Global Crisis trend? Will Chinese policymakers be able to re-orient the economy toward a more sustainable, domestic-demand driven growth model? Will the process of production fragmentation, as exemplified by the development of global value chains, continue unabated? In addition, how will the answers to each of these questions bear on the issue at different horizons?

In order to analyse the question, I break it down into several parts. The first is to consider the short-term dynamics of Chinese trade – namely, how Chinese exports and imports respond to income and relative price factors. This seems a fairly prosaic approach; however, there has long been a view that Chinese trade flows behave in an odd way.

The longer-term issues pertain to the ability of the Chinese economy to adjust to greater reliance on domestic-oriented sources of aggregate demand. To the extent that they can, this will draw resources away from the export sector. In addition, the ongoing process of rising labour costs will make China's position as a low-cost producer of manufactured goods less dominant.

To illustrate the difficulties in explaining China's trade, consider simple depictions of China's trade flows. First, examine exports; at a first approximation, one would think of Chinese exports as a direct function of world demand, proxied perhaps by GDP. However, as shown by Figure 1, export growth has *far* outstripped world GDP growth.

Figure 1 Log Chinese real goods exports (darker) and rest-of-world real GDP (lighter)



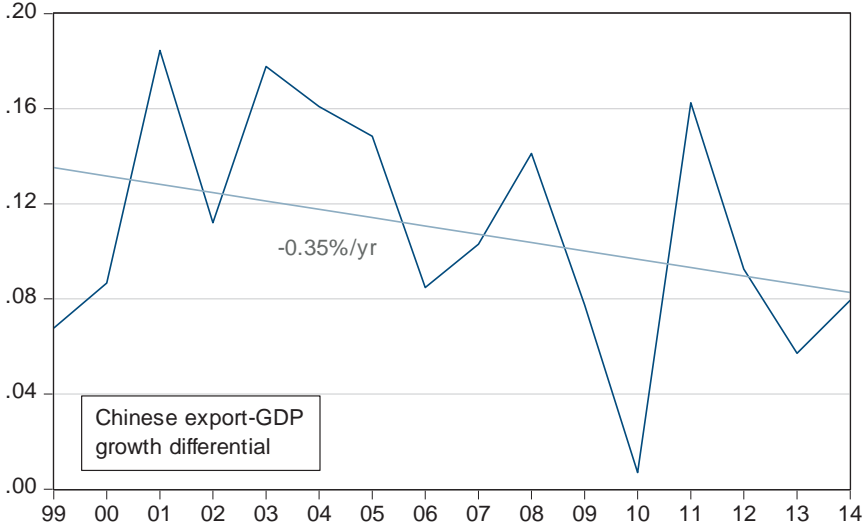
Notes: Both in logs, normalised to 1998=0. Rest-of-world GDP is export-weighted.

Source: IMF *World Economic Outlook* (October 2014), personal communication from Shaghil Ahmed, and author's calculations.

Since 1998, Chinese exports have grown by over 200% (in log terms) while the rest of world GDP (weighted by exports) has grown only by about 40%. Clearly, if gross exports represent exported value added, this is a trend that cannot be sustained indefinitely. It is hard to imagine the trend being sustained even if there is a large share of imported content in exports. That conjecture is supported by the fact that the differential between export growth and rest-of-world growth has been declining over time.

The trend shown in Figure 2 is consistent with the growth differential shrinking by about 1 percentage point every three years. Hence, even if the rest of the world maintains its pace – which seems unlikely in the next few years – it appears unlikely that Chinese gross exports will continue to grow at the same rate.

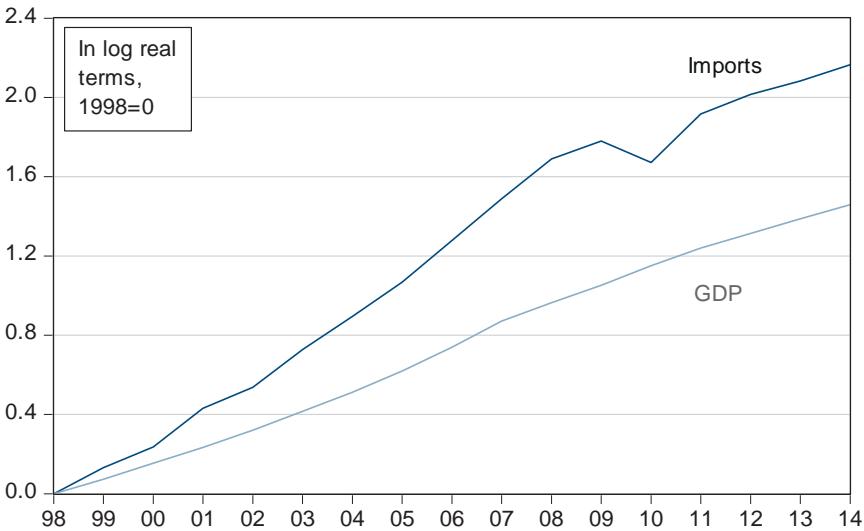
Figure 2 Year-on-year growth differential between Chinese goods exports and rest-of-world real GDP growth (darker), and linear trend GDP (lighter)



Note: Growth rates calculated as log-differences.

Source: IMF World Economic Outlook (October 2014), Shaghil Ahmed, and author's calculations.

Figure 3 Log Chinese real goods imports (darker) and Chinese real GDP (lighter)



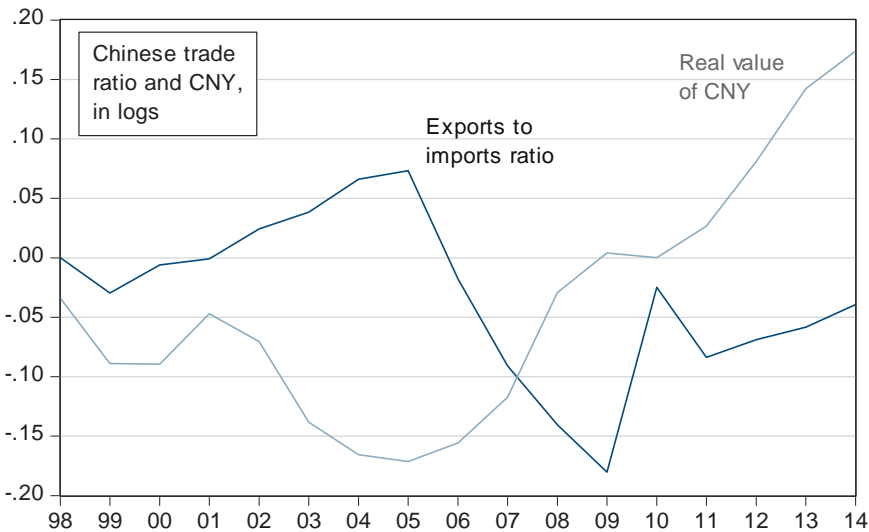
Notes: Both in logs, normalised to 1998=0.

Source: IMF World Economic Outlook (October 2014), and author's calculations.

Chinese imports have grown by about the same amount, but much more in line with Chinese GDP. The former has grown by about 150%, while imports have grown by about 220% over the same time period (Figure 3).

Over this time (1998-2014), the real value of the Chinese yuan has varied substantially, with some impact on the relative amounts of exports versus imports. This is shown in Figure 4.

Figure 4 Log of ratio of Chinese real goods exports divided by imports (darker) and log real value of Chinese yuan, 2010=0 (lighter)



Source: IMF *World Economic Outlook* (October 2014), IMF *International Financial Statistics* and author's calculations.

Casual inspection of the figure highlights the fact that the mid-2000s were marked by the expected relationship: the depreciation of the yuan on a trade-weighted basis was associated with an increase in exports relative to imports. However, a slightly deeper examination reveals that the appreciation of the Chinese currency since 2010 has also been associated with an increase in the export-to-import ratio. This is hard to reconcile with conventional interpretations of the trade balance-real exchange rate relationship in a partial equilibrium framework.

I argue that the explanation for the seemingly anomalous behaviour of Chinese trade flows resides not necessarily in an appeal to a general equilibrium approach, but to disaggregating the data, proper accounting for the role of imported intermediate goods in Chinese exports, as well as better measuring of the real exchange rate. I address the first two points in the next two sections.

2 Modelling Chinese trade in a partial equilibrium framework

Several hypotheses have been forwarded in the literature for why Chinese trade flows appear to have behaved in an anomalous fashion. First, the large amount of processing trade obscures the usual effects; when a large share of the imported goods is used in exports, the usual activity variables, such as GDP, might not be appropriate. In addition, exchange rates might have a muted effect if the share of domestic value added in Chinese exports is small. There is some indication that this is true, although the effect probably peaked in the mid-2000s.

Second, with a rapidly changing economic structure and different import intensities, aggregate import elasticities might exhibit instability. A similar argument could be applied to a changing structure of trade; different types of trade might respond differently to exchange rates. Once again, stable aggregate elasticity estimates might be difficult to obtain in such instances.

Cheung et al. (2012) offer the most recent examination of Chinese aggregate trade.² In their study of Chinese trade over the period 1993-2010, they account for the oft-cited characteristic of the Chinese economy is its position in the global production chain in an ad hoc fashion. Since China plays an important role in the final phrase of the

2 On this subject, see also Wang and Ji (2006), Garcia-Herrero and Koivu (2007), Marquez and Schindler (2007), Aziz and Li (2008), Ahmed (2009) and Cheung et al. (2010), Thorbecke and Smith (2010), and Thorbecke (2015). Cheung et al. (forthcoming) examine US-China trade behaviour.

international production process, its trade flows might not be responsive to exchange rate changes. Specifically, an appreciation raises the relative price of exports, but lowers the price of inputs. The appreciation thus only affects the value added component of Chinese exports, and the net effect of a CNY appreciation on global imbalances could be ambiguous.

They model Chinese exports and imports, respectively:

$$ex_t = \beta_0 + \beta_1 y_t^* + \beta_2 r_t + \beta_3 z_t + u_{1,t}, \quad (1)$$

and

$$im_t = \gamma_0 + \gamma_1 y_t + \gamma_2 r_t + \gamma_3 w_t + u_{2,t}, \quad (2)$$

where y is an activity variable, r is the real value of the RMB, and z is a supply-side variable. The variable w is a shift variable accounting for other factors that might increase import demand.³

Table 1 presents the results for aggregate exports and imports, estimated using dynamic OLS (Stock and Watson 1993). The key take-away from the table is that the estimates of income elasticities are very sensitive to the specification. In column 1, the most literal interpretation is examined; the real value of the Chinese yuan is expressed so that an increase represents an appreciation. The exchange rate enters with a strongly and significantly negative coefficient. In addition, rest of the world economic activity registers strongly positive, with a coefficient of around 1.4. This is true even though they augment the specification with a linear time trend. Had one omitted the trend, the coefficient on foreign output would have been around 2.2.

3 Real values of trade flows are the key difficulty confronting researchers. Specific deflators are only available for recent years, so generally one has to resort to proxies. Cheung et al. (2012) focus on results based upon Hong Kong re-import and re-export unit value indices, although similar results are obtained using alternative deflators. The IMF's trade weighted CPI-deflated index is used as the exchange rate variable. Chinese GDP is used as the home activity variable, while the export-weighted real GDP in the rest of the world is used for y^* . For z , Cheung et al. (2012) rely upon several proxy variables, including the stock of fixed asset investment, and relative productivity.

Table 1 Aggregate flows, normalised by the Hong Kong re-export unit value index

	Exports [1]	Exports [2]	Imports [3]	Imports [4]
GDP	1.433*** (0.51)	5.648*** (0.61)		
GDP*			3.184** (1.51)	-3.005** (1.14)
REER	-1.575*** (0.17)	-0.906*** (0.23)	-2.034*** (0.29)	1.111** (0.48)
CRgrw		-0.159 (0.38)		
WTO		-0.642*** (0.08)		
WTO*Trend		0.024*** (0.00)		
Exports				0.980*** (0.17)
Trend	0.040*** (0.01)	-0.005 (0.01)	-0.033 (0.04)	0.068*** (0.02)
RSME	0.08	0.06	0.06	0.04
Obs.	63	64	33	33
Leads-lags	1, 2	1, 1	1, 1	1, 1, 1

Notes: The table reports the results of estimating equations (1) and (2) with the aggregate trade data. All regressions include quarterly dummies. The pair of numbers given in the row labelled “Leads-lags” are the number of leads and the number of lags of the first-differenced cointegrated variables used in the dynamic OLS regression. Robust errors are in parentheses underneath coefficient estimates. ***, **, and * indicate the 1%, 5%, and 10% level of significance, respectively. Coefficients for constant and quarterly dummies not reported.

In some sense, when one thinks of the tremendous growth in Chinese exports, only a small amount is being driven by the measured correlation with the world’s income, and the rest is a trend increase in Chinese exports, perhaps due to China increasing its share of world exports, as well as the increasing export intensity of the world economy. That trend works out to a secular 16% annual growth over the sample period. This basic result is not sensitive to the inclusion of some obvious stationary covariates, including, for instance, the growth rate of credit.

A cautionary note is provided by the allowance for structural breaks. One particular break seems especially plausible, namely China's accession to the WTO. On a priori grounds, as well as suggestive statistical test results, we augment the regression with a dummy variable for WTO accession, and allow for a differential trend in the post-WTO period.⁴ These results reported in column 2 indicate that the overall time trend was proxying for a trend in the post-WTO period. The income coefficient is now substantially higher.

Cheung et al. (2012) are unable to obtain reasonable estimates for imports over a comparable sample. Hence, they truncate the sample to begin in the post-WTO accession period. In the basic specification (column 3), increases in Chinese GDP are associated with an increase in imports, with a particularly high elasticity of 3.2. Counter to expectations, an appreciated Chinese yuan induces a decrease in imports.

Given how much of Chinese imports are used as inputs for export, assuming that Chinese imports are driven solely by demand from domestic Chinese households and firms is inappropriate. One ad hoc way to account for the vertical specialisation phenomenon is to include exports as an independent variable. As shown in column 4, exports enter in with the expected sign (and a near unit elasticity). Unfortunately, the perverse coefficient on income is statistically significant, and the time trend now becomes statistically significant, probably due to the multicollinearity between GDP and the trend. However, they do obtain a positive and statistically and economically significant coefficient on the real exchange rate.

3 Disaggregating trade flows

Aggregation might be inappropriate if the components of trade flows behave in substantially different ways. The data allows one to investigate differential behaviour

4 The WTO accession dummy is set to equal 1 at 2002Q1 and thereafter.

along categories of goods used for processing versus for end consumption, or between manufactured versus non-manufactured goods, or between goods exported or imported by firms of different ownership.

One of the peculiarities of the Chinese system is that the Chinese customs agency categorises exports and imports into those goods that are to be used for processing purposes and those to be used as ordinary exports or imports. For instance, processing imports are usually for manufacturing finished products in China for (re-)exporting, and these imports are usually subjected to more favourable tariff rates. In contrast, processing exports are exports that are used by the imported country for processing and assembly. With this information, one can examine the data at a more disaggregated level.

Ordinary export results are on the left-hand side, while processing export results are on the right-hand side in Table 2. The common result is that for both types of exports, the value of the yuan enters in with the right sign and statistical significance. One large difference is the fact that ordinary exports do not exhibit a statistically significant sensitivity to rest of the world GDP (unless a post-WTO trend is included). In contrast, processing exports always exhibit income elasticities in excess of unity.

Next, we investigate whether the corresponding disaggregation yields results more in accord with priors for imports (see Table 3). The answer is mixed. For ordinary imports, the income elasticity is positive but not statistically significant, while the exchange rate has the wrong effect. If one includes exports (which is not well motivated for ordinary imports), the results are largely uninformative as well, since no economic variable enters with significance.

For processing imports, both income and the real exchange rate enter significantly, but the latter enters with the wrong sign. Including exports results in properly signed coefficients for the exchange rate and export variables. Income now enters with a negative, and significant, sign. This result signals the collinearity of many of the variables.

Table 2 Exports of ordinary and processing trade, normalised by by the Hong Kong re-export unit value index

	[1]	[2]	[3]	[4]	[5]	[6]
	Ordinary	Ordinary	Ordinary	Processing	Processing	Processing
GDP	0.422 (0.78)	0.478 (0.81)	4.809*** (0.73)	3.592*** (0.61)	3.640*** (0.61)	6.878*** (0.77)
REER	-1.864*** (0.25)	-1.869*** (0.25)	-1.319*** (0.25)	-1.199*** (0.22)	-1.203*** (0.23)	-0.875*** (0.23)
CRgrw		0.226 (0.62)	-0.055 (0.53)		0.195 (0.55)	-0.084 (0.44)
WTO			-0.764*** (0.10)			-0.598*** (0.13)
WTO*Trend			0.027*** (0.00)			0.022*** (0.00)
Trend	0.047*** (0.01)	0.047*** (0.01)	0.000 (0.01)	0.024*** (0.00)	0.024*** (0.00)	-0.014* (0.01)
Q1	-0.176*** (0.04)	-0.175*** (0.04)	-0.185*** (0.03)	-0.226*** (0.03)	-0.225*** (0.03)	-0.218*** (0.02)
Q2	-0.036 (0.04)	-0.031 (0.04)	-0.033 (0.03)	-0.117*** (0.03)	-0.113*** (0.03)	-0.111*** (0.02)
Q3	0.003 (0.04)	0.006 (0.04)	-0.006 (0.03)	-0.041 (0.03)	-0.038 (0.03)	-0.018 (0.02)
Constant	17.660*** (1.17)	17.671*** (1.19)	15.380*** (1.17)	14.786*** (1.03)	14.795*** (1.05)	13.510*** (1.03)
RMSE	0.11	0.11	0.08	0.08	0.08	0.06
Obs.	64	64	64	64	64	63
Leads-lags	1, 1	1, 1	1, 1	1, 1	1, 1	1, 2

Notes: The table reports the results of estimating equation (1) with the ordinary and processing export data. The pair of numbers given in the row labelled "Leads-lags" are the number of leads and the number of lags of the first-differenced cointegrated variables used in the dynamic OLS regression. Robust errors are in parentheses underneath coefficient estimates. ***, **, and * indicate the 1%, 5%, and 10% level of significance, respectively. Coefficients for constant and quarterly dummies not reported.

Table 3 Imports of ordinary and processing trade, normalised by the Hong Kong re-export to China unit value index

	[1]	[2]	[3]	[4]
	Ordinary	Ordinary	Processing	Processing
GDP	2.960 (2.02)	-0.101 (2.37)	3.591*** (1.13)	-2.259** (0.80)
REER	-0.962** (0.41)	0.376 (0.89)	-3.101*** (0.26)	0.787* (0.45)
Export		0.255 (0.33)		1.264*** (0.14)
Trend	-0.026 (0.05)	0.033 (0.05)	-0.051* (0.03)	0.033** (0.02)
RMSE	0.09	0.07	0.06	0.02
Obs.	33	33	33	33
Leads-lags	1, 1	1, 1, 1	1, 1	1, 1, 1

Notes: The table reports the results of estimating equation (2) with the post-WTO ordinary and processing import data. The pair of numbers given in the row labelled “Leads-lags” are the number of leads and the number of lags of the first-differenced cointegrated variables used in the dynamic OLS regression. Robust errors are in parentheses underneath coefficient estimates. ***, ** and * indicate the 1%, 5%, and 10% level of significance, respectively. Coefficients for constant and quarterly dummies not reported.

In terms of the manufactures versus overall distinction, not much difference arises on the export side. To the extent that most goods exports are now manufactured, this result is unsurprising. On the import side differences arise, but nothing of a particularly systematic nature.

The pattern of ownership has interesting ramifications for trade behaviour. At the beginning of the 1990s, state-owned enterprises (SOEs) held a commanding role in the economy. By 2010, private firms had taken on a much bigger role. At this level of disaggregation, export elasticities are generally more in accord with priors, with SOE exports exhibiting the lowest income elasticity, foreign-invested enterprise (FIE) exports a higher elasticity, and private firm exports the very highest. Price elasticities exhibit the same pattern. This set of results also suggests that overall aggregation is at least partly to explain for the difficulty in obtaining sensible results.

The corresponding results for imports are less promising. The estimated income elasticity is positive, unless the exports variable is included. The exchange rate coefficient has the wrong sign, and has the correct sign only for SOEs and FIEs when exports are included. For both SOEs and FIEs, exports show up as particularly important. The elasticity of imports with respect to exports is least marked for private enterprises.

Chinese imports in general remain difficult to explain. One possible reason for this outcome is the fact that the CPI deflated real exchange rate does not fully reflect the price of Chinese tradable output, as it includes a large non-tradable component (Chinn 2006). In order to account for productivity trends, Cheung et al. (2012) adopt an ad hoc approach, including a proxy variable, namely, Chinese GDP per capita relative to US output per man hour in the non-farm business sector (Table 4).

The inclusion of the relative productivity variable yields substantially improved results (Table 5). The exchange rate now has the correct sign for all aggregates and components of imports, and is statistically significant in all cases but one. Higher Chinese relative productivity decreases imports as well, which makes sense, as higher productivity is consistent with greater competitiveness. In some sense, the competitiveness variable explains even more of Chinese import behaviour than the conventional variables, as the associated coefficient is significant in all cases but one.

Table 4 Disaggregated imports, with private consumption and fixed asset investments activity variables

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
	Aggregate	Ordinary	Proc.	Primary	Manuf.	SOE	FIE	Priv.
Consumption	0.847** (0.40)	1.304 (0.79)	0.436 (0.32)	-0.925* (0.45)	-0.109 (0.16)	0.275 (0.61)	1.333* (0.72)	-1.298 (0.90)
Fixed asset inv.	0.836* (0.47)	1.663** (0.74)	1.186*** (0.41)	1.054** (0.40)	-0.214 (0.20)	1.438* (0.78)	1.488** (0.67)	2.149** (1.00)
REER	-1.561*** (0.52)	-0.647 (1.54)	0.665 (0.56)	1.814* (1.01)	-1.501*** (0.34)	1.177 (0.78)	-0.660 (0.52)	7.155*** (1.33)
Export	0.348** (0.16)	-0.360 (0.31)	1.077*** (0.11)	0.898* (0.50)	0.174 (0.11)	0.312 (0.24)	0.823*** (0.13)	1.676*** (0.18)
WTO	0.366 (0.31)	1.857** (0.69)	0.525** (0.22)	0.330 (0.36)	0.215 (0.17)	1.548*** (0.51)	0.450 (0.31)	-3.363*** (1.05)
WTO*Trend	-0.012 (0.01)	-0.053*** (0.02)	-0.016** (0.01)	-0.012 (0.01)	-0.003 (0.01)	-0.043*** (0.02)	-0.017 (0.01)	0.093*** (0.03)
Trend	0.026*** (0.01)	0.077*** (0.02)	-0.024*** (0.01)	0.014 (0.01)	0.039*** (0.01)	0.026** (0.01)	-0.006 (0.01)	-0.240*** (0.03)
RMSE	0.05	0.08	0.05	0.11	0.04	0.04	0.05	0.08
Obs.	59	59	59	59	65	59	57	59
Leads-lags	1, 4, 1, 1	1, 2, 4, 1	1, 4, 1, 3	1, 1, 2, 4	1, 1, 1, 1	1, 2, 3, 1	2, 4, 1, 2	1, 1, 1, 2

Note: The table reports the results of estimating equation (2) with GDP replaced by its two components: consumption and fixed asset investment. Coefficients for constant and quarterly dummies not reported.

Table 5 Disaggregated imports, with China's relative productivity variable

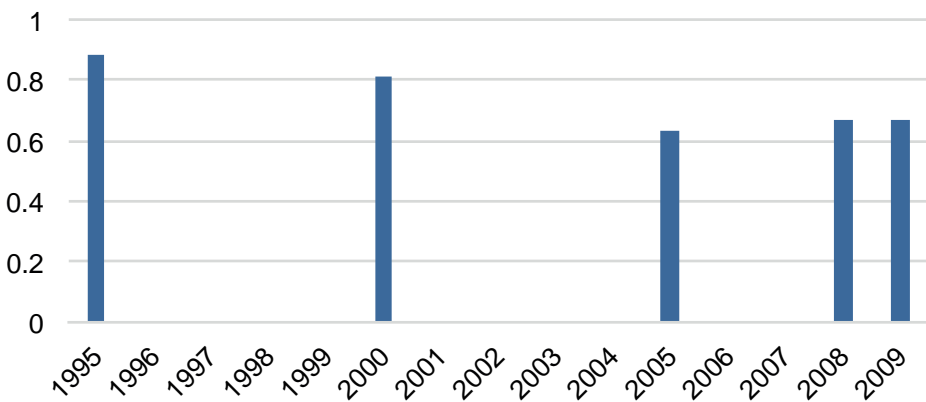
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
	Aggregate	Ordinary	Proc.	Primary	Manuf.	SOE	FIE	Priv.
GDP	4.099 (2.39)	1.563 (8.31)	4.648 (2.62)	6.723 (3.98)	1.701 (1.45)	-0.504 (2.84)	3.834 (2.21)	11.581*** (4.47)
REER	2.785*** (1.13)	0.586 (1.07)	0.884 (1.21)	4.973*** (1.86)	1.320** (0.58)	2.530*** (0.64)	1.518 (1.01)	5.535*** (1.24)
Export	1.472*** (0.36)	1.820*** (0.65)	0.857** (0.37)	1.822** (0.59)	1.323*** (0.18)	1.760*** (0.37)	1.137*** (0.26)	1.262*** (0.17)
Prod	-6.744*** (2.28)	-2.091 (5.05)	-4.812* (2.42)	-12.606*** (3.53)	-3.021*** (1.09)	-5.637*** (1.58)	-4.472** (1.99)	-12.651*** (2.57)
Trend	-0.009 (0.03)	0.010 (0.12)	-0.032 (0.04)	0.012 (0.07)	-0.013 (0.02)	0.1113** (0.05)	-0.027 (0.03)	-0.106 (0.07)
gfc08	-0.849 (28.70)	34.195 (50.23)	-1.195 (28.94)	1.446 (45.72)	8.153 (12.87)	7.133 (16.85)	8.584 (19.45)	67.008* (31.10)
gfc08*REER	-0.008 (5.45)	-8.217 (9.38)	0.221 (5.38)	-0.929 (9.47)	-2.101 (2.44)	-3.168 (3.53)	-1.635 (3.66)	-12.582* (5.98)
gfc08*Export	0.083 (0.43)	0.416 (0.62)	0.026 (0.48)	0.246 (0.45)	0.156 (0.24)	0.639*** (0.25)	-0.050 (0.39)	-0.519 (0.52)
RMSE	0.04	0.09	0.04	0.07	0.02	0.04	0.04	0.07
Obs.	35	35	35	35	35	35	35	35
Leads-lags	1, 1, 1, 1	1, 1, 1, 1	1, 1, 1, 1	1, 1, 1, 1	1, 1, 1, 1	1, 1, 1, 1	1, 1, 1, 1	1, 1, 1, 1

Note: The table reports the results of estimating equation (2) with a relative productivity variable and the Global Crisis (gfc08) dummy and its interactions. The one lead and one lag DOLS specification. * Coefficients for constant and quarterly dummies not reported.

4 Value added versus gross trade, again

In the studies discussed above, China's role as the final stage of the regional global value chain is addressed indirectly – that is, the distinction between gross exports and exports of value added have not been directly addressed. Yet, it is widely known that the relative price of value added likely differs substantially from the relative price of gross goods (and even more so from the relative price of broad bundles of goods and services). For instance, Bems and Johnson (2012) report Chinese value added in manufactured exports to be 39% in 2004; most anecdotal evidence suggests that the value added component has increased over time, although only modestly (Figure 5).

Figure 5 Share of domestic value added in total exports.



Source: OECD TiVA.

Nonetheless, the importance of the distinction is highlighted in Bems and Johnson's (2012) comparison of the value added and CPI deflated real exchange rates (Figure 6).

Figure 6 Log real value of Chinese yuan, value added (darker) and CPI deflated (lighter).



Source: Bems and Johnson (2012).

There are at least two ways of directly tackling the fact that the export of value added differs substantially from the gross value of exported goods. The more appropriate route would be to directly estimate the amount of value added traded, and link those values to the relevant activity variables. However, merely measuring the amount of value added that is traded is an involved task, as demonstrated in Bems and Johnson (2012) and Patel et al. (2014). Estimates of the elasticity of trade in value added with respect to the relative price of value added are yet to be calculated.

If one were concerned about measuring the sensitivity of gross flows with respect to income and the real exchange rates correctly, a more expedient approach is to include a control for determinants of the cost of production. Thorbecke (2011) undertakes exactly this task. He finds that an integrated real exchange rate variable (one taking into account exchange rates of the countries supplying intermediate inputs into the Chinese production process) yields a higher (in absolute value) price elasticity; and allowing for separate Chinese exchange rates and Chinese supplier exchange rates also provides more sensible estimates. One implication is that a Chinese yuan appreciation has a

different impact than a Chinese yuan appreciation accompanied by changes in China's exchange rate with supplier country currencies.⁵ One could interpret the recent advent of balanced ordinary goods, and the persistently positive processed goods balance, as being due to the differential behaviour of China's exchange rate vis à vis the export destination countries, and vis à vis the supplier countries.

Directly related to the question at hand, it is of note that the sensitivity of Chinese gross exports to the rest of the world's economic activity is not particularly sensitive to the specific exchange rate variable used (it is sensitive, however, to the treatment of time trends). A few studies have attempted to address the role of global value chains in the recent slowdown in gross trade flows. Gangnes et al. (2014) examine China's trade, disaggregated by industry. They exploit the Chinese tariff system, which categorises imports as processing or ordinary. They find that there is a composition effect in the pattern of Chinese exports (durable goods are more income sensitive), while there is no apparent processing goods effect. Unfortunately, the sample examined spans the period 1995-2009, hence omitting the last five years of the trade slowdown.

Ferrantino and Taglioni (2014) show that through 2013Q1, the growth rate of trade associated with global value chains decelerated more rapidly than that associated with non-GVC trade. However, the post-recession rebound in GVC-associated trade was also larger. Hence, it is hard to say whether there has been a systematically faster deceleration in GVC-related trade growth.

As for the trend in the development of global value chains, it seems unlikely to exhibit a drastic reversal. Amador and Cabral (2014) document the fact that vertical specialisation continued even as energy prices rose. With energy prices lower, and likely to stay low for some time, the process of production fragmentation is very likely to continue.

5 In practice, this effect might be muted in the future. Chinn (2014) provides evidence that the currencies of the countries most intimately involved in the regional global value chain have tended to stabilise their currencies against the yuan since the end of the Great Recession.

I have not addressed other important questions, including the *composition* of Chinese exports. There is some concern that the manufactured share of exports has not changed substantially since 2008 (Batson 2013,⁶ 2015). This is worrisome, given the presumption that a greater manufactured export share would represent a movement up the value chain, a key ingredient in attaining income convergence, if the example of earlier newly industrialising economies such as Korea is any guide.

5 Summing up

The bulk of the discussion has treated the main questions related to Chinese trade, and more particularly exports, as a function of world conditions, regardless of whether one is concerned with gross exports or exports of value added. That is, the demand for exports ultimately determines the amount of exports. However, this need not be the case, and in fact domestic demand could draw some of the goods and services away from the export market.

A key question, thus far side-stepped, then becomes relevant. Are the Chinese authorities able to navigate the Chinese economy toward a more domestically oriented, consumption-based growth model? If this were to occur, Chinese export growth would be more likely to decelerate more rapidly than suggested by the earlier discussion, as a greater consumption share suggests an export sector that is smaller than would have otherwise occurred.

To date, there is some evidence that a greater share of output has been devoted to household consumption; the 2013 share stands at 36.2%, up from a low of 34.9% in 2010. Similarly, total consumption (government and household) has risen from 48.2% to 49.8%. However, in both cases these shares are down from levels of about 47%

⁶ China's New Silk Road diplomacy, and moves to development a China-funded infrastructure investment bank, can be thought of as a means of maintaining exports of manufactured goods. See Batson (2015) for additional discussion.

and 62%, respectively, in 2000.⁷ In this context, progress toward rebalancing has been limited so far.

Is there a means to assess quantitatively the impact of reform on the current account, going forward? Ito and Volz (2013) use estimates from a cross-country analysis to assess the impact of reforms aimed at rebalancing the Chinese economy.⁸ They conclude that with drastic domestic financial reform, the current account balance, national saving rate, and investment would be lower than in the baseline by 0.7, 2.5, and 1.7 percentage points, respectively. Lower saving is consistent with more imports, as is lower investment. Other measures, such as increased health care provisioning, also have a negative impact on the current account.⁹

Success in steering the economy toward greater consumption orientation requires a greater labour share of income, and hence likely a higher average wage rate. That trend is already showing up, as discussed in Li et al. (2012), and placing greater pressure on maintaining productivity growth to protect the competitiveness of Chinese exporters. Estimates of the impact on competitiveness are hard to come by; Ceglowski and Golub (2012) estimate that Chinese relative unit labour costs evaluated at PPP terms are either 33% or 69% of US levels as of 2009-2008. There is tremendous uncertainty surrounding the direction and magnitude of these trends, and yet they could prove to be as important as the demand conditions that have been the focus of earlier discussions.

Assuming current trends, it seems plausible that Chinese export growth will continue to decelerate, so that the growth gap between exports and export-weighted rest-of-world GDP will shrink by about a third of a percentage point a year, perhaps faster if pro-

7 See IMF (2014), Figure 3. Figures refer to expenditure basis. On the production side, the industry/services split has shifted toward the latter: 47/43 in favour of industry in 2011, to 42/48 in favour of services in 2014. For a discussion of how greater services orientation can lead to much greater employment (and implicitly to a greater labour income share), see Feenstra and Hong (2010).

8 The approach is based on Chinn and Prasad (2003), and Chinn et al. (2014).

9 Healthcare spending is included as a policy determinant of current account balances in the IMF's External Balance Assessment (EBA); see Phillips et al. (2013).

consumption reforms are forcefully implemented.¹⁰ Variation in the real value of the yuan will have some impact, but it is difficult to see how anything but a much more rapid appreciation will force a large deviation from this trajectory.

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¹⁰ The October 2014 IMF *World Economic Outlook* projects a marked deceleration of export volume growth, from 10.2% in 2014 to 5.8% in 2019. Import growth will converge to the same rate, but at a much slower pace.

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14 Trade impact of China's transition to the 'new normal'

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1 The 'new normal' and structural reform

China is now in transition from a fast growing economy driven largely by investment and export to a new growth model with domestic demand and innovation as the new growth engines. This new growth model may come with a lower growth rate, and is often dubbed the 'new normal'. It will define China's growth trajectory for decades to come. To fulfill this transition, the Chinese economy needs to be rebalanced from an over-reliance on export and investment to more innovation and more domestic consumption.

Trade adjustment is a key part of this transition. A distinct feature of China's foreign trade is its processing trade arrangement, in addition to its normal trade regime. Under the processing trade regime, parts and components enter China duty free and are exported after being processed or assembled. While parts and components are mostly made in ASEAN, Korea and Japan, the major destination of the assembled products is the US and the EU.

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China's processing trade took off in the early 1990s. It was accelerated by the 1997 Asian financial crisis as exporting firms in crisis-stricken countries sought safe haven in China. The country's accession to the WTO in 2001 secured its access to the US market, so that more exported oriented FDI flowed into China. On the demand side, Chinese provinces were competing to attract FDI by offering various incentives. To avoid competition with local domestic firms, FDI in labour-intensive sectors has been encouraged to enter export businesses. As a result, processing trade is the natural choice of low-tech FDI.

After almost a quarter of a century of rapid growth, China's processing trade regime is now under stress. Rising labour costs are driving foreign funded processing firms to move to other cheap developing countries or even return to home countries, as evidenced by the re-industrialisation in the US. Chinese policies encouraging indigenous innovation have helped domestic production of R&D-intensive parts and components, which are increasingly replacing imported intermediates.

This development has coincided with the 2008 Global Crisis, which not only depressed firm's foreign outsourcing activities, but also slowed down normal international trade. However, the Crisis itself is a cyclical factor and its impact on trade will go away once the world economy is fully recovered. In fact, Constantinescu et al. (2014) attribute the recent slower trade growth to the slowdown of US foreign outsourcing to China. In the long run, structural factors, such as the processing trade adjustment and other structural reform measures, will have a permanent impact on trade. This chapter tries to shed light on this issue by employing an innovative China CGE model, which has a detailed trade structure, to make a quantitative assessment of China's transition to the 'new normal'.

2 DPN GEM: Data and model

Conventional CGE models for Chinese trade policy analysis do not differentiate processing export and the rest of the Chinese economy. Examples include the model developed by China's Development Research Center (the DRC model), which focuses

on the Chinese regions, and the standard GTAP model (Hertel and Tsigas 1997). Economists have attempted to separate normal and processing trade in a CGE model for China (Ianchovichina et al. 2000, Wang 2003, Ianchovichina 2004, Ianchovichina and Martin 2004). The split, however, is largely based on assumptions on key input-output coefficients and does not further differentiate the normal export and domestic production sectors.

Our proposed modelling work is an improvement along this line and is made possible through the construction of an innovative Chinese input-output table (IOT) that differentiates the production for domestic use (D), the production for processing trade (P) and the production for normal trade and other production of foreign-invested enterprises for domestic use (N) and is known as DPN IOT. This work has been significantly enhanced since China's participation in the WTO/OECD "Made in the World Initiative" in early 2012. With the support of various Chinese government agencies, DPN IOT is the best source of economy-wide data for China's foreign trade and constitutes the backbone of the database for the China trade CGE model used in this chapter, known as DPN GEM.

The tripartite feature of the DPN IOT is shown in Table 1 in the Appendix. There are three types of heterogeneous production technologies: type D gives the production for domestic use, type P represents the production of processing trade, and type N the production for normal trade and other production of foreign-invested enterprises for domestic use. This classification of three production technologies is justified by the theory of, and Chinese empirical evidence on, firm heterogeneity (Melitz 2003, Yao et al., 2015), and was pioneered by Chen et al. (2001) and Chen et al. (2012).

The key parameters of the DPN IOT are given in Table 2 in the Appendix. The last row in the right-hand panel of the numerical table gives one more indicator: the capital-to-labour ratio. It suggests that the production type P is labour-intensive, whereas the production type N is capital-intensive. The model structure and behavioral parameters are drawn from a miniature ORANI (Dixon et al. 1982)

3 Policy scenarios and simulation results

Baseline scenario: Normal growth

Our baseline ('normal') scenario is normal annual growth based on the 2010 data. As shown in Table 3 in the Appendix, under the 'normal' scenario, the economy maintains high growth rates for investment, normal and processing exports (10% each), but low growth rates for domestic consumption (4%) and a low level of innovation (1% Hicks-neutral productivity gain). The DPN GEM does not explicitly model FDI, an important source of growth. Instead, we use capital-saving technological progress to model the effects of FDI inflows. In the baseline case, the effect of FDI is represented by a 4.5% capital-saving productivity gain.

As shown in the left-hand panel of Table 4 in the Appendix, the 'normal' economic growth produces a high GDP growth rate – 9.66% for nominal GDP and 6.75% for real GDP. The share of imports in GDP rises at 1.32% and 4.08% per year for nominal and real term measures, respectively.

Against this baseline, the processing trade adjustment and economic rebalancing are modelled to reflect (i) slower growth in foreign outsourcing, and (ii) less reliance on investment and exports, and more reliance on domestic consumption and innovation. We set up three scenarios for each of the two types of structural changes – minor, moderate and major reforms. Counterfactual growth rates for all indicators under various scenarios are listed in Table 3, and simulation results are reported in Table 4.

Foreign outsourcing slowdown

The middle panel of Table 4 reports the simulation results for foreign outsourcing slowdown. Processing export growth is slowed from the normal 10% to 8%, 6% and 4%, respectively, under the minor, moderate and major reforms. All other things being the same as in the 'normal' scenario, growth rates for both imports and exports in both real and nominal terms are also reduced compared to the normal scenario. In particular,

nominal import to nominal GDP ratio grows at 0.98%, 0.62% and 0.27% under the minor, moderate and major adjustment scenarios, respectively, compared to 1.32% under normal scenario. The numbers for the same scenarios for the real import to real GDP ratio are 3.46% (minor), 2.81% (moderate), 2.19% (major) and 4.08% (normal). In both measures, trade slows down as a result of foreign outsourcing adjustment.

Economic rebalancing: Transition to the 'new normal'

China's ongoing economic reforms involve more than just a processing trade adjustment. Most of the discussions on China's economic rebalancing imply a slower growth rate, and the annual growth rate itself was a closely watched figure in the prime minister's annual work report to the National People's Congress in March 2015. However, the growth rate is not a policy tool but the result of a set of economic policies used to make the transition to the 'new normal', including domestic investment, consumption, net FDI and innovation.

Policy shocks for the transition to the 'new normal' scenarios are listed in the right-hand panel of Table 3. Except for normal exports, all other economic indicators will be changed under the minor, moderate and major reforms. While the processing trade adjustments remain the same, investment growth is slowed from 10% to 8%, 6% and 4%, respectively, while consumption growth is raised from a low 4% to 6%, 8% and 10%, respectively. In our model, the consumption variable C includes both private and government consumption.

Growth of net FDI inflows is slowed not only because FDI inflows are associated with processing trade, but also because China is increasing its overseas investment. For this, we factor in slower growth rates for capital-saving technology progress, which are 3.5%, 2.5% and 1.5%, respectively, for the three scenarios.

Growth by indigenous innovation is a core element of the ‘new normal’ growth model. We set higher growth rates for the Hicks-neutral technology progress of 2%, 3% and 4% to represent minor, moderate and major innovations, respectively.

We do not change the growth rate for normal exports. As a policy matter, there is less emphasis on export promotion and the growth engine is shifting from external demand to internal demand. This tends to lower the growth prospects for normal exports.

However, China is also strengthening its trade relations with low-income developing countries. There has been evidence that Chinese trade patterns are evolving in contrasting directions with high-income and low-income ASEAN members since 1997. High-income ASEAN countries are specialising in the production of R&D-intensive parts, with China as an assembly centre. At the same time, the low-income ASEAN countries are becoming assembly centres for Chinese-made parts (Yao et al. 2014). When South Asia and Africa start to integrate into global value chains, they will become the assembly centres for Chinese-made parts and components. This is a realistic development, particularly for India, where the Modi administration is trying to revitalise its manufacturing sector to create jobs for unskilled workers, a strategy endorsed by prominent free trade economists (Bhagwati and Panagariya 2013). The external developments in South Asia and Africa are coinciding with China’s R&D push, which will stimulate the production of knowledge-intensive parts and components. Therefore, the integration of South Asia and Africa into global value chains provides an opportunity for China to expand its exports of parts and components, which fall into the category of normal exports. For our modelling exercise, we assume the internal and external factors are cancelled out so that normal export growth rate remains ‘normal’.

The right-hand panel of Table 4 reports the simulation results. The consumption impacts are very straightforward, as the nominal investment and consumption ratio (I/C) grows at a much smaller rate (1.89%) under minor reform, and turns to negative growth (-1.85%) under moderate reform. For major economic rebalancing measures, the ratio declines at the largest rate (-5.45%).

The decline of the consumption share in GDP, all in nominal terms, is contained at -1.51% when minor reform is introduced. Its decline is reversed to a positive growth rate (0.68%) if moderate reform measures are taken. For bold reform, the growth rate of the consumption share stands at 2.86%.

With the nominal consumption growing at a rate of between 7.31% and 10.35%, household utility could grow between 10.90% and 18.16% annually, depending on how drastic the reform measures are.

Compared to consumption, the trade impacts are less straightforward, as some reform measures tend to slow down imports (e.g. reduced growth of investment), while others stimulate imports (e.g. growing consumption). As a result, the question of how economic rebalancing will impact China's foreign trade is an empirical issue. However, our simulation results suggest that rebalancing will tend to slow trade, for both imports and exports in both nominal and real terms. Deeper reform is uniformly associated with slower trade growth, as shown in the right-middle block of Table 4.

In the debate over China's reform strategy, the GDP growth rate is the most talked about number. It is believed that a slower GDP growth rate is generally associated with more radical reform, while a faster one reflects the continuation of the current growth model. Does reform necessarily depress growth? It depends. As shown in the first two lines in the lower-right block of Table 4, nominal GDP indeed grows at a slower rate if reform is more drastic, but the opposite is true for real GDP.

The last two lines in the lower-right block of Table 4 reports the growth rates of the trade share, measured as the share of imports in GDP, under the 'new normal' scenarios. In terms of the import value over nominal GDP ratio, trade growth becomes slower as reform goes deeper. This pattern also holds if the trade share is measured by the ratio of import volume over real GDP. For both measures, trade growth turns negative under the 'major' reform scenario.

4 Conclusion

Processing trade accounts for about 30%-50% of China's total trade. In our DPN GEM database, with core data from China's 2010 DPN IOT, the proportion is no less than 34%, which is significant. It is intuitive that adjustment in China processing trade as a result of the stagnation of production fragmentation in the US will slow down China's overall trade; it is not quite straightforward to see how the 'new normal' growth model will impact trade, as several adjustments are taking place. When considering a package of reform measures, our modelling exercise shows China's transition to the 'new normal' is also contractionary in terms of trade. The new growth model unambiguously raises household welfare with more domestic consumption. It generates a higher growth rate for real GDP, but a lower one for nominal GDP.

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Appendix

Table 1 The structure of China's DPN input-output table

	Intermediate use			Final use		
	D	P	N	DFD	EXP	TOT
D	\mathbf{Z}^{DD}	\mathbf{Z}^{DP}	\mathbf{Z}^{DN}	\mathbf{f}^D	0	\mathbf{x}^D
P	0	0	0	0	\mathbf{e}^P	\mathbf{x}^P
N	\mathbf{Z}^{ND}	\mathbf{Z}^{NP}	\mathbf{Z}^{NN}	\mathbf{f}^N	\mathbf{e}^N	\mathbf{x}^N
IMP	\mathbf{M}^D	\mathbf{M}^P	\mathbf{M}^N	\mathbf{f}^M	0	\mathbf{x}^M
VA	$(\mathbf{v}^D)'$	$(\mathbf{v}^P)'$	$(\mathbf{v}^N)'$			
TOT	$(\mathbf{x}^D)'$	$(\mathbf{x}^P)'$	$(\mathbf{x}^N)'$			

Notes: D = the production for domestic use; P = the production for processing trade; N = the production for normal trade and other production of foreign-invested enterprises for domestic use; DFD = domestic final demands; EXP = exports; TOT = gross outputs (and total imports in the column TOT); IMP = imports; and VA = value added. The input-output table is expressed in monetary units (of 10,000 Yuan).

Table 2 Key parameters for China's DPN IO table, 2010

	Input structures (2010 billion yuan)			Input structures (shares)		
	D	P	N	D	P	N
D	50889	1033	12621	0.52	0.21	0.54
P	0	0	0	0.00	0.00	0.00
N	8835	306	2979	0.09	0.06	0.13
IMP	3681	2819	2375	0.04	0.56	0.10
VA	33984	854	5528	0.35	0.17	0.24
TOT / K-L*	97389	5011	23503	0.77*	0.67*	1.04*

Note: K-L gives the capital-to-labour ratio (last row in right panel), an indication of capital-intensive or labour-intensive nature of specific production class, e.g. 0.67 means the type P production is labour-intensive.

Table 3 Annual growth rates under different reform scenarios (%)

Indicators	Foreign outsourcing slowdown				Transition to 'new normal'		
	Normal	Minor	Moderate	Major	Minor	Moderate	Major
Demand in volume							
normal exp	10	10	10	10	10	10	10
processing exp	10	8	6	4	8	6	4
investment	10	10	10	10	8	6	4
consumption	4	4	4	4	6	8	10
FDI/Innovation							
FDI (K-saving tech)	4.5	4.5	4.5	4.5	3.5	2.5	1.5
Innov (Hicks-neutral)	1	1	1	1	2	3	4

Table 4 Simulation results for different reform scenarios (%)

Indicators	Foreign Outsourcing Slowdown				Transition to 'new normal'		
	Normal	Minor	Moderate	Major	Minor	Moderate	Major
Consumption							
I/C	5.77	5.77	5.77	5.77	1.89	-1.85	-5.45
C/GDP	-3.71	-3.58	-3.46	-3.34	-1.51	0.68	2.86
HH utility	7.27	7.27	7.27	7.27	10.90	14.53	18.16
Nominal C	5.59	5.39	5.19	4.99	7.31	8.89	10.35
Trade							
imp val	11.11	10.38	9.64	8.91	9.39	7.61	5.80
imp vol	11.11	10.38	9.64	8.91	9.39	7.61	5.80
exp val	12.65	11.42	10.21	9.02	10.88	9.07	7.22
exp vol	10.00	9.16	8.32	7.48	9.16	8.31	7.47
GDP							
Nominal GDP	9.66	9.31	8.96	8.62	8.95	8.16	7.28
Real GDP	6.75	6.69	6.64	6.58	6.95	7.18	7.43
imp val/Ngdp	1.32	0.98	0.62	0.27	0.40	-0.51	-1.38
imp vol/Rgdp	4.08	3.46	2.81	2.19	2.28	0.40	-1.52

Note: I, C and GDP under "Consumption" are all in nominal terms.

15 Crisis-era trade distortions cut LDC export growth by 5.5% per annum

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Introduction

Conventional wisdom has it that the multilateral trading system was tested during the Global Crisis and passed with flying colours. No 1930s-style raising of import barriers occurred, ergo trade distortions were kept under control, or so the argument goes. This rosy view has been called into question as more data on global trade dynamics have come to light. Some have contested that the era of rising ratios of world trade to income is over, a phenomenon referred to as ‘peak trade’ (Constantinescu et al. 2014).

Why does this matter? Export-led growth is said to have been particularly important for many developing countries. Anything that throws sand into the wheels of a nation’s export machine can limit its economy’s growth prospects and the potential to create employment, raise wages, and lift individuals and families out of poverty. While some contest the contribution of higher exports to poverty alleviation and growth, arguments are rarely advanced that lower national exports or foreign trade distortions that limit such exports enhance development. Peak trade implies that one important development engine may have stalled.

Figure 1 provides some evidence to support of the contention that world trade growth has not regained its pre-Crisis momentum. The average export elasticities for several

groups of countries were calculated for the periods 1990-2000, 2000-2008, 2008-2010 (the most acute years for world trade), and 2010-2013. These average export elasticities are crude estimates of the responsiveness of exports to world GDP, as they take the percentage change in the former for a given time period divided by the percentage change in the latter over the same time period. Ratios equal to or below 1 imply the export-to-world GDP ratio for a particular group of countries may have peaked.

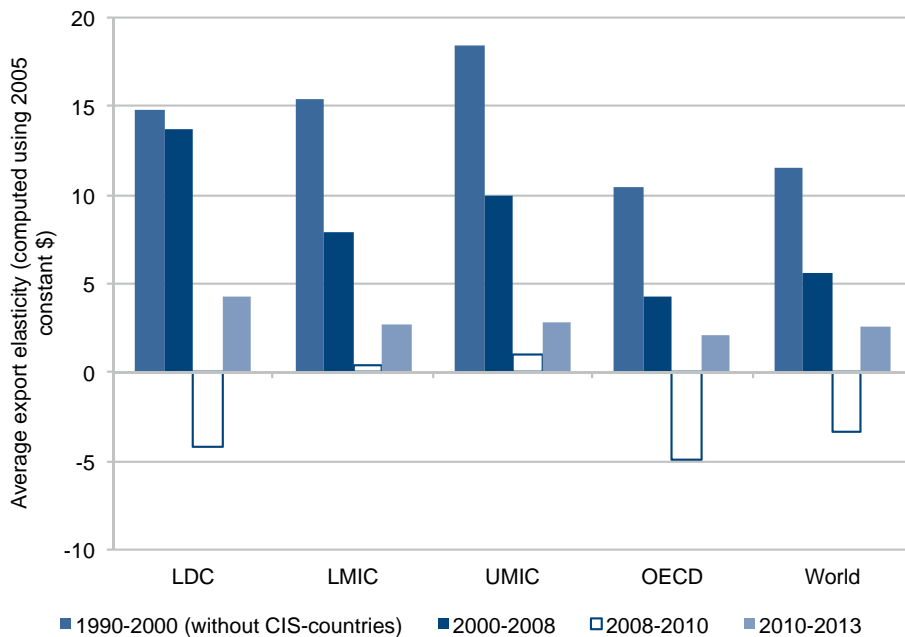
The Least Developed Countries (LDCs) had the largest average export elasticity in the years immediately before the Global Crisis. Indeed, their average export elasticity held up well during 2000-2008 as compared to 1990-2000, in contrast to other developing countries, the lower middle-income countries (LMICs) and upper middle-income countries (UMICs). Once world trade began growing again, the average export elasticities for each group of developing countries were markedly below that of the pre-Crisis era. While the changes in these average elasticities were less pronounced for the OECD (in particular, when comparing 2000-2008 to 2010-2013), a post-Crisis reduction in the responsive of exports occurred. World trade dynamics, then, appear to have changed. Attention naturally turns to why, and whether the source of export growth slowdown is reversible.

The purpose of the remainder of this chapter is to summarise the findings of a study of the determinants of LDC export growth since the onset of the Global Crisis commissioned by the Government of Sweden and conducted by us (Evenett and Fritz 2015).¹ Unlike Constantinescu et al. 2014, who consider only the effects of a narrow class of import restrictions, our study breaks new ground by employing data on the trade potentially covered by trade-distorting domestic subsidies and export incentives. The impact on LDC exports of different classes of trade distortions was estimated and the total reduction in LDC export growth due to foreign trade distortions was computed for each of the years 2009-2013.

1 Copies of this study are available upon request.

Our study, therefore, sheds light on the degree to which the LDC export growth slowdown is due to trade distortions imposed during the Crisis era. Not only are the development prospects of the LDCs at stake, so is the reputation of a rules-based trading system during the greatest ‘stress test’ since its creation.

Figure 1 Developing country average export elasticities have fallen sharply since the Crisis



Source: UN COMTRADE database (data on exports) and World Development Indicators (data on GDP measured in 2005 US dollars).

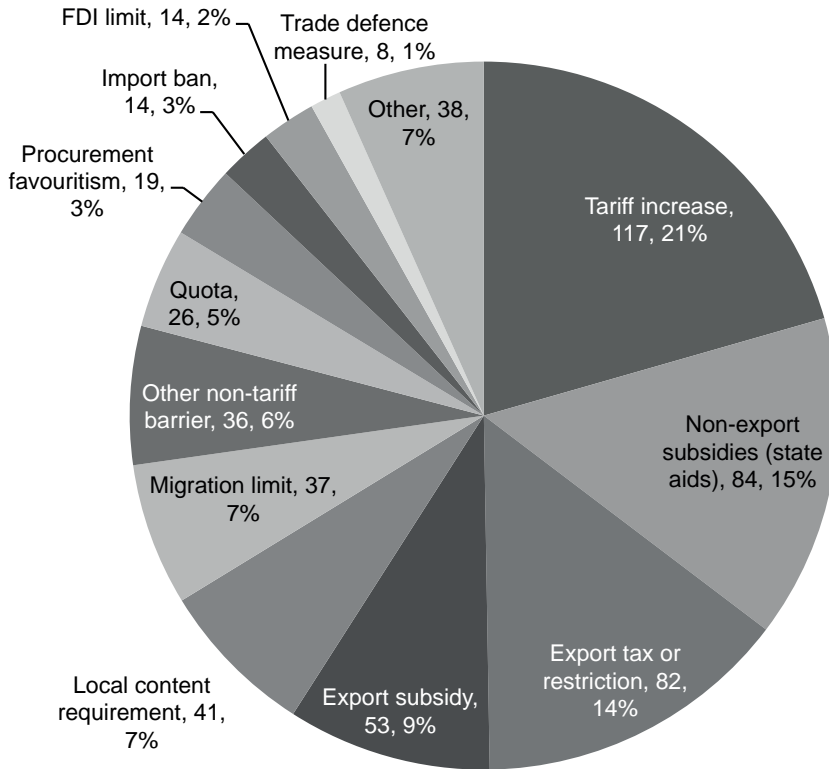
Trade distortions faced by Least Developed Countries during the Crisis era

Using data collected by the Global Trade Alert team, of which both of us are members, first we identified the policy instruments implemented by the trading partners of

LDCs that have plausibly harmed the latter's commercial interests.² The methodology employed by the GTA team here is particularly conservative, so the data reported in Figure 2 on the incidence of different types of protectionism almost certainly understate the true picture. Still, in the absence of reports by the international organisations on measures that harm LDCs, this is the most comprehensive picture available to analysts and policymakers. In terms of numbers of measures implemented – but not trade affected – tariff increases harmed LDC commercial interests most often (117 times since November 2008). In second place came state aids and bailouts to firms that were not export subsidies. This was followed closely by hits to LDC commercial interests from export taxes and other export restrictions. Taken together, tariff increases, state aids, and export taxes and restrictions account for half of the incidence of protectionism faced by LDCs. Interestingly, such protectionism affects both the imports and the exports of LDCs.

2 To be clear, the following data refer to policy measures implemented since November 2008 that are likely to have harmed the commercial interests of LDCs, defined to include exporters, investors, migrant workers, and owners of intellectual property. It is possible that a measure harms LDC and non-LDCs. To provide a comprehensive picture we do not confine ourselves to foreign measures that only target one or more LDC's commercial interests.

Figure 2 Foreign protectionism harming LDC commercial interests, by type of policy instrument



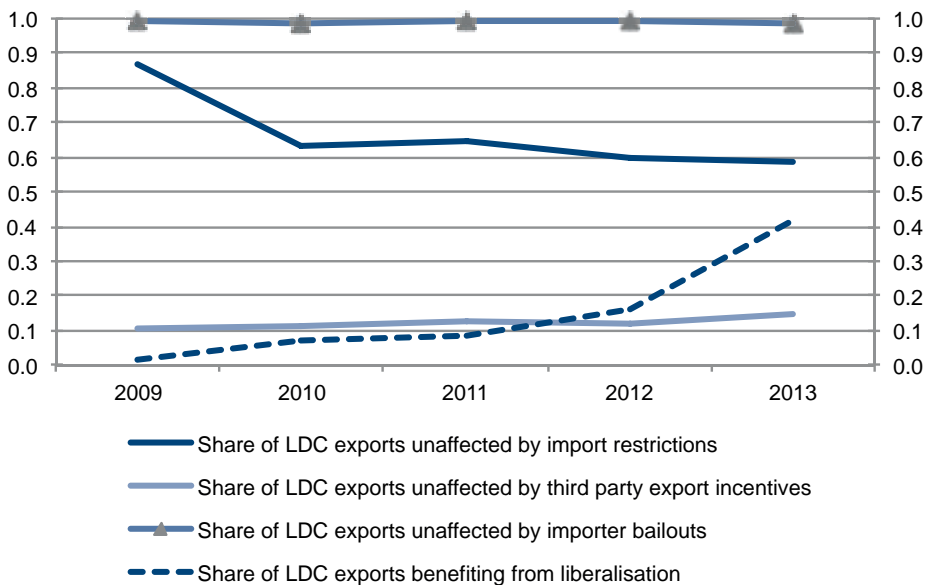
Source: Global Trade Alert website, data extracted 28 December 2014.

Figure 2 highlights the wide range of trade distortions affecting LDCs. Trade defence measures – the principal form of import restriction considered by Constantinescu et al. (2014) and in the WTO reporting on Crisis-era protectionism – rarely affected the commercial interests of LDCs. If there is significant harm done to LDC exports, it must come from other sources.

An important difference between the GTA’s reporting on trade restrictions and that of international organisations is the more comprehensive approach taken by the former, including in particular consideration of potentially trade-distorting subsidies. An LDC exporter may find their sales in a trading partner reduced for at least two subsidy-related

reasons. First, the LDC exporter may compete against a domestic firm in the trading partner that has received a bailout or is being kept afloat by public subsidies. Second, the LDC exporter may compete in the trading partner's markets against another exporter from a third country that has received an export subsidy or tax-related export incentive.

Figure 3 Trade coverage ratios affecting LDC exports vary markedly across classes of trade policy instrument



Source: Computed from Global Trade Alert reports and trade weighted using 4-digit trade flow data obtained from the COMTRADE database.

Figure 3 reports for each of the years 2009-2013 the trade-weighted average of the share of LDC exports that (a) did *not* face a foreign import restriction, (b) did *not* compete in product lines where there was a bailed out domestic competitor, (c) did *not* compete in product lines where there was an unsubsidised exporter from a third party that sold to the same foreign market, and (d) benefited from some form of trade liberalisation. In each case only changes in policy stance taken since November 2008 were taken into account, hence the shares reveal the *policy-induced changes* in export market conditions facing LDCs since the onset of the Global Crisis. The higher each

of these shares is, the more favourable the global trading environment facing LDC exporters. Growth in these shares over time represents good news for LDC exporters. Analysts may be used to trade coverage ratios, principally for import-restricting non-tariff barriers. The shares reported in Figure 3 are a form of trade coverage ratio but for a class of countries and for a wider range of policy changes, including the liberalisation of imports.

Figure 3 reveals that relatively few LDC exporters compete in foreign markets with a subsidised or bailed out domestic firm located in that foreign market (see the thick line with triangles at the top of the figure.) A growing share of LDC exports benefited from foreign trade reforms, highlighting the importance of controlling for this factor when estimating the determinants of LDC export growth. By 2013 over 40% of LDC exports were in product lines and to export destinations where some form of import liberalisation had occurred since 2008. The year 2010 saw a big fall in the share of LDC exports not affected by foreign import restrictions and, given that share has not changed much since 2010, it suggests that many Crisis-era import restrictions facing LDC exporters have yet to be unwound.

The most striking finding in Figure 3 is the very low share (around 0.1) of LDC exports that compete in product lines in third markets where no foreign supplier has been the beneficiary of an export subsidy or, as is more often the case, a tax-related export incentive. For sure that share rises a little in 2013, which is good news for LDC exporters. Nevertheless, the share is always low, suggesting that competition in many markets where LDC firms export is not on the merits. Indeed, to the extent that LDC governments cannot afford export incentives, they may be of the opinion that

their exporters are at a structural disadvantage.³ The amount of LDC trade potentially affected by foreign export incentives call into question the results of prior studies that have not controlled for the impact of these policies.

What factors caused the LDC export growth slowdown?

To estimate the contribution of different determinants of LDC exports, we collected the largest possible sample of bilateral exports from LDCs to their trading partners for the years 2009 to 2013. Once limits on data availability were taken into account a sample of 6,393 observations on such bilateral trade, accounting for over 90% of total LDC exports, was assembled. A standard gravity equation approach was taken, augmented with data on the bilateral shares of exports that benefit from trade liberalisation and that were not harmed by foreign import restrictions, domestic bailouts, and export incentives to firms based in third countries. A wide range of econometric specifications were employed and despite the well-known noisiness of bilateral trade data, a consistent pattern of econometric estimates was found.⁴ It is important to stress that there is considerable cross-sectional and intertemporal variation across the policy variables in our sample diminishing, in principle, concerns about spurious correlation between trending variables.

3 An example of a country with a wide range of fiscal incentives to export is China. See Evenett et al. (2012) for an account of the form and scale of China's rebates on value added taxes available to exporters. Unlike most countries, China has actively expanded the products covered by these rebates as well as adjusting the magnitude of these rebates during the global economic crisis. Chinese policies in this regard amount to nothing less than active export management. It is important to note that China is not the only large trading nation to have altered fiscal incentives to export since the onset of the global economic crisis, as perusal of the Global Trade Alert database will reveal.

4 See Table 3 of Evenett and Fritz (2015). A barrage of robustness checks was conducted and did not alter the pattern of results reported here. In particular, controlling from the commodity composition of exports did not change the overall findings. Controlling for differences across LDCs in time to export –a factor influenced by poor infrastructure, red tape, etc. – if anything heightened the sensitivity of LDC exports to foreign trade distortions.

Table 1 Conservative estimates of total annual LDC gains and losses from foreign policies imposed since 2009

	2009	2010	2011	2012	2013	Total for 2009-2013
Estimated LDC export benefit due to foreign liberalisation (US\$ billion)	0.33	1.91	2.75	4.54	20.6	30.12
(as a % of total observed LDC exports)	0.28%	1.27%	1.43%	2.43%	10.56%	3.58%
Estimated LDC export loss due to foreign trade distortions (US\$ billion)	37.02	46.84	57.87	61.56	61.73	265.03
(as a % of total observed LDC exports)	31.86%	31.18%	30.13%	32.99%	31.63%	31.54%
Ratio of LDC trade loss to trade benefit	113.4	24.6	21.1	13.6	3.0	8.8

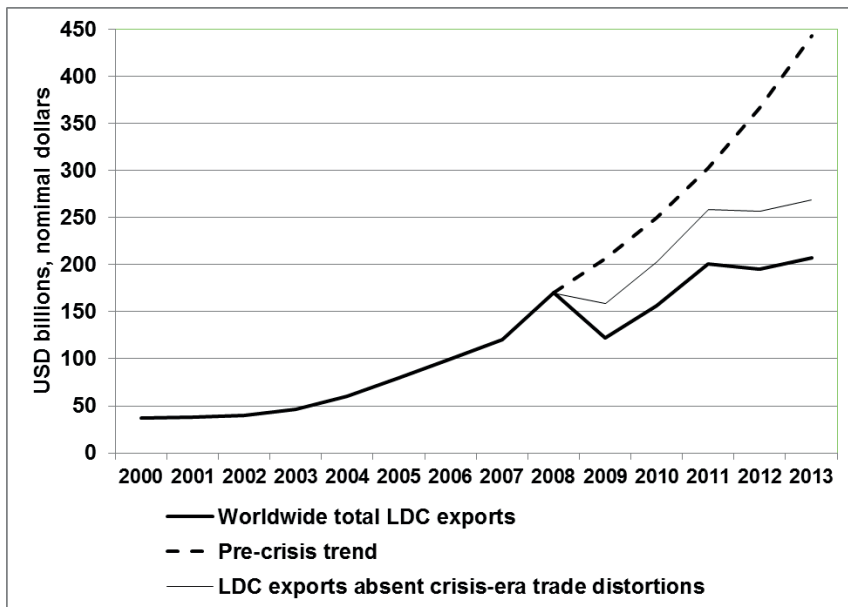
Source: Evenett and Fritz (2015).

As in most gravity equation studies, changes in the GDP of the trading partners influenced LDC exports in a statistically significant manner. Interestingly, of the policy-related variables, the share of LDC exports unaffected by foreign import restrictions performed worst of all. Meanwhile, foreign trade liberalisation, bailouts of domestic firms by trading partners, and third-party export incentives were found consistently to be statistically significant determinants of changes in LDC exports during the Crisis-era. The fact that data on the former variables are much more readily available than data on the latter variables has probably skewed other analyses of Crisis-era trade flows.

Our most conservative econometric estimates were used to forecast the impact of foreign trade reforms and statistically significant foreign trade distortions on LDC export growth for each year from 2009 to 2013. The results are reported in Table 1. Foreign trade distortions are estimated to have held back LDC exports by 31.5% during the period 2009 to 2013, or by an amount in excess of a quarter of a trillion US dollars.

The beneficial impact of foreign trade liberalisation pales in contrast, accounting for at most one-eighth of the scale of the harm done to LDC exports. Further computations reveal that by far the largest contributor of harm to LDC exports comes from export incentives offered by third parties.

Figure 4 Trade distortions reduced total LDC export growth by 5.5% per annum



Source: Obtained from econometric estimates reported in Evenett and Fritz (2015) and using COMTRADE data.

To appreciate the extent of the harm done by foreign trade distortions to LDC exports see Figure 4. Between 2000 to 2008, LDC exports grew in nominal terms at 20.6% per annum. Since 2008, the annual rate of growth of LDC exports has collapsed to an average of 5.7%. LDC exports have not peaked, but the export growth machine has certainly slowed down. In the absence of Crisis-era foreign trade distortions, LDC exports would on our estimates have grown by 11.2% per annum, suggesting that these distortions have cut LDC export growth on average by 5.5% per annum. Foreign trade distortions have thrown sand into the wheels of the LDC export growth engine.

Policy implications: Is the export growth slowdown reversible?

Over time, it is becoming evident that world trade dynamics shifted after the Global Crisis. Fortunately, unlike the 1930s, world trade didn't spiral downwards. However, export growth has slowed down and it is important to establish why. Public policy might be able to remedy any technological or market failure, if either were found to be a principal source of the problem. But analysts and officials ought to be open to the possibility that public policy could itself be the cause of the export growth slowdown.

In this chapter, we have summarised the findings of an extensive study of the determinants of the export patterns of the poorest countries on Earth – the Least Developed Countries. That study has shown that foreign trade distortions, principally in the form of state-provided export incentives, are responsible for cutting LDC exports by on average 5.5% per annum. This retrograde step has occurred despite WTO rules on subsidies, calling into question the faith that should be placed in the rules-based trading system. That such trade distortions are frequently buried in the minutiae of national tax systems is a further example of murky protectionism and the tendency of governments to substitute transparent for more opaque policy instruments.

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16 Trade growth prospects: An African perspective

Ottavia Pesce, Stephen Karingi and Isabelle Gebretensaye

Economic Commission for Africa

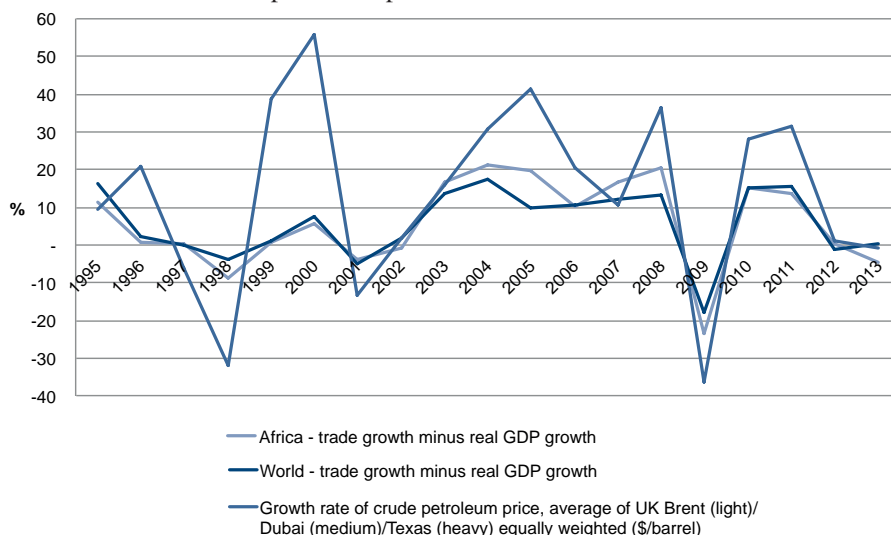
The global trade landscape is changing fast and these changes have profound implications for Africa. Emerging powers are gaining a larger share of global exports, implying greater competition for African exporters of manufactures. The global recession has affected the developed world more severely than most of the developing world: signs of recovery in Europe, still one of Africa's major trading partners, are weak. Emerging markets such as China have been a key source of demand for African commodities, but the fast growth that has characterised the BRICs over the past decade appears to be slowing down. Africa's export growth over the past decade and a half was driven mostly by price effects, and prospects for a resurgence in prices for commodities are likely to be limited in the near to medium term, given slower growth in China and the rest of the world. Looking forward, trade growth prospects for Africa depend on the realisation of Africa's regional integration objectives and on the impact of the trade agreements being negotiated with and among global economic powers. What follows discusses some of the potential implications of the changing trading landscape for Africa and prospects for trade growth.

1 Trends in trade and GDP growth before and after 2008

Africa's trade grew much faster than real GDP between 2002 and 2008, even more than what was observed at the global level, driven mostly by strong commodity prices (Figure 1). Differences in the growth rate of trade and of GDP tend to move together

with the growth rate of crude petroleum prices, both for Africa and for the world. The correlation between the two is strong, at 0.74 for Africa and 0.72 for the world.

Figure 1 Difference between growth in trade and real GDP plotted against growth rate of crude petroleum prices



Note: Trade defined as imports plus exports.

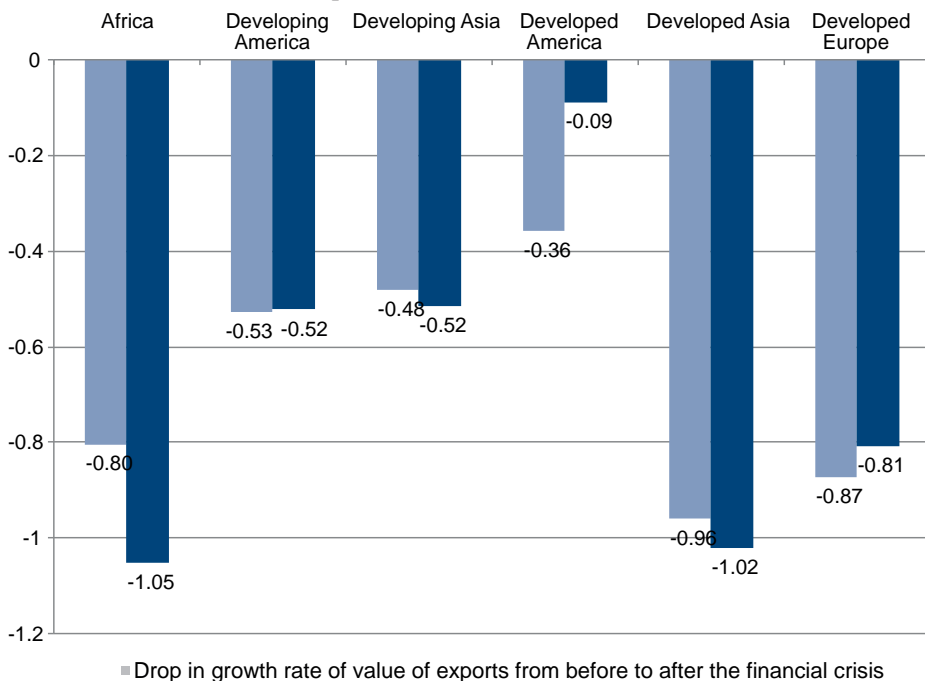
Source: ECA analysis of UNCTAD data.

After the Global Crisis, the growth rate of trade plummeted more than the growth rate of real GDP, with the drop more marked for Africa. Trade growth exceeded that of real GDP in 2010-2011, but data for 2012-2013 seem to point towards another period of lagging trade growth. The drop in the growth rate of export volumes after the Global Crisis was more marked for Africa than for most other regions (Figure 2). This likely reflects the dominance of commodities in Africa’s exports: the concentration index of African exports, at 0.4, is much higher than the 0.1 average for the developing world.¹

1 ECA analysis of UNCTAD data. The Herfindahl-Hirschmann index is a measure of the degree of market concentration. It has been normalised to obtain values from 0 to 1. An index value close to 1 indicates a very concentrated market (maximum concentration).

Given the continuing low commodity prices, addressing this drop in exports will require Africa to diversify its production beyond commodities and tap into global value chains.

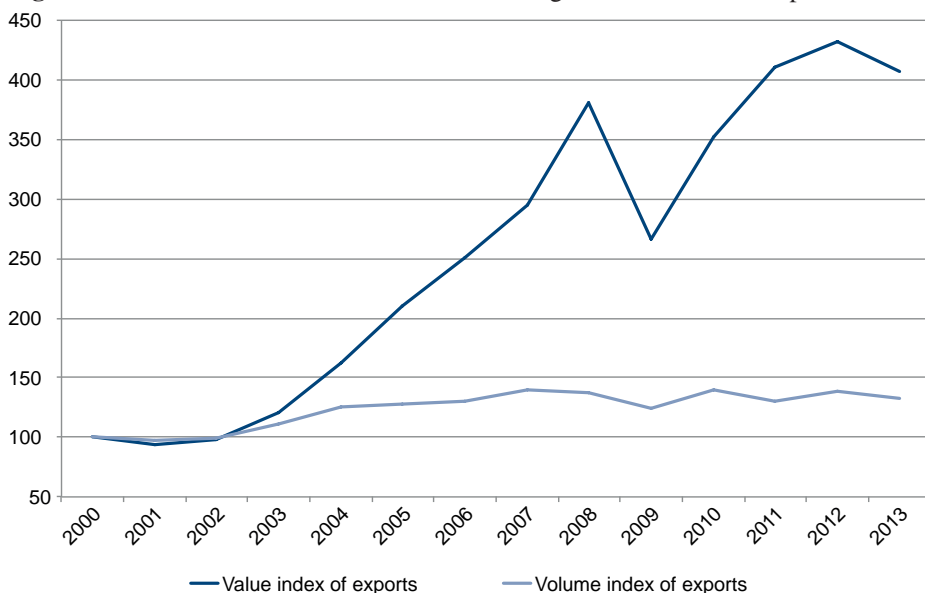
Figure 2 Growth rate of exports, 2000-2008 versus 2009-2013



Source: ECA analysis of UNCTAD data.

In value terms, Africa's exports increased by 13% on average in the period 2000-2013, compared to just 2% in volume terms, i.e. the growth in the value of African exports was primarily driven by high commodity prices. Primary commodities represented 77% of Africa's exports over 2000-2013, and fuels alone 57%. The value index experienced a drop during the Crisis, then recovered until 2012. Data for 2013, however, show another drop, probably driven by lower commodity prices.

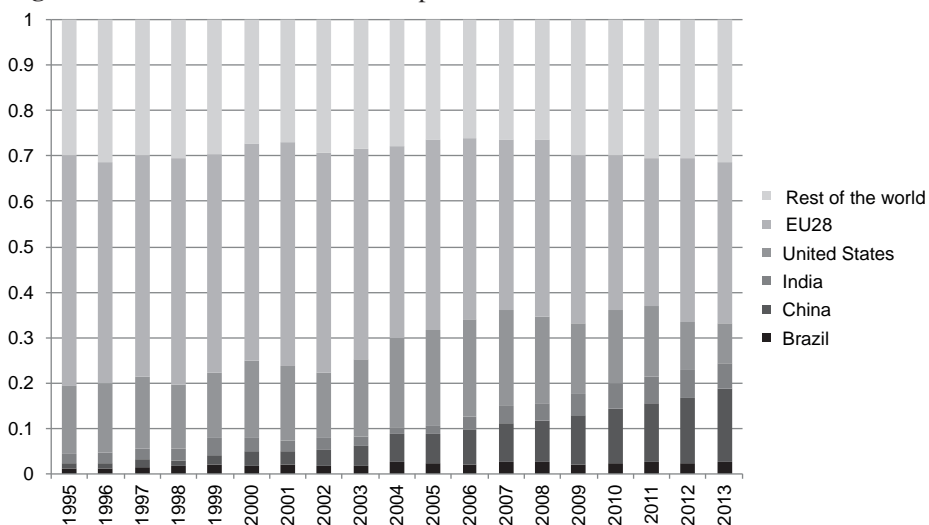
Figure 3 Volume and value indexes of Africa’s global merchandise exports



Source: ECA analysis of UNCTAD data.

Africa’s trade with the BRICS has grown faster than the continent’s trade with any other region in the world, doubling to US\$340 billion between 2007 and 2012, and is expected to reach US\$500 billion in 2015 (ECA 2013a). Over the past two decades, the shares of Africa’s exports to its traditional trading partners – the EU and the US – have declined. The EU bought 50% of Africa’s exports in 1995 and 36% in 2013, while for the US this percentage dropped from 15% to 9%. China, in the meantime, has become Africa’s main single trading partner, absorbing 16% of Africa’s exports in 2013. India has also emerged as an important destination (6% of Africa’s exports in 2013). These percentages have been growing fast over the past ten years, at 15% per year on average for China and 13% for India.

Figure 4 Destination of Africa's exports, 1995-2013.



Source: ECA analysis of UNCTAD data.

In 2006, China overtook the US and the EU as the leading export destination for African LDCs and, since 2010, the value of African LDCs' exports to China has on average been greater than that to the EU and US combined (ECA 2015). However, over the coming years, China is expected to switch from an export-led model of growth to one led by internal demand (Ramanauskas 2014), and its GDP growth rate has slowed (7.4% growth expected in 2015, compared to 14.2% in 2007).² The growth in Chinese demand for commodities is slowing and prices for many raw materials are falling. That said, China's hunger for agricultural goods, and perhaps for farm land, may grow as China's population expands and the middle class becomes richer. This would present an opportunity for Africa, provided that it can supply China with competitive agricultural and non-agricultural goods (*Economist* 2015).

African trade with India is projected to reach US\$100 billion this year and is growing faster than Chinese trade with Africa (*Economist* 2015). India's rate of GDP growth,

² World Bank data.

however, has slowed from 10.3% in 2010 to 5% in 2013. If this trend continues, it may lead to lower demand for African exports.

India is not the only emerging market experiencing a growth slowdown. Recent data show that growth is receding across the BRICS: emerging markets slumped in the first quarter of 2015 to their weakest performance since the Global Crisis (*Financial Times* 2015). China's appetite for commodities is slowing, Russia is entangled in a political crisis, and Brazil's economy is in a recession. If the slowdown across the BRICS continues, Africa will need to further differentiate its trading partners and export products and to develop its internal trade in order to maintain export growth.

As mentioned, Africa's main trading partners, both from the developed world and from the 'global South', buy mostly its commodities. Fuels accounted for between 64% and 76% of Africa's exports to partners such as China, India, the US and the EU28 (Table 1). Developed regions such as the US and Europe buy more manufactured goods from Africa than China or India do. These are not all high-value-added manufactured goods, but, in 2013, the majority of them (56% for the US and 57% for the EU28) were medium-to-high skill-intensive and technology-intensive.

The fact that fuels account for the overwhelming majority of Africa's exports to China and India suggests that, by deepening its trade with these countries, Africa is also deepening its dependency on primary commodities. Africa currently accounts for less than 2% of global manufacturing exports. The continent needs to find ways to increase the share of manufactured and higher value added goods in its commerce. This might be more difficult to achieve as the 'Southern' partners grow and develop their own manufacturing. On the other hand, manufactured goods represented 40% of intra-African trade in 2013. This shows that the continental market can greatly help Africa to step up its value addition.

Table 1 Composition of Africa's exports by partner, 2013

Good as percentage of Africa's exports/trading partner	China	India	US	EU28	Africa with itself
Primary products excluding fuels	31%	11%	10%	16%	23%
Fuels	64%	74%	76%	65%	32%
Manufactured goods	3%	5%	12%	16%	40%

Source: ECA analysis of UNCTAD data.

With the exception of Brazil, Africa's main trading partners mostly export manufactured goods to Africa. Chinese exports to Africa, for example, were 95% manufactured products in 2013, compared to 60-70% for the EU, India and the US. These imports of manufactured goods create increased pressure for African manufacturers, which might find it hard to compete.

2 Africa has the opportunity to ride on some favourable mega-trends

Africa currently benefits from some underlining trends that have the potential to accelerate its economic transformation. Africa is attracting increasing foreign investment flows; by the end of 2014, the continent had received more than US\$80 billion (Manson 2014a). In 2011, the rate of return on inward FDI in Africa was 9.3%, the highest among all regions and well above the 7.2% world average (ECA 2014a). Foreign investors are primarily attracted by Africa's commodities, but are also tapping into other sectors, such as consumer products, business services and hospitality. By the end of 2014, private equity firms were estimated to have assets worth US\$25 billion in Africa (*Financial Times* 2014). In 2012, the four most popular sectors for private equity in Africa were business services, information technology, industrial products and telecoms, media and communications.

For Africa to reap the benefits of these new sources of finance, adequate policy measures need to be in place. For instance, FDI policies aiming at linking foreign investors to local businesses and promoting learning exchanges between the two can benefit

the local industry. Foreign investments in extractive industries need to be balanced with greenfield and joint venture investments in other areas of the economy, where knowledge exchanges, employment opportunities and local entrepreneurship can be created (UNCTAD 2014). Also, African governments need to support the emerging African-owned private equity firms so that a larger share of profits can stay in the continent (ECA 2014b).

State-owned sovereign wealth funds, pension funds, global banks and multinationals are also significant and growing sources of finance for Africa. Addressing challenges such as underdeveloped financial and banking systems is essential to unlock their potential.

The perception of Africa as a risky geopolitical environment is becoming less and less of an obstacle to investments. As an example of how reality differs from popular perception, Africa has experienced a consistent decline in the number of conflicts over the past decade and had, as of 2014, fewer conflicts than Asia (ECA 2014c). The continent has also made significant progress in social indicators and business environments over the past decade. Moreover, evidence shows that global investors are often willing to overlook high risks to pursue profits in Africa. The IMF expects investments in Africa's frontier markets to grow at 6% a year by 2016, outpacing even frontier Asia as the fastest expanding region in the world (Manson 2014b).

Africa also has a high potential to raise more resources domestically through various channels such as taxes (Nnadozie 2010), public pension funds, well-managed resource-revenues and sovereign wealth funds, diaspora remittances, banking revenues and stock market capitalisation (ECA and NPCA 2014). In 2013, the MSCI African Frontier Market (equity) index was up 28.5% and \$10.7 billion of sovereign bonds were issued by capital markets in Africa. There are now five times more sovereign ratings in Africa than there were in 2000 (Sy 2014).

Africa's demographic dividend is set to give a huge comparative advantage to the continent in the coming years. More than half of Africa's population is under 20. Africa's workforce was 460 million in 2010 and is expected to reach almost 800

million by 2030. Labour costs are rising fast in China (by 20% from 2007 to 2011 alone) (Callan and Pan 2014), due to its shrinking young labour force, and Africa has the potential to replace China as a global manufacturing hub. In 2013, education levels in Africa excluding North Africa were on a par with Turkey and Mexico in the early 1980s, suggesting that the continent has the human capital it needs to replicate their success (Robertson 2013). However, Africa's growing population also creates significant challenges. Rapid urbanisation requires adequate infrastructure capacity, healthcare and education provision, food security and environmental measures, or risks increasing inequality and social conflict.

A growing African middle class is set to alter domestic markets and redraw consumption patterns. Africa is second only to Asia-Pacific in terms of the rate of growth of consumer markets, albeit starting from a low base (Deloitte 2014). The continent's middle class has grown by 3.1% per year over the last three decades, reaching 350 million people, or 34% of Africa's total population, in 2010. If this trend continues, the growing middle class will drive private sector development and increase consumer spending, which is expected to reach US\$ 1.4 trillion in 2020 (McKinsey 2010). A larger middle class with significant economic power is also likely to expect more political transparency and accountability from governments.

Africa needs to make the most of these trends to foster economic transformation, but benefits will not accrue automatically. Regionally, Africa needs to consolidate internal markets by strengthening infrastructural capacities, for example through the steps envisaged by the Programme for Infrastructure Development in Africa (PIDA) and by Africa's Accelerated Industrial Development Action Plan (AIDA), which aim to promote infrastructure development, regional integration and trade in the continent. Africa's Agenda 2063 can also guide countries' priorities. Nationally, African governments need to address inequality issues, create formal sector jobs, improve health care and education, as well as promote sound political and macroeconomic governance. Additionally, improving the management of oil revenues and mining rents

will be important for governments to finance development plans and make sure that these resources are invested in Africa's future.

3 Africa can take advantage of the changing global landscape

In order to benefit from the changing global landscape, Africa needs to face various challenges. First, Africa needs to diversify its exports, in particular to emerging economies, beyond primary commodities and fuel. This can be done by mapping opportunities for African goods in partner countries, strategically invest in upgrading productive capacity and skills to meet the standard required in export markets and reducing costs of production linked to infrastructure gaps, lack of skills and access to finance, bureaucratic barriers, corruption and geopolitical insecurity. Governments can help in addressing these barriers and in providing private sector participants with information about export opportunities.

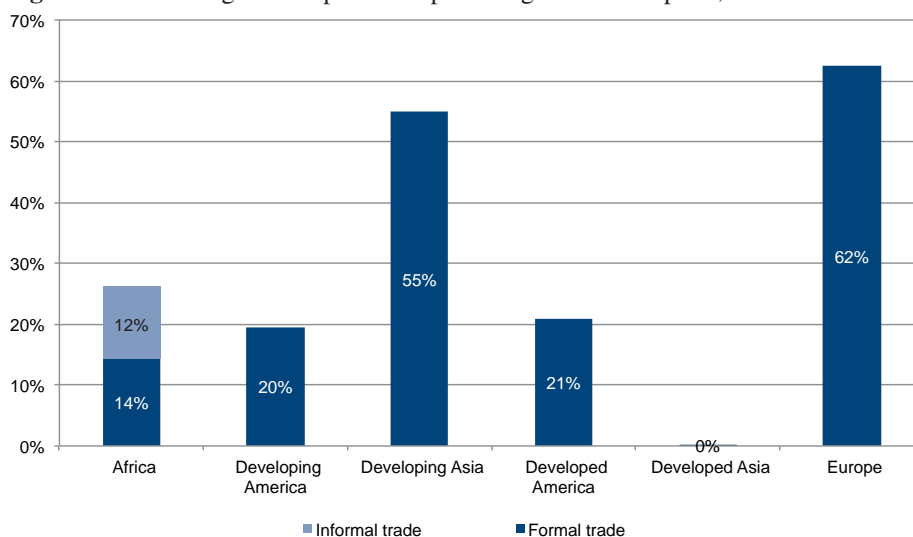
Second, Africa needs to upgrade the capabilities of its trade negotiators and strategically target trade agreements that not only lower barriers for Africa's traditional products, but that also open up opportunities for Africa to expand beyond low value added goods. Moreover, the rules contained in these agreements need to be accessible to African firms.

Third, Africa should pursue regional integration before, or in parallel to, bilateral, regional and multilateral trade arrangements with external partners. Regional markets provide more opportunities for Africa's manufactured goods and can be a stepping-stone in building global competitiveness. Creating a strong and integrated bloc would change Africa's position at the negotiating table, and this is likely to bring cascading positive effects for Africa in all future trade agreements. Moreover, growing internal trade can counterbalance a slowdown in external trade caused by a prolonged downturn in the developed world and in emerging markets.

4 Africa has an ambitious agenda to grow intra-continental trade

In 2013, just over 14% of Africa's formal imports came from fellow African countries. As shown in Figure 5, this compares poorly with most other regions of the world. Some estimates indicate that Africa's informal internal trade is around 12% of total trade, based on actual payments (Mupotola 2013). Adding this percentage raises the continent's internal trade significantly, but, as the same could be done for other developing regions, the comparison is unlikely to change and the conclusion remains that Africa's internal trade is below potential. Intra-African trade matters; through regional integration, African countries can reap economies of scale, expand markets and collectively benefit from their resources, thus gradually raising their competitiveness in the global economy (Ancharaz et al. 2011).

Figure 5 Intra-regional imports as a percentage of total imports, 2013



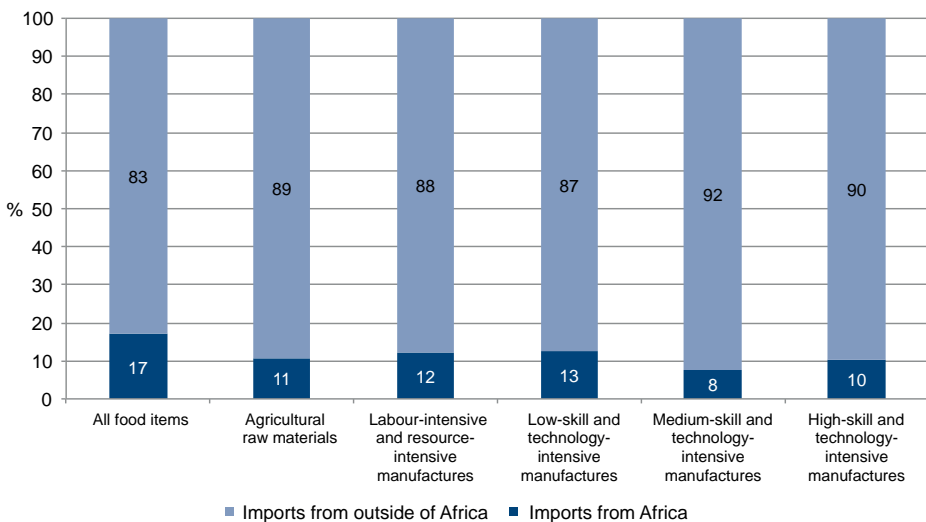
Source: ECA calculations based on UNCTAD data.

Despite Africa's abundance of agricultural goods, the continent imported 89% of agricultural raw materials and 83% of food items from outside in 2013. For manufactured

goods, especially those requiring higher skills and technology, these percentages were even higher, as shown in Figure 6.

Intra-African trade includes more manufactured goods than trade from Africa to the rest of the world. For example, while Kenya exports mostly tea, flowers, coffee and vegetables to Europe, it exports mainly processed goods such as cement, medical products and refined fuel oil to African countries (Mutiga 2014). This suggests that the continental market offers greater opportunities for African countries to focus on value added products.³

Figure 6 Percentage of goods imported from Africa and from outside the continent by category of goods, 2013



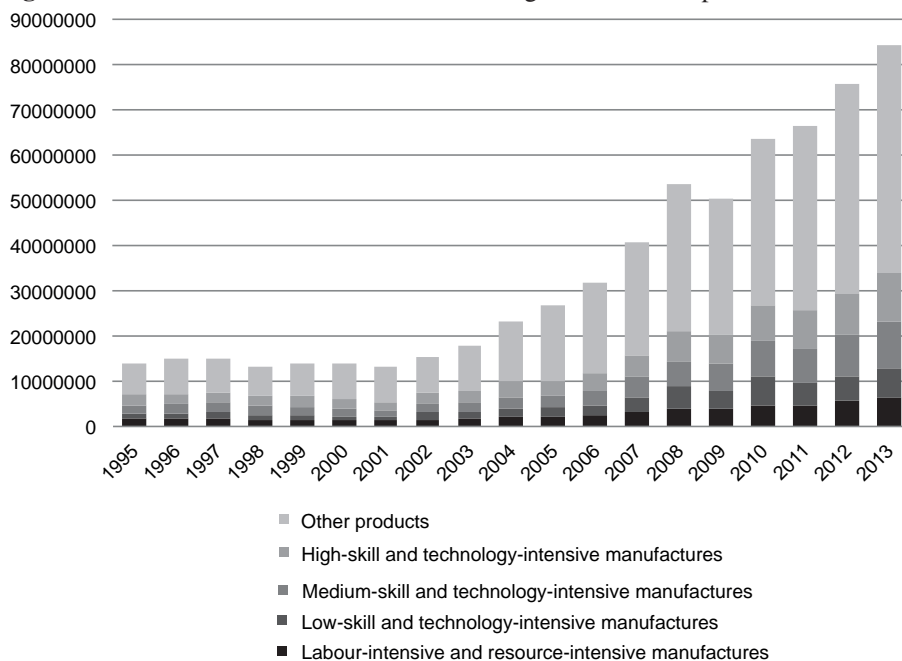
Source: ECA calculations based on UNCTAD data.

Despite the fact that Africa’s internal trade is more diversified than its trade with the outside world, it is important to note that manufactures as a share of intra-African exports declined from 59% in 1995 to 40% in 2013. The share of high skill-intensive and technology-intensive manufactures in intra-African trade declined by 23% between

3 http://ti.au.int/en/sites/default/files/REVISED%20QA%20-%20Final%20_3_%20underlined.pdf.

1995 and 2013. The drop was even more marked for labour-intensive and resource-intensive manufactures (-34%).⁴

Figure 7 Intra-African trade of manufactured goods and other products over time



Source: ECA analysis of UNCTAD data.

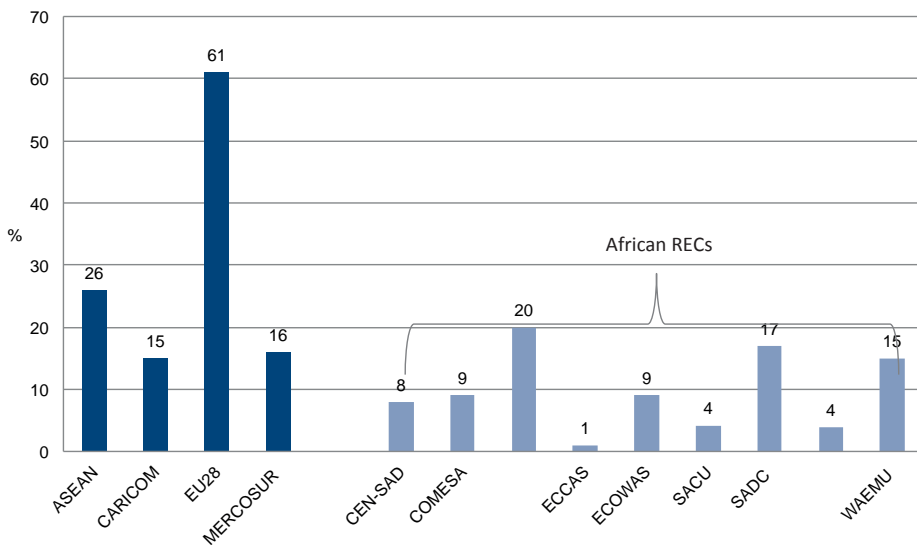
The low performance of intra-African trade is despite Africa having eight Regional Economic Communities (RECs), each with a different degree of economic integration and trade liberalisation. A total of 28 African countries currently belong to three or more RECs⁵ and there is a simultaneous challenge in managing external trade relationships

4 ECA analysis based on UNCTAD data.

5 <http://www.moibrahimfoundation.org/downloads/publications/2014/2014-facts-&-figures-regional-integration-uniting-to-compete.pdf>.

such as economic partnership agreements (EPAs)⁶ with the EU, trade with the emerging powers and multilateral negotiations under the WTO. Economic motivations are not always the only reasons for African countries to join RECs. A survey conducted by ECA in 2006 found that half of the countries surveyed cited political and strategic reasons as the main determinants for joining RECs (ECA 2006). Political moves might have contributed to creating an intricate RECs environment on the continent. As shown in Figure 8, Africa's RECs have different performances in terms of internal trade: while 20% of the exports from EAC countries stayed within the bloc, only 1% of ECCAS exports were traded within the community. As shown in Figure 8, only the most successful African RECs, such as the EAC and the SADC, compare favourably to the performance of trading communities from other regions of the world, such as ASEAN.

Figure 8 Percentage of exports directed within the trading community, 2013



Source: ECA analysis of UNCTAD data.

6 Economic Partnership Agreements (EPAs) are free trade agreements between the EU and African, Caribbean and Pacific Group of States (ACP) countries, with negotiations beginning in 2002. In Africa, EPAs only concern non-North Africa countries. They aim to make ACP trade regimes reciprocal, phasing out previous trade preferences and barriers. EPAs require African countries to liberalise 80% of their markets before October 2014. In return, African countries maintain preferential access to EU markets.

In what follows, we explore some of the reasons that seem to undermine the effectiveness of Africa's RECs in promoting intra-Africa trade.

Despite some progress, commitments made at the regional level have often not been implemented by member states (AfDB, OECD and UNDP 2014). Trading across borders in Africa remains more expensive than in other regions of the world. The cost of exporting a container from an African country overseas is US\$2,000, more than double the cost estimated for Asia (US\$900) (Mo Ibrahim Foundation 2014).

Significant tariffs still remain among RECs. In 2013, average protection within Africa was about 8.7%, versus 2.5% towards the rest of the world. For strictly industrial products the difference was even starker: 9.0% versus 2.3% (Mével and Karingi 2013). Therefore, trade within Africa remains more limited by protectionism than trade outside of Africa. Moreover, the eight RECs are very different starting blocks: their size varies from 92 to 551 million people and their GDP from US\$98 billion to US\$974 billion. For example, in the SADC, the income of a person living in the Seychelles is 49 times higher than that of someone living in fellow SADC member D.R. Congo. Levels of human development, human rights, safety and rule of law also differ widely not only among RECs but among their members (Mo Ibrahim Foundation 2014).

Trans-national threats such as terrorism, piracy, drug trafficking and protracted conflicts in areas such as South Sudan, Somalia and the Great Lakes region still undermine some integration efforts. Free movement of people within the continent is also lagging behind – only five African countries (Seychelles, Mozambique, Rwanda, Comoros and Madagascar) offer visa-free access or visas on arrival to other African citizens. Despite the efforts made through agreements such as the Yamoussoukro decision, which aims to progressively liberalise aviation in Africa, the sector remains a weak support to the continent's integration – there are only a handful of intercontinental carriers in Africa, flying in the continent remains extremely expensive (*Economist* 2013) and non-African airlines account for 80% of the intercontinental market share.

5 The CFTA can deliver large benefits for Africa's trade

In December 2010, African trade ministers meeting in Kigali, Rwanda, agreed on a fast track agenda for the CFTA, aiming to address Africa's low internal trade performance. The CFTA would eliminate tariffs and quotas on most goods and services among 54 African countries with a combined population of more than 1 billion people and a combined GDP of more than US\$1.2 trillion. The CFTA could help African economies become more competitive internationally, since regional markets are easier to penetrate and have less restrictive standards than foreign markets.

A computable general equilibrium (CGE) analysis by Karingi and Mevel in Cheong et al. (2013) estimated that the CFTA could stimulate intra-African trade by up to US\$35 billion per year, or 52% above the baseline by 2022. It could also lead to a US\$10 billion decrease in imports from outside the continent, while boosting agriculture and industrial exports by up to US\$4 billion (7%) and US\$21 billion (5%), respectively. Gains in real income and employment could be even higher if the CFTA is complemented by trade facilitation reforms, reductions of non-tariff barriers, improved infrastructure and measures to counter-balance some of the negative effects associated with liberalisation reforms, such as a loss of tariff revenue (AfDB 2014).

If progresses in facilitating trade (specifically, reducing costs to trade across borders)⁷ are made in parallel with eliminating tariff barriers on goods within Africa, the share of formal intra-African trade could more than double by 2022, from 14% to 22% (Mevel and Karingi 2012). The gain could be larger still if informal traders were better integrated into the formal system, as statistics on intra-African trade do not include informal cross-border trade (likely to be extremely high). Most of the benefits would be felt in industry, which is unsurprising as intra-African trade already tends to be more diversified and to have relatively higher industrial content than Africa's trade with the

⁷ Assuming that customs procedures are made twice as efficient and the time goods spend in African ports is halved.

rest of the world. Deepening regional integration could also make African nations less dependent on outside partners for their industrial needs (ECA 2015).

The COMESA-EAC-SADC Tripartite Free Trade Area (TFTA), which is currently being negotiated and should come into effect by the end of 2015, is a large stepping-stone towards the CFTA. The TFTA will span the whole of East Africa, from the Cape to the North African coast, creating Africa's largest free trade area. It would cover 26 countries,⁸ with a combined population of 625 million people and a total GDP of US\$1 trillion, or 58% of the continent's economic activity (de Melo 2014).

6 Services should form an integral part of Africa's trade reform agenda

In 2013, all African countries for which data were available exported services. Africa's exports of services increased from US\$32.7 billion in 2002 to US\$94.9 billion in 2013,⁹ a remarkable rise. In 2013, services accounted for the largest contribution to GDP in 35 out of 54 African countries and data show that, over the past decade, the movement of workers in Africa has been out of agriculture and into services, rather than manufacturing (World Bank 2014).

Given the potential of services to support Africa's economic transformation, the sector should form an integral part of the ongoing CFTA. The SADC is by far the most advanced REC in services liberalisation. In August 2012, SADC members signed the Protocol on Trade in Services, with a mandate to progressively remove barriers to the free movement of services. In April 2012, negotiations on the liberalisation of six priority sectors (communication services, construction services, energy-related services, financial services, tourism services, and transport services) were launched,

8 Angola, Botswana, Burundi, Comoros, Democratic Republic of Congo, Djibouti, Egypt, Eritrea, Ethiopia, Kenya, Lesotho, Libya, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Rwanda, Seychelles, South Africa, Sudan, Swaziland, Tanzania, Uganda, Zambia and Zimbabwe.

9 International Trade Centre data.

and are foreseen to be completed by the end of 2015. These negotiations are expected to result in market access commitments that will provide a predictable legal environment for trade and investment in the sector within the region.¹⁰ Other RECs should follow this pattern. The CFTA is expected to lead to deep regulatory reforms that will promote and accelerate trade in services across the continent. African countries, especially those with a large share of services in their economy, should push forward the intra-African reform agenda for the sector, especially as part of the CFTA.

Reducing barriers to trade in services would allow countries to benefit from the competitive advantage of their neighbours – sourcing, for example, good business support services in their region – and at the same time support the growth of domestic manufacturing and other sectors of the economy.

7 Conclusions: Prospects for Africa's trade

In order to benefit from the changing global trading landscape, where the emphasis is shifting more and more towards bilateral economic agreements among the largest world powers and blocs, Africa needs to act and negotiate as a united entity. The implementation of the CFTA and other agreements aiming to deepen integration in Africa should be the major focus for the continent, taking precedence over the negotiation of trade agreements with the rest of the world. Studies have shown that the CFTA is likely to bring large benefits to Africa. Where possible, the timing of trade agreements with the rest of the world should be altered in order for Africa to have the CFTA in place before signing them.

At the same time, Africa needs to negotiate or renew trade agreements strategically, with an eye to making them a strategic support for its industrialisation, value addition, economic diversification and private sector development. This implies carefully

¹⁰ <http://www.sadc.int/themes/economic-development/trade-services/>.

negotiating details, such as rules of origin and quality requirements, which can allow African firms to compete on an equal basis and benefit from trade preferences. In order to achieve this, African negotiators need to be well trained and equipped with adequate know-how.

In parallel to negotiating trade agreements more strategically, Africa should tackle structural impediments to the competitiveness of its firms by improving access to finance, reducing infrastructure barriers, raising technical and business skills, improving links with foreign investors and among various sectors of the economy, and building regional value chains that would allow the continent to export more finished products (Pesce et al. 2015). Africa is increasingly substituting its traditional trading partners with emerging economies such as India and China. While the diversification of trade partners might bring some benefits for the continent, Africa needs to ensure that it does not lose out, in terms of export variety and value addition, in this exchange.

Most of the increase in Africa's exports seen over the past decade has been driven by price effects, and more specifically by the high prices of commodities. In a future where such prices are likely to be ever more volatile, Africa urgently needs to reduce the dependence of its trade on primary commodities. The intra-African market can be an important stepping-stone for Africa to develop its global competitiveness, and it is already more diversified than Africa's trade with the outside world. However, intra-African trade in manufactured goods has gone down in recent years and the integration agenda for the continent should aim to boost it. Also, dependence on external markets for basic commodities such as agricultural products, in which Africa abounds, should be reduced. In the framework of increasing intra-African trade, services are an important area that should not be neglected. A better integrated market for services can support economic transformation in the continent and offer opportunities to countries, such as landlocked countries and island states, which are struggling to develop through manufacturing (ECA 2013b).

Africa is entering an exciting era for trade. The next decade is likely to see the implementation of major trade agreements (most notably the CFTA), increased integration and wider liberalisation policies through regional and international forums, and possibly the introduction of an African common monetary union (or at least of regional monetary unions). These changes offer the chance to minimise tariff and monetary barriers to trade on the continent.

Moreover, Africa has recently seen growth in a number of non-traditional sectors, such as services (notably I.T., financial and insurance services, tourism, transport and construction). These services are increasingly traded within and from Africa. The progressive diversification of trade and sources of growth away from just commodities will help reduce the volatility of Africa's exports' value and economic growth and their dependence on commodity prices.

On the infrastructure side, accelerated investments from an increasingly diversified array of financial sources (private equity, sovereign bond, foreign investments among others) are expected to reduce physical barriers to trade on the continent.

On the supply side, Africa's industrialisation agenda and the creation of regional value chains are expected to lead to a shift to higher value added products, and therefore to higher-value exports. If Africa gets those steps right, trade within and outside the continent has the potential to multiply in the years ahead.

Africa's economic growth is also likely to continue, and at a sustained rate as African countries graduate from LDC status and the emerging middle class drives demand. Despite the expected stagnation in commodity prices and the forecast reduction in demand from China and other emerging markets, the abundance of natural resources is likely to continue sustaining Africa's growth over the coming years. According to British Petroleum (2015), Africa will account for 10% of global oil and 9% of natural gas production in 2035. Nonetheless, Africa has much to gain from further diversifying its exports beyond commodities.

Along with its natural resource endowments, Africa has the potential to benefit from the positive mega-trends discussed above, such as a younger and more educated labour force, better macroeconomic and political stability, urbanisation driving consumer demand and increased and more varied sources of finance. If African governments put in place the right policies to harness these opportunities – taking strategic actions to create jobs and enhance education, infrastructure, business environment, transparency and predictability, economic and political stability, the continent has the chance to accelerate its growth over the coming decade.

Given the significant improvements expected to advance the trading environment in and from Africa, it is likely that trade growth will again surpass output growth in the continent over the coming years. But whether this trend will be sustained or will only be a short-term effect of trade liberalisation depends on the effectiveness of the trade agreements and accompanying policies needed to make ‘made in Africa’ more diversified and more competitive in the global arena.

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17 'Peak trade' in the steel sector

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Introduction

Worldwide the steel sector directly employs two million people plus another six million in supporting sectors (World Steel Association 2014). As such, it is a major manufacturing sector and one that receives considerable attention from policymakers. Changes appear to be afoot in this sector. During the boom years of 2000-2008, the total value of global trade in steel grew in nominal terms by 18% per year.¹ In contrast, between 2008 and 2013 global steel trade fell by 5% per year. By 2013, global steel trade had fallen to levels not seen since before 2007 (Figure 1).² The steel sector, then, may be an example of a leading sector where trade has peaked.

While many factors – not least economic developments in the larger emerging markets – may influence the total amount of steel exported worldwide, changes in public policies that treat domestic and foreign suppliers differently may have also played a part. For example, recent press reports point to a new wave of EU anti-dumping actions against steel imported from China and Russia.³

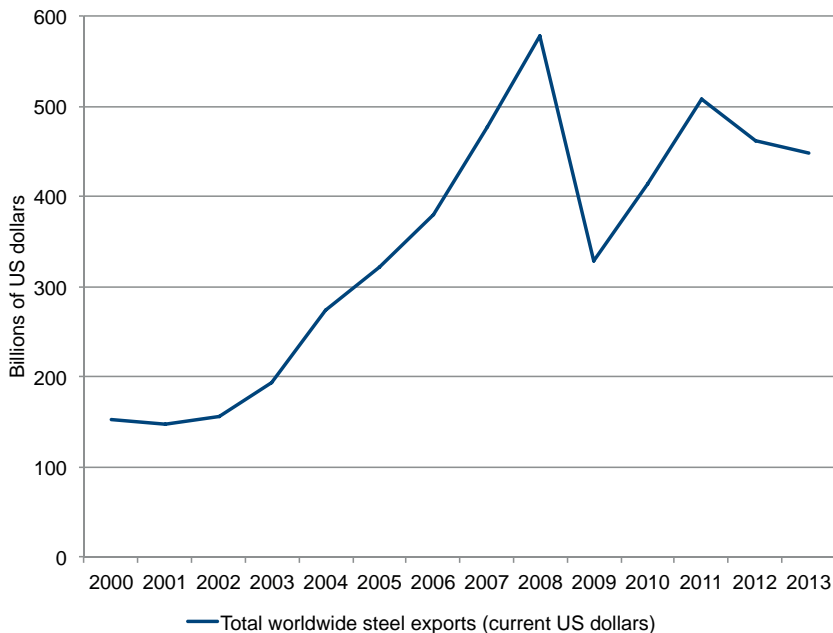
1 In the preparation of this chapter data on steel trade was taken from the UN COMTRADE database for the following four digit product categories: 7206-7229, 7301, 7302, 7304-7307, 7325, 7326, and 8607.

2 World Steel Association (2014) reports on the volume of global steel trade. Measured in terms of millions of tonnes of finished steel that peaked in 2007. So-called “quantum indices” are also presented and these show that the volume of global trade has not recovered to 2008 levels.

3 See *Financial Times* (2015). More generally, the OECD (2015) shows that there was a sharp rise in anti-dumping and countervailing duty actions taken against steel imports in the years 2012 to 2014, exceeding in total 20 cases per year. Six (non-OECD) nations resorted to safeguard measures and four to tariff increases in steel.

Using data contained in the independent Global Trade Alert database,⁴ the purpose of this chapter is to demonstrate the scale of different types of policy interventions that have confronted firms trading in this prominent sector of the world economy. While much commentary and research on this sector focuses on import restrictions, these are hardly new and may not easily account for the observed shifts in trade patterns. Our focus here will be on a broader range of policy changes implemented between November 2008⁵ and the end of 2014 that could affect cross-border trade in steel.⁶ Our approach is also balanced, taking account of trade reforms as well as government measures that discriminate against foreign commercial interests.

Figure 1 Global steel exports have fallen back to levels seen before 2007



Source: UN COMTRADE. See footnote 3 for the 4-digit product lines used to compute these totals.

- 4 A description of this database can be found in Section 3 of Evenett (2011).
- 5 In this month G20 leaders first came together in crisis mode in Washington, DC and declared, amongst other matters, that they would refrain from protectionism.
- 6 A comparison between the information collected by the Global Trade Alert team and by the WTO can be found in Chapter 4 of Evenett (2014).

Number of new trade distortions and reforms introduced since November 2008

It has long been recognised that policies other than traditional import restrictions – such as tariffs, quotas, and trade defence measures – can influence international trade. With that in mind, the Global Trade Alert team collects information on any public policy measure that alters the *relative* treatment of domestic suppliers vis-à-vis their foreign rivals. The information on such measures taken since November 2008 that relate to steel products was extracted from the Global Trade Alert database.

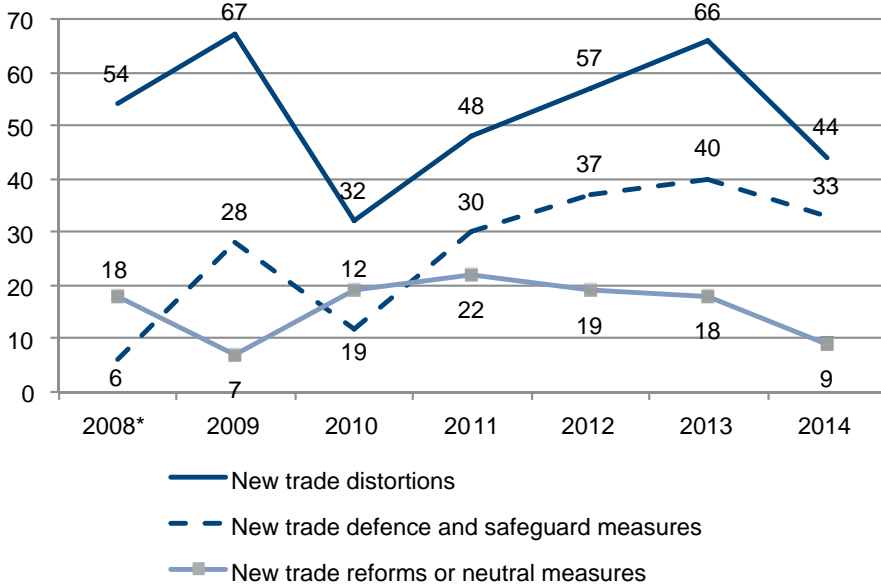
Figure 2 presents the total number of *new*⁷ trade distortions and trade reforms affecting the steel sector implemented since November 2008. Bearing in mind that the data collected for 2008 relates only to measures implemented in November and December of that year, and given the desire to compare totals across years, the totals for 2008 reported here are annualised totals. It should be immediately apparent that in every year from 2008 to 2013, the total number of new policy interventions that discriminate in one way or the other against foreign suppliers are multiples of the total number of new trade reforms and measures that treat domestic and foreign firms neutrally.

Since the onset of the Global Crisis, the total number of implemented trade distortions that affect the steel sector broadly has followed the worldwide totals. Compared to 2008, more new trade distortions were implemented in 2009, when fears about a possible resurgence of protectionism were at their peak. The total number of new trade distortions affecting the steel sector fell in 2010 and then began rising, so much so that the total for 2013 almost reached the level witnessed in 2009. Given reporting lags, the totals for 2013 and 2014 are likely to be revised upwards. Crisis-era trade distortions to the global steel trade were not confined to a burst of protectionism in 2009. As global

7 Therefore, the Global Trade Alert database does not include information on the stock of protectionism inherited from before November 2008.

economic growth prospects have faded, resort to new trade distortions in the steel sector has grown.⁸

Figure 2 Annual totals of new trade distortions and reform measures introduced during the crisis era that directly implicate steel products



Note: *Data for 2008 are annualised totals based on policy interventions observed in November and December of that year.

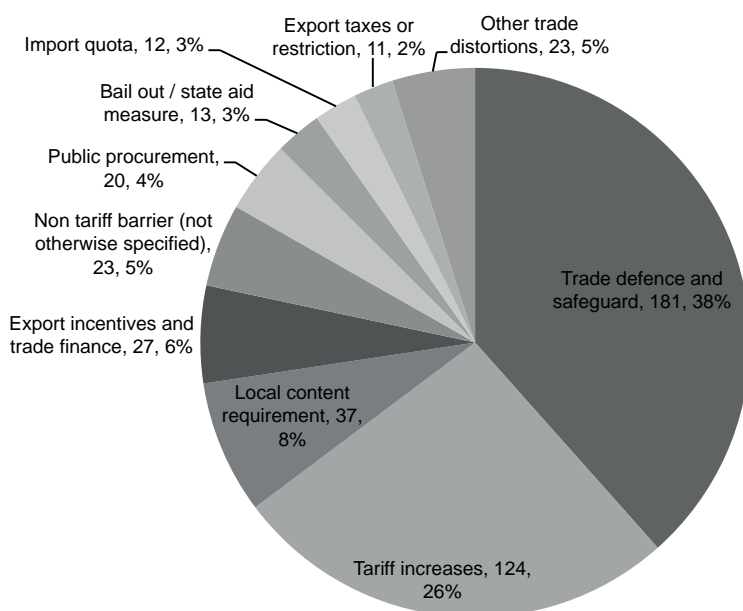
Source: Global Trade Alert.

The steel sector has seen numerous trade defence and safeguard measures implemented over the years. This has continued since the onset of the Crisis (see Figure 2). Of the trade measures that discriminate against foreign suppliers in the Global Trade Alert database and that implicate the steel sector, 49% are trade defence and safeguard actions (Figure 3). Tariff increases on steel products account for another 14% of Crisis-era measures taken in this sector. Of course, these percentages refer to the total counts of measures implemented and not to the amounts of trade potentially affected.

8 The dip in the total number of discriminatory instruments implemented in 2014 is, if prior experience of the Global Trade Alert team is anything to go on, almost entirely due to reporting lags.

However, governments have resorted to other public policy measures that tilt the playing field in favour of local firms. Figure 3 also reveals that 35 local content requirements, 27 export incentives and favourable trade finance measures, 20 'buy national' public procurement measures, and 13 other non-tariff measures have been implemented that are likely to have distorted steel trade.

Figure 3 The mix of policy instruments imposed during the Crisis era that discriminate against foreign suppliers of steel



Source: Global Trade Alert.

Trade policy interventions can be temporary or longer lasting. Table 1 provides information on how many discriminatory and trade-reforming measures implemented in a given year were still in effect at the end of subsequent years. In all but one year, the percentage of trade reforms that were still longer in force at the end of 2014 was less than or equal to the percentage of trade distortions still in effect. Thus, during the Crisis era reform measures in the steel sector trade have tended to be phased out sooner than trade distortions; including trade defence and safeguard measures strengthens this conclusion.

Table 1 Trade reforms in the steel sector tend to be phased out sooner than trade distortions

All discriminatory trade policy instruments	Number still in force at the end of...							Percentage still in force at the end of...						
	2008	2009	2010	2011	2012	2013	2014	2008	2009	2010	2011	2012	2013	2014
2008	15	15	13	13	13	13	13	100%	100%	87%	87%	87%	87%	87%
2009		86	77	70	68	63	60	100%	100%	90%	81%	79%	73%	70%
2010			45	44	40	39	38	100%	100%	100%	98%	89%	87%	84%
2011				51	51	50	48				100%	100%	98%	94%
2012					63	62	58					100%	98%	92%
2013						74	74						100%	100%
2014							53							100%

Trade distortions excluding trade defence measures	Number still in force at the end of...							Percentage still in force at the end of...						
	2008	2009	2010	2011	2012	2013	2014	2008	2009	2010	2011	2012	2013	2014
2008	14	14	12	12	12	12	12	100%	100%	86%	86%	86%	86%	86%
2009		58	52	45	43	42	39	0%	100%	90%	78%	74%	72%	67%
2010			33	32	28	28	28	0%	0%	100%	97%	85%	85%	85%
2011				21	21	21	21	0%	0%	0%	100%	100%	100%	100%
2012					26	25	21	0%	0%	0%	0%	100%	96%	81%
2013						34	34	0%	0%	0%	0%	0%	100%	100%
2014							19	0%	0%	0%	0%	0%	0%	100%

Table 1 (contd.)

Trade reforms and neutral measures	Number still in force at the end of...							Percentage still in force at the end of...						
	2008	2009	2010	2011	2012	2013	2014	2008	2009	2010	2011	2012	2013	2014
2008	3	3	3	2	2	2	2	100%	100%	100%	67%	67%	67%	67%
2009		10	10	9	7	7	7		100%	100%	90%	70%	70%	70%
2010			26	20	15	14	14			100%	77%	58%	54%	54%
2011				34	33	11	10				100%	97%	32%	29%
2012					27	24	16					100%	89%	59%
2013						23	22						100%	96%
2014							14							100%

Source: Global Trade Alert.

Steel trade in product lines affected by selected trade distortions

For public policy interventions that affect cross-border trade in goods, the reports from the Global Trade Alert database identify the associated 4-digit tariff lines (product categories). With the UN COMTRADE database, therefore, it is possible to compute the total value of steel trade that is in the 4-digit tariff lines implicated by the implementation of a public policy measure. Furthermore, information on the date a measure came into force and, where necessary, was withdrawn allows for the total amount of steel trade affected by Crisis-era policy interventions to be tracked over time.

In the case of a tariff increase on a certain steel product implemented on a most favoured nation (MFN) basis, the steel trade affected is the total value of steel imports in the relevant 4-digit product line by the jurisdiction implementing the tariff increase. For policy interventions that are not applied on an MFN basis, the bilateral nature of the COMTRADE database can be exploited to identify the relevant trade flow.

Data on the total value of steel products potentially affected by new tariff increases, new local content requirements, and new trade defence and safeguard actions taken since November 2008 are reported in Table 2 for the years 2009 to 2013. The data reported for a given year and policy instrument refer to the total amount of steel trade potentially affected by policy instruments of that year that are still in effect at the end of the year in question. Therefore, if no or few measures are unwound or withdrawn over time, the reported totals will almost certainly rise as new measures are introduced.

Despite the frequency of trade defence and safeguard actions, they cover less steel trade than tariff increases and new local content requirements. In fact, over the years 2009-2013 nearly 19% more steel trade was affected by tariff increases than by trade defence measures and safeguard actions. Over the same time frame, the total amount of steel trade potentially affected by new local content requirements (\$172 billion) was double the amount affected by trade defence actions and safeguards (\$82 billion).

These findings give some sense of the relative importance of different threats to the flow of steel trade.

Table 2 Total steel trade potentially covered by different Crisis-era policy interventions

Policy change	Total value of steel exports in 4-digit product lines affected by policy instrument				
	2009	2010	2011	2012	2013
New tariff increases	16.08	17.19	14.69	23.63	26.07
New local content requirements	18.44	29.89	39.66	44.47	39.76
New trade defence measures	6.46	8.24	16.11	24.56	26.96
New export incentives: beneficiary	30.00	38.47	49.16	51.10	55.10
New export incentives: unsubsidised rivals competing with beneficiary	228.06	277.99	338.19	309.81	317.85

Notes: 4-digit HS code data were used to compute these totals. Different levels of aggregation may well produce different estimates of potential trade affected.

Source: Global Trade Alert and UN COMTRADE.

Some governments offer tax-related incentives for exporting products, including steel products.⁹ Others offer generous trade finance schemes for goods, for which steel products are eligible. Table 2 reports the total amount of steel exports that are in tariff lines eligible for such export incentives. The relevant totals rise over time from \$30 billion in 2009 to over \$55 billion in 2013.

⁹ An example is Brazil (see <http://www.globaltradealert.org/measure/brazil-tax-refund-all-companies-exporting-manufactured-goods>).

Table 3 Total value of exports eligible for export incentives, by year and implementing jurisdiction

	2009	2010	2011	2012	2013
Total steel trade eligible for export incentives	30.00	38.47	49.16	51.10	55.10
Export incentives provided by Brazil	4.28	4.94	7.70	6.99	5.10
Export incentives provided by China	25.72	33.52	41.46	43.51	44.37
Export incentives provided by India	n.a.	0.01	0.00	0.53	5.55
Export incentives provided by Uruguay	n.a.	n.a.	n.a.	0.07	0.07

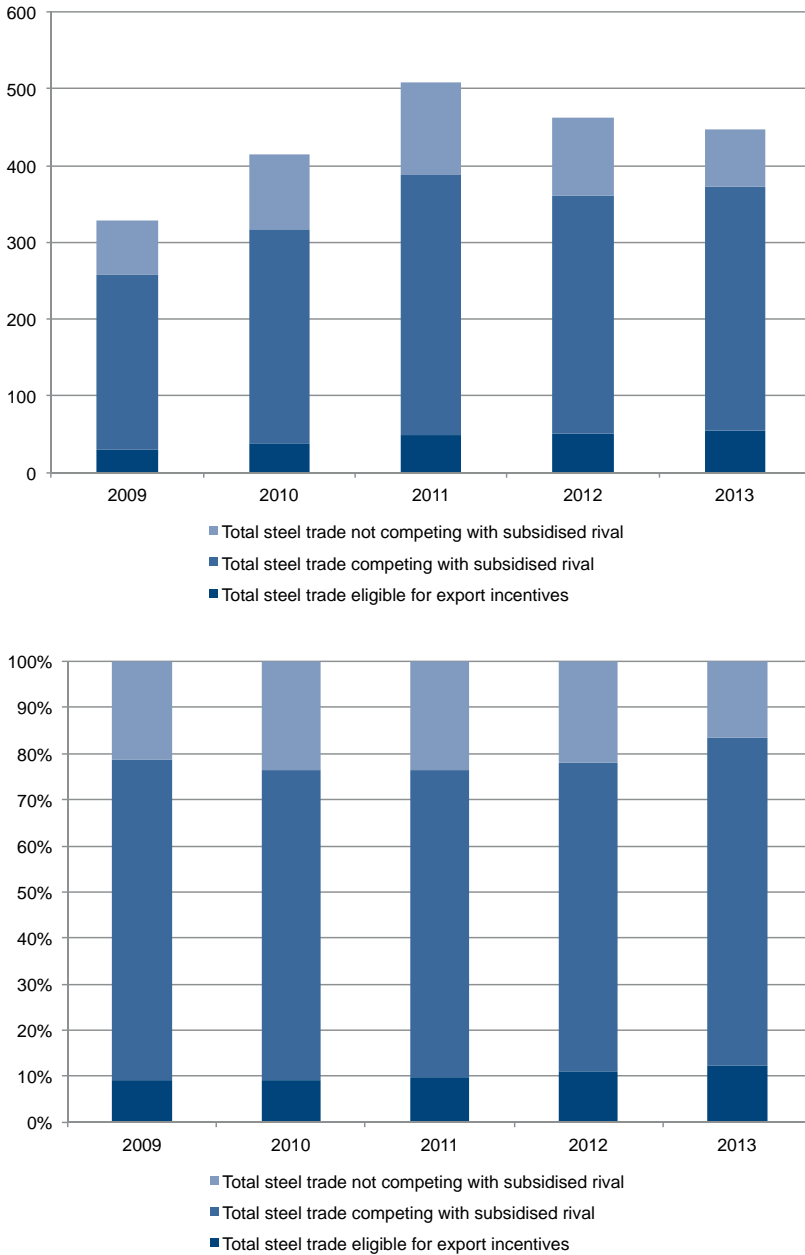
Notes: 4-digit HS code data were used to compute these totals. Different levels of aggregation may well produce different estimates of potential trade affected.

Source: Global Trade Alert and UN COMTRADE.

The growth of such subsidised steel exports is likely to have affected conditions of competition in third markets. Table 2 includes calculations of the total amount of steel trade that is shipped from jurisdictions not offering export incentives to third markets where at least one subsidised steel exporter also ships the same type of steel product. From 2009 to 2013, in total over \$300 billion of unsubsidised steel exports faced direct competition in third markets from one or more subsidised rivals.

For each year from 2009 to 2013, Figure 4 breaks down the global total of steel exported into three parts: total value of steel exports that are eligible for some kind of export incentive, total value of unsubsidised steel exports that compete with rivals that are eligible for export incentives, and the total value of unsubsidised steel exports that are shipped to foreign markets where no unsubsidised rival competes. Our calculations imply that *only a fifth* of global steel trade is neither subsidised nor competes directly against a subsidised rival in third markets.

Figure 4 Only a fifth of global steel trade is neither subsidised nor competes directly with exporters from jurisdictions offering export incentives



That so many export incentives have been offered for steel products may help account for the recorded falls in hot rolled and cold rolled steel prices. The price per tonne of Chinese hot rolled coil has fallen from over \$700 in 2011 to nearly \$350 in the first quarter of 2015 (*Financial Times* 2015).

Since the Global Trade Alert database includes information on the implementing jurisdiction, it is also possible to identify which countries are responsible for the export incentives in the steel sector. Moreover, it is possible to calculate the total amount of steel exports from those countries that are eligible for these incentives in a given year, see Table 3. It is important to stress here that data on the actual use of these incentives are not available – hence the approach taken here is to compute the total value of exports in product lines known to be eligible for export incentives.¹⁰ By 2013, over \$5 billion of steel exports from Brazil and India were in product lines eligible for such incentives. The comparable total for China is nine times larger, at just under \$45 billion.¹¹

Concluding remarks

This chapter has demonstrated that in the steel sector since the onset of the Global Crisis:

- Cross-border trade in steel has peaked with volumes stagnant (at best).
- A focus on traditional trade policy interventions would provide a misleading picture of developments in the global market for steel.
- Measures to liberalise trade in steel are being phased out faster than measures that discriminate against foreign suppliers of steel.

¹⁰ It is also worth noting that subsidiaries of foreign steel companies operating in these countries may be eligible for export incentives too.

¹¹ On 1 January 2015, China altered its VAT rebates on steel products. May (2014) is typical of the commentary on the likely impact of such policy changes on the world price of steel.

- In terms of likely steel trade affected, the impact of various state-provided incentives to export is far greater than steps to raise tariffs, impose local content requirements, and implement trade defence measures.
- Only a fifth of global steel trade is shipped to markets where there is no subsidised foreign supplier.

'Peak trade' in steel has occurred at a time when certain governments have scaled up different types of export incentives. Further research will have to ascertain the extent to which such incentives merely reshuffled market shares across suppliers and resulted in greater risk premia for investments in new capacity and the like.

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18 Supporting the micro-multinationals to help achieve peak trade¹

Usman Ahmed, Brian Bieron and Hanne Melin

eBay Public Policy Lab

The prototypical model for trade has involved a large domestic company setting up overseas operations and eventually establishing a multinational supply chain with vendors and consumers located around the world. This model continues to be the dominant one for trade, and as this eBook suggests, is stagnating a bit. Interestingly, there is an emerging model for trade that could help to fill the gap.

In 2005, former University of California, Berkley economist Hal Varian wrote a groundbreaking piece in the *New York Times* about a new trend whereby small businesses were leveraging technology, particularly the internet, to locate employees and access customers around the world (Varian 2005). Varian coined the term ‘micro-multinationals’ to describe this new phenomenon. But, notably, Varian’s article did not have much data to back it up and instead relied upon case studies, describing a future where this emerging trend would become commonplace.

The data analysis contained in this chapter is the realisation of Varian’s 2005 prediction. Micro-multinational exporters are now a widespread phenomenon. The internet has created a truly global digital network. When the internet is combined with commercial services and efficient logistics, small businesses can connect with

¹ This article has been adapted from a recently released eBay Marketplaces Report entitled *2015 US Small Business Global Growth Report*.

consumers and establish trust across national and cultural borders. We use the term the ‘*global empowerment network*’ to describe this model. It runs alongside the traditional internationalisation archetype for participation in trade, described above, known as the global value chain model.

At the eBay Public Policy Lab, we have spent the last four years examining the impact of globalisation and technology on small business commerce around the world. This chapter utilises newly released data analysis from eBay Marketplaces looking at small and medium-sized enterprises (SMEs) from across the US. We argue that the eBay Marketplace provides an illustration of a new model for technology-enabled trade that is taking shape. Importantly, we believe our findings to be applicable generally to the nexus of trade and technology.

A team of economists at Sidley Austin LLP supported our efforts by conducting the economic research contained in this chapter, which is based on a global dataset of eBay Marketplace transactions from 2004 to 2014. The piece compares findings from eBay Marketplaces with ‘traditional’ trade flows between the US and other countries that have been gleaned from US Department of Commerce and US Census data, as well as from World Bank data.

This chapter will walk through the major findings that have come to light from our research. The first finding is that small businesses leveraging technology export around the world at unprecedented rates compared to traditional SMEs. Second, this exporting leads to better survival and growth outcomes. Third, technology is helping to create a more inclusive economic model by bringing small businesses into the tent of beneficiaries from global trade. Fourth, technology can help reduce the effect of traditional barriers to trade.

If micro-multinational trade is so widespread and beneficial, why has trade slowed down over the last few years? We believe that the reasons for this are three-fold: 1) this is still an emerging trend and many more micro-multinationals will be born over the coming decade; 2) trade statistics are not well suited to capture the impact that the

internet is having on global trade; and 3) trade barriers have a disproportionate effect on micro-multinationals, and policy solutions have yet to be put in place to help these SMEs.

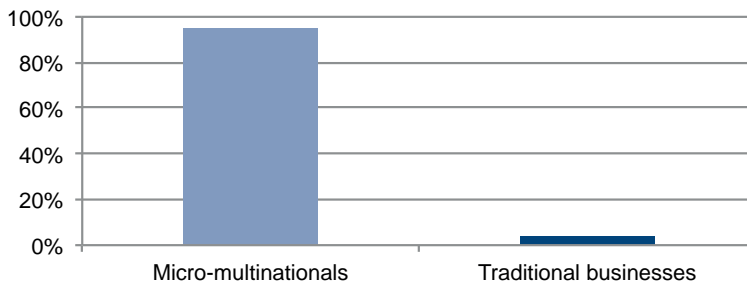
This chapter will describe key policy actions that, if taken, would enhance the ability of micro-multinationals to reach world markets more effectively. Legal rules and administrative procedures have a key role to play in ensuring that the global empowerment network provides increasing opportunities for technology-enabled SMEs to directly participate in global commerce. If we want to achieve ‘peak trade’, we need to create a new initiative within the global trade regime that is designed specifically to facilitate the new type of trade – micro-multinational trade.

Exploring the world as global traders

Traditionally, SMEs have been limited by distance in terms of their ability to explore foreign markets, since most customers had to physically enter a business to transact. Reaching a customer in a different state, let alone in a different country, seemed like an impossible task for most SMEs. The internet has changed the calculus.

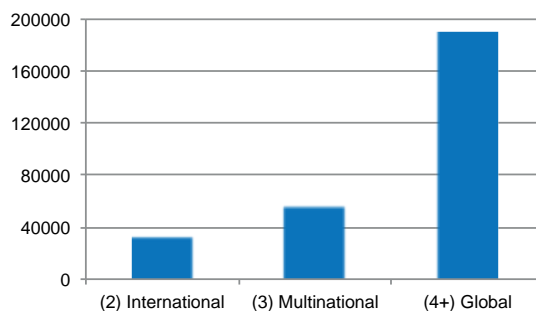
eBay Marketplaces data demonstrate that 95% of US-based SMEs on the eBay platform sell to customers in foreign countries. In short, they export. This is in stark contrast to traditional businesses in the US, of which only about 4% engage in exporting (Bernard et al. 2007) (Figure 1).

Figure 1 Share of firms exporting



In many cases these are truly global businesses, exporting to nearly every corner of the world. In 2014, SMBs on eBay exported to 215 markets around the world. Moreover, this is not a niche trend, but rather a growing phenomenon. To demonstrate the pervasiveness of the unprecedented geographic reach and scale of these technology-enabled SMEs, we have placed them into three categories: ‘International’ = exports to two continents; ‘Multinational’ = exports to three continents; ‘Global’ = export to four or more continents (Figure 2). In 2014, there were 32,649 US SMEs that sold to two continents and 56,373 US SMEs that sold to three continents. Most notably, over 190,000 US SMEs had global reach, exporting to four or more continents in 2014.

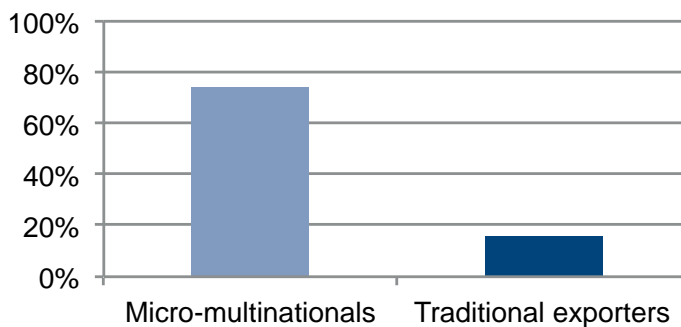
Figure 2 Number of SMEs reaching two, three and four+ continents



Surviving and thriving

The idea that trade leads to firm growth is one that most economists hold almost as self-evident. The Chairman of the Council of Economic Advisers Jason Furman stated, “[T]he ability to sell to a larger world market allows firms to take better advantage of increasing returns to scale” (Furman 2015). But, the complexities involved in exporting can often lead to high failure rates (i.e. ceasing to export) among firms. The World Bank collects data on exporting firms from around the world. This database does not contain information on the US, but the three-year export survival rates in representative developed European countries (Sweden, Spain, Portugal, Estonia, Bulgaria, and Belgium) is just 15.7%.² In stark contrast is 2014 data from eBay Marketplaces, which demonstrates that 74% of micro-multinationals are still exporting after three years (Figure 3).

Figure 3 Survival rate for exporters



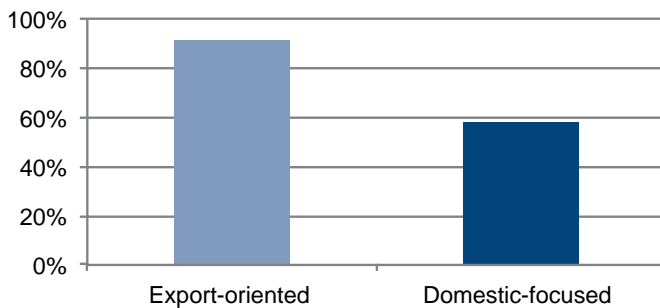
Exports on the eBay platform increased nearly 300% between 2004 and 2014, while overall exports in the US increased by less than 100% over the same time frame.³ It is also useful to track the growth of export-oriented firms to demonstrate the economic principle that exporting firms grow because of increasing returns to scale. We looked at SMEs on eBay from 2010 to 2014 and found that domestic-focused firms (those

² Average of similarly situated markets in World Bank Exporter Dynamics Database.

³ International Trade Centre, Trade Map database.

with less than 50% of sales going to international consumers) grew 58% over that time frame, whereas export-oriented firms [those with greater than 50% of sales going to international consumers) grew 91% (Figure 4). Export-oriented firms grew 57% faster than their domestic-focused counterparts.

Figure 4 Growth of export-oriented firms



Creating a more inclusive model for global commerce

The benefits of global trade have traditionally been captured almost entirely by large established firms. Small businesses could not afford the large infrastructure, marketing, and capital costs required to engage in global trade. The internet now enables an SME to ‘go global’ instantly. This explains why start-up (newcomer) businesses on the eBay Marketplace are able to capture 12.7% of the export market in just one year, whereas, globally, new enterprises make up only 5% of the traditional export market⁴ (Figure 5).

The reciprocal factor of start-ups struggling to gain market share in the traditional economy is that the largest traditional entities maintain much of the market share. Globally, the top 5% of exporters account for 82% of the export market.⁵ This is not the case for SMEs using the eBay Marketplace. The top 5% of micro-multinationals only account for 55% of the exports on the eBay platform, underscoring how the online marketplace is a more inclusive venue for SMEs (Figure 6).

4 Average of similarly situated markets in World Bank Exporter Dynamics Database

5 See footnote 8.

Figure 5 Market share of newcomers

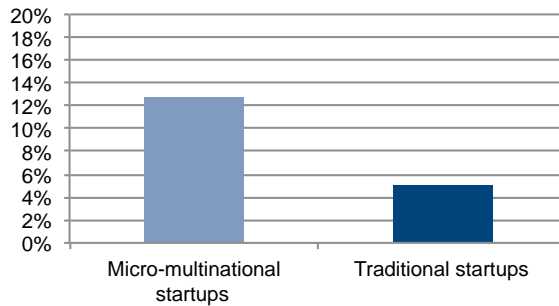
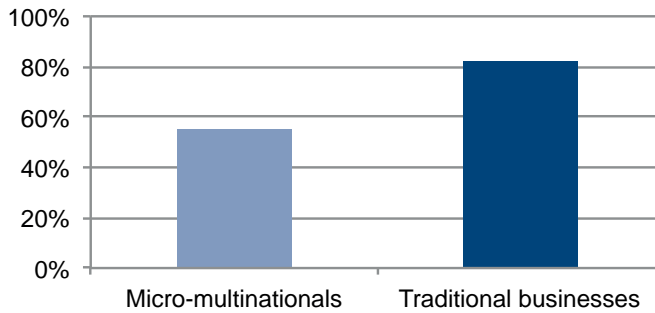


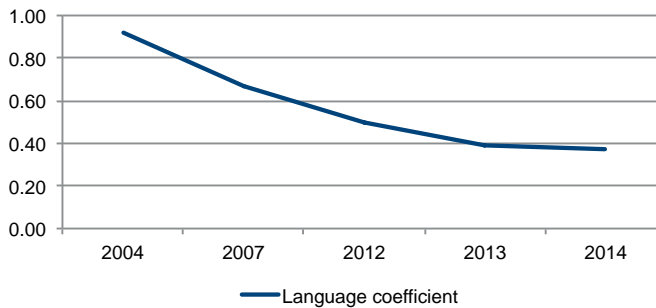
Figure 6 Market share of top 5% of businesses



Breaking down the barriers to economic opportunity

Small businesses continue to face disproportionate barriers to trade, despite the positive effect that the internet has had in reducing marketing and communication costs. One of the major barriers that has inhibited micro-multinationals has been language. This has been an area of focus for eBay; the company has created machine translation technology that can help reduce the challenges associated with language. Over the past decade, language as a barrier to trade by US-based micro-multinationals has been reduced by more than two-thirds on the eBay platform. In 2004, trading with a buyer from a country with English as the official language used to boost exports of US-based sellers by 150%, but in 2014 it ‘only’ increased exports by 44% – that’s a two-thirds reduction within a decade (Figure 7)

Figure 7 Reduction in language as a barrier to trade



There are several other barriers to trade that continue to inhibit micro-multinationals. Customs, in particular, is noted by micro-multinationals as a particularly onerous barrier to trade. Trade agreements are one of the most effective methods for improving customs processes and reducing fees and paperwork. eBay has served as a platform for micro-multinationals to organise and demonstrate their support for policy issues that would reduce business frictions. In early 2015, micro-multinationals using eBay sent over 50,000 emails to members of the United States Congress expressing support for the Trans-Pacific Partnership (TPP) (Hattem and Trujillo 2015). The TPP is a trade agreement between the US and 11 other markets that represents more than 35% of the exports from US-based micro-multinationals on eBay.

Micro-multinationals have struggled to present a voice on policies that limit their ability to access international markets. But, their issues are of tremendous importance as they represent an entrepreneurial exporting class of business that governments should seek to promote.

The final section of this chapter will lay out specific policy recommendations for governments around the world to consider in order to facilitate the continued growth of micro-multinationals.

Policy Recommendations

Poor government policies can have a particularly powerful effect on SMEs. The Organization for Economic Cooperation and Development finds that proportionate compliance costs can be 10 to 30 times greater for small firms than for larger firms (OECD 2014). Moreover, micro-multinationals are a relatively new segment of trader, which means they have never before been a meaningful part of trade negotiations and the policy solutions needed to facilitate micro-multinational trade have therefore not been proposed, let alone implemented, within the traditional trade regime. This section will highlight four policy recommendations that would enhance the ability of US micro-multinationals to access the global market.

- **Raise de minimis levels:** The de minimis threshold is the monetary level below which an importer of physical goods is exempted from customs duty and paperwork requirements. Returns are an essential part of the retail experience. In the current environment, providing cross-border returns is difficult for micro-multinationals because if a good is valued at a level above the de minimis threshold, then upon its return it may be subject to customs duty and paperwork requirements, with the burden falling on the seller. De minimis levels around the world are varied, with some countries setting them as high as \$1,000 and others with no de minimis level (GEA 2013). Raising de minimis thresholds through trade agreements would reduce customs barriers for micro-multinationals and facilitate trade.
- **Modernise and harmonise postal regimes:** Harmonisation and simplification of policy and regulation, as well as increased technological investment and development of postal services, are extremely beneficial for micro-multinationals that utilise the postal service to move their goods around the world. Multilateral harmonisation is the most effective method for improving the global postal system, agreement on addressing mechanisms, customs clearance policies, and tracking would make cross-border technology-enabled trade much more efficient.

- **Protect intermediaries against third-party liability:** A balanced regime for internet intermediary liability has been instrumental in developing internet-enabled economic activity. The balanced notice-and-takedown regime achieved in the US Digital Millennium Copyright Act (DMCA) protects IP while enabling platforms to grow. The blanket immunity for speech violations provided by the US Communications and Decency Act (CDA) Section 230 enables free speech to flourish online. Unfortunately, very few nations have adopted a similarly balanced regime for governing intermediary liability. This creates a great deal of uncertainty for micro-multinationals. Trade agreements should seek to harmonise intermediary liability regimes in a manner that encourages countries to adopt balanced, pro-innovation liability regimes.
- **Tailor government programmes to fit the needs of micro-multinationals:** Several governments have created trade-promotion programmes designed to help educate, finance, and facilitate export-oriented businesses. Unfortunately, many of these programmes are tailored to fit the needs of larger manufacturing and agricultural businesses. Micro-multinational businesses face divergent barriers from the traditional exporter. Governments should revisit export promotion programmes and tailor them to meet the needs of the micro-multinational.

Conclusion

Pierre Omidyar, eBay's founder, frequently says, "[e]veryone is born equally capable, but lacks equal opportunity" (Goldberg 2011). The internet has opened up a world of opportunity for businesses of all sizes around the world. We believe that the micro-multinational trend is still nascent and is only going to grow. The growth of micro-multinationals will bring more wealth creation and will spread that wealth to entities that have traditionally been left out. This trend will help to push trade to new peaks, but the proper policies must be put in place in order to achieve this future.

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19 Bold political leadership and vision can unlock global trade growth

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Global trade volumes have slowed dramatically after a period of steady growth, with financial flows hovering at levels almost 70% below their peak, according to the IMF .

The slowdown in growth has broad consequences for domestic economies. Less trade means weaker job growth. Declining trade is also quite damaging to global economies that have invested in infrastructure for manufacturing or services exports.

Some of the sluggish growth is attributable to normal cyclical factors such as fluctuations in currency and commodity prices. But other causes, such as a troubling stasis in global trade policy, are reason for concern. Trade policy sets the stage for many of the derivative benefits that economies receive.

Addressing these factors and returning global trade volumes to their pre-recession levels require strong political leadership capable of connecting bold new policies with modern technologies that facilitate communication and connectivity between countries. Together, these moves will ensure a future in which trade is easier, less expensive and more democratic. When trade operates in that kind of friendly environment, everyone has the potential to win by participating in global value chains.

The rise and fall of trade growth

From 2000 to 2013, soaring commodity prices caused trade to grow unusually fast. To some extent, the 13-year rally reflected existing market conditions. More bulk carriers and tankers were moving more commodities such as copper ore and crude oil around the world, and these goods sold at higher prices. But slumping commodity prices in the last two years have cut overall export growth. This is of obvious concern to the industries involved and to their customers. But it doesn't really affect the world economy as a whole. The condition will correct itself as economies adjust.

The Global Crisis of 2008 was another contributor to sluggish trade growth. This historic downturn caused a temporary trade collapse as consumer demand shrank and construction industries wilted. It also led to longer-term questions of business strategy. Though many of the global value chains and joint manufacturing platforms developed in the last decade are still in place, output has decreased in many cases due to slowing consumer demand.

This brings us to the third cause of the growth slowdown: the halt to the broad-based reduction of global trade barriers. This reduction virtually stopped around 2010 and has not got back on track. From the early 1990s to 2010, the world economy was steadily reducing tariffs and other barriers through major multilateral and regional agreements. Examples include the Uruguay Round, a trade negotiation that created the WTO in 1995, and the series of accession agreements that brought China, Taiwan, Saudi Arabia, Vietnam, Ukraine, Russia and others into the WTO. These agreements brought world trade barriers to their lowest levels on record and nearly eliminated world tariffs on exports such as medical devices, computers, smartphones and tropical farm goods.

Liberalisation of trade policy helped make the era from 1990 to the Global Crisis the most productive for growth and poverty reduction in world history. Deep poverty rates worldwide fell by half, and American households gained almost \$4,000 a year in

purchasing power as supply chains made food, clothes and home goods more cheaply and readily available.

Unfortunately, supportive policy and other favourable trends have slowed or ended entirely. The Uruguay Round agreements have long since been implemented, and the WTO's Doha Round remains deadlocked. Aside from Iran, no large countries remain outside the WTO.

Free trade agreements (FTAs) are only a partial substitute for liberalised policy. Until very recently, the big economies and largest traders – the US, the EU, China and Japan – had been negotiating *around* one another rather than *with* one another. Trade, therefore, has been proceeding under a policy system that is essentially static rather than dynamic.

Express delivery, the internet and the rise of small-business trade

As governments plan their next steps, our experience at UPS suggests a possible large new area of potential trade growth: a trade boom among smaller businesses and individuals who leverage the established global express delivery and technology networks to tap new customers.

The internet now reaches 3 billion people, up from 1.5 billion a decade ago and 360 million in 2000. This, combined with the further expansion of global express delivery networks that were forged on the backs of multinational value chains, has made exporting and importing possible for smaller businesses that previously could not engage directly in international trade.

Before these developments, the cost of finding customers and suppliers abroad was prohibitive for many companies. So were the costs of small shipments and returns. And the mountains of trade-related paperwork were so high that few small businesses had the manpower or the patience to participate in trade.

Today, the internet helps companies reach countless potential customers and suppliers. With express delivery enabling small package shipping, a world of new opportunity has opened. Statistics show this clearly. In 2003, the US had 119,000 exporting companies with fewer than 100 employees. Today that number has jumped to more than 280,000.

Trade policymakers now have the chance to build momentum with policies that can revive trade growth. For that to happen, broad-based liberalisation must resume. The ambitious set of regional and multilateral trade negotiations now underway can help. So can the international regulatory cooperation agreements being negotiated. Specific agreements include the Trans-Pacific Partnership (TPP), the Transatlantic Trade and Investment Partnership (TTIP) and the Trade in Services Agreement (TiSA), as well as Europe-Asia, Asia-Asia cooperation efforts.

Small businesses should be enthusiastic supporters of these agreements, which reflect many of the unique challenges companies face. They also help address new issues arising from internet access and data flows. Such policy innovation – and the fact that almost all of the world’s largest trading economies are participating – gives them great promise for growth.

As the negotiations continue, the Obama administration and Congress are set to consider Trade Promotion Authority (TPA). Many regard the bill, which would modernise the US trade ambition in the 21st century, as essential to the US’s ability to conclude TPP, TTIP and TiSA. At the same time, a raft of trade legislation has expired in recent years and will need to be addressed. The Generalized System of Preferences (GSP), which provides duty-free access for many goods from developing and least developed countries, expired at the end of July 2013. The Africa Growth and Opportunity Act (AGOA), which provides benefits for countries in Africa, will expire in September 2015. A Customs Modernization bill, including a UPS-led provision to raise the *de minimis* threshold, has been under consideration for a number of years. And Trade Adjustment Assistance (TAA) legislation expired in December 2014. Clearly, the US

has at its doorstep a path that accelerates economic growth and trade in a significantly robust and inclusive way for businesses of all sizes.

To jumpstart trade growth, policymakers must support the boom in small-business and specialised, individualised trade. The WTO's Trade Facilitation Agreement, which was completed in 2014, would enable a world trading economy that is friendlier to smaller businesses and entrepreneurs than ever before. The challenge now is to ensure full and effective implementation among the 160 countries that signed the agreement, especially the smaller and poorer economies that need the most help building capacity to implement technologies and processes for inclusion in high-velocity global supply and value chains. These developing economies, if they ambitiously embrace the opportunities to modernise their trade regimes, stand to gain the most.

Strong trade growth could resume

The long stalemate in the Doha Round suggests some of these negotiations may be difficult. And we know, trade liberalisation often faces increased scepticism and opposition during periods of economic hardship.

But last year's approval of the WTO's highly pragmatic and valuable Trade Facilitation Agreement suggests that determined and creative policymakers can win uphill battles. The record of the last generation is strong. Trade liberalisation launched an era of falling poverty and rising growth in the developing world, raised living standards worldwide and ensured access to markets that enabled the US to recover from the Global Crisis through exports.

The current stasis in trade policy should not continue. We see new opportunities, a future of higher participation and broader benefits for businesses of all sizes as well as a re-invigoration of global production and services trade that can deliver significant benefits for those who get it right. All this takes is bold vision and courageous leadership, because the more trade barriers that we remove, the more trade happens.