



ECFIN *Economic Brief*

ECONOMIC ANALYSIS FROM EUROPEAN COMMISSION'S DIRECTORATE GENERAL FOR ECONOMIC AND FINANCIAL AFFAIRS

Has the EU's leading position in global trade changed since the crisis?

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Changing trade patterns

Several important developments have changed the patterns of the international trading system in the post-crisis period. They were both institutionally and market driven.

At the institutional level, the slow progress in the WTO multilateral trade negotiations and difficulties to reach an agreement on the Doha Development Agenda for more than a decade supported the proliferation of bilateral and regional trade negotiations. The EU has been negotiating free trade agreements (FTAs) i.a. with the US (Transpacific Trade and Investment Partnership, TTIP), Canada and Japan. Similar developments have been taking place around the globe. The Transpacific Partnership Agreement (TPP) is another example of a new type of trade negotiations embracing 12 developed and developing countries.¹ In parallel, the so-

called plurilateral negotiations, within or outside the WTO, are seen by many observers as a feasible alternative to the multilateral negotiations.²

Market driven developments have been shaped by the on-going rise of emerging economies, even though their growth dynamics have not reached the pre-crisis rates of 7-8%. Still, faster GDP growth in emerging and developing countries than in advanced economies has led to increased real convergence with developed countries in terms of per capita income. GDP growth has moved hand in hand with integration in the world economy. According to the WTO, the share of developing

Mexico, New Zealand, Peru, Singapore, the United States, and Vietnam.

² A plurilateral agreement implies that WTO members would be given the choice to agree to new rules on a voluntary basis. This contrasts with the multilateral WTO agreement, where all WTO members are party to the agreement. The Agreement on Government Procurement is a typical plurilateral agreement.

¹ Negotiations on the TPP started in 2005 with the aim to liberalise trade and investment. As of 2014 twelve countries throughout the Asia-Pacific region have participated: Australia, Brunei Darussalam, Canada, Chile, Japan, Malaysia,

Summary

The global crisis has taken its toll on the EU's prime position in international trade. While the EU still has the largest relative market shares, its position has deteriorated since the crisis, much more so than the US, and its comparative advantage in knowledge-intensive goods has been partly eroded. Globally, participation in international production sharing has increased significantly between 1995 and 2005. However, the pace of global outsourcing slowed down during the crisis. China seems to drive the structural shifts not only in the last two decades but also in the most recent period, capturing increasing shares in the global market to the detriment of advanced economies. Concerns have arisen as to whether the EU will be able to keep pace with the changing global environment and maintain its strong position in global value chains. The fact that the EU gained relative market shares in 2013 for the first time in the post-crisis period, provides some reason for optimism.

economies in world output increased from 23% to 40% between 2000 and 2012. The share of these countries in world trade also rose from 33 per cent to 48 per cent.³ In parallel, emerging and developing countries capture an increasing part of global FDI. According to UNCTAD (2014)⁴, emerging and developing economies were responsible for 54% of global FDI inflows and half of the top 20 countries ranked by FDI inflows in 2013 were EMEs.

Still, there is sizable heterogeneity across emerging economies, even within the BRICS bloc itself. China belongs to the top 3 largest trading powers in the world and in 2013 its total merchandise trade in absolute terms was around 10 times larger than that of Brazil and 20 times higher than that of South Africa. At the same time new important economic players have emerged. The 'frontier markets' include some Asian economies, Mexico, Turkey, all heavily involved in manufacturing trade and global value chains. In contrast, most African countries (with important exceptions),⁵ and some countries in Latin America, the Middle East and Central Asia remain dependent on trade in natural resources.⁶ This is also the case for Russia which is currently facing difficult economic challenges and a bleak economic outlook on the back of the imposed sanctions and declining energy prices with economic growth and exports stagnating and imports growth potentially falling to -6% in 2014.⁷

EU trade performance

A simple ranking based on export and import values in 2013 shows that the EU secured its global position in both merchandise and services trade despite its sluggish economic performance in this year. In particular, the EU has a strong advantage over its trading competitors in commercial services. Trade in services seems to be less cyclical than trade

in goods,⁸ which had some positive impact on the EU trade performance during the crisis.

Table 1: Top 5 world exporters and importers in 2013 (goods)

	Exporter	Value	Share	Importer	Value	Share
1	EU-28*	2.307	15.3	1	US	2.329 15.4
2	China	2.209	14.7	2	EU-28*	2.235 14.8
3	US	1.580	10.5	3	China	1.950 12.9
4	Japan	715	4.8	4	Japan	833 5.5
5	Korea	560	3.7	5	Hong Kong	622 4.1

Table 2: Top 5 world exporters and importers in 2013 (services)

	Exporter	Value	Share	Importer	Value	Share
1	EU-28*	891	25.2	1	EU-28*	668 19.7
2	US	662	18.7	2	US	432 12.7
3	China	205	5.8	3	China	329 9.7
4	India	151	4.3	4	Japan	162 4.8
5	Japan	145	4.1	5	Singapore	128 3.8

Source: WTO, * excluding intra-EU trade

The analysis focusses on trade in goods which still plays a crucial role in worldwide trade patterns (with a share of some 75% of total trade in 2013). A detailed analysis of global trade in commercial services goes beyond the scope of this analysis, although services capture an increasing share of EU trade in both gross and value added terms (service trade in value added terms is discussed in the last section).

3 WTO (2014) World Trade Report

4 UNCTAD (2014) World Investment Report

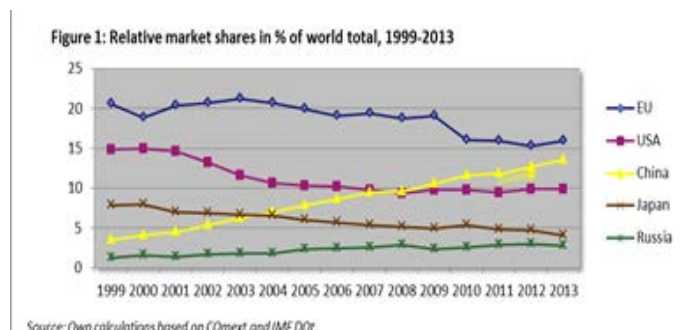
5 The IMF classifies 9 sub-Saharan African countries as frontier markets. These are Ghana, Kenya, Mauritius, Mozambique, Nigeria, Senegal, Tanzania, Uganda and Zambia. The definition is based on recent growth dynamics and prospects, financial market developments, general institutional and political conditions and prospects. See: IMF (2014) Managing Volatile Capital Flows: Experiences and Lessons for SSA Frontier Markets.

6 Hoekman B. (2014) Supply Chains, Mega-regionals and Multilateralism. A Road Map for the WTO, CEPR Press

7 European Economic Forecast, Winter 2015

8 The collapse in global trade was much more pronounced for goods than for services between 2007 and 2008: CEPII (2013) EU External Competitiveness: recent developments

The evolution of the EU relative market shares significantly differs from those of the US and Japan (trade in goods) between 1999 and 2013.

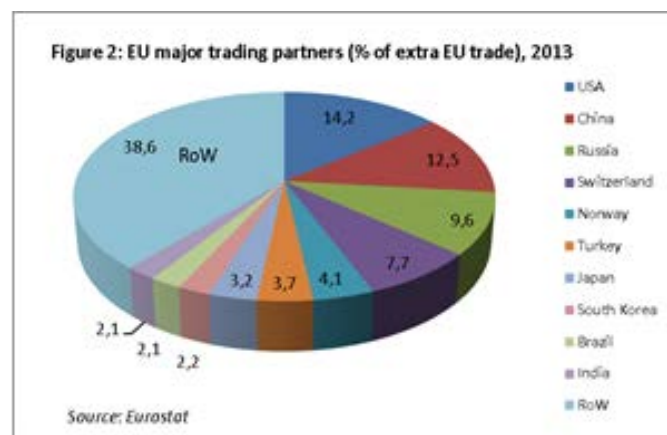


While the EU captured relatively stable market shares, hovering around 20% between 2000 and 2007, the severe consequences of the crisis lasted longer in the EU than in the US. Thus, the drop of market shares just after the crisis was much stronger in the case of the EU. In contrast, the US lost rather significant export market shares already in the pre-crisis period of 2000-2007 (some 5 pp.), but in the aftermath of the global crisis it has recovered relatively quickly as mirrored in its stable market shares after 2009. Japan follows a market share profile similar to that of the US. Finally, it is worth noting that despite the on-going redistribution of market shares towards emerging economies, the EU gained market shares in 2013, for the first time in the post-crisis period.

These different trade patterns can be explained by several factors. In the decade preceding the crisis, the EU has kept stable market shares, benefiting from regional value chains developed in Europe. Although the Member States that joined the EU in 2004 (EU10) are clearly evolving in the direction of greater homogeneity with the 'old Member States' (EU15) over time, the two regions have important complementarities⁹. This ensuing division of labour within the EU had a significantly positive effect on the EU performance. The EU10 countries have become important suppliers of intermediate goods to the EU15 industry, particularly German firms, whose competitiveness and export market gains seem to have benefitted from these inputs. Contrary to the EU, the US and Japan lost significant market shares in the pre-crisis period, reflecting strong value chain ties with China which after the initial period of opening up has become more competitive during the decade preceding the

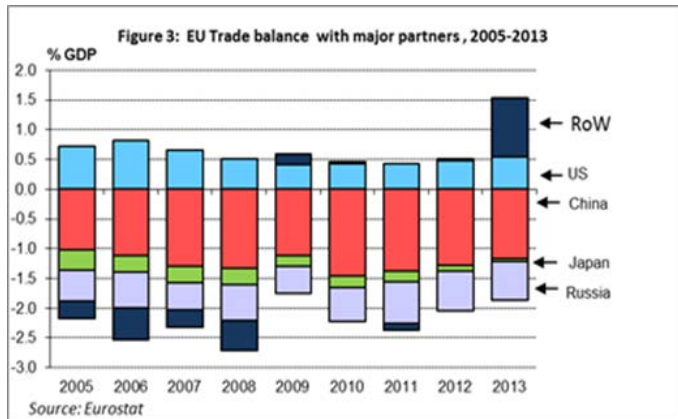
crisis, gaining significant market shares mainly at the expense of the US and Japan.

The geographical composition of EU trade points to the prominent role of emerging market economies. Indeed, the US has been for decades the major trading partner of the EU but its dominance has diminished significantly over time. For instance, in 1999, the share of the US in extra-EU trade was almost twice as high (27%) compared to 2013 (14%). China captured only 5% of extra-EU trade in 1999 while it was responsible for a share of 12.5% in 2013.



Despite large divergences between EU Member States in terms of trade performance, the overall EU trade balance in goods has remained relatively stable, compared to more pronounced trade imbalances in the world economy. Looking at the geographical breakdown of the EU trade balance (figure 3), the deficit with China stands out. It increased gradually up to 2008 and declined thereafter. In contrast, the EU trade balance with the US is marked by a long-term surplus. Even if it fell between 2006 and 2011, the surplus started to widen slightly in 2011. In 2013, and for the first time in the last decade, the EU registered a significant surplus with the remaining group of countries (RoW).

⁹ CEPPII (2009) Evolution of EU and its Member States 'Competitiveness in International Trade



It should be noted, however, that the improved EU trade balance in goods is partly due to the relatively weak demand in the EU that depressed imports, resulting in this positive overall outcome. Some improvements in EU competitiveness could have also played a role, mirrored in the increased EU relative market shares in 2013.

Drawing on this general analysis of the EU trade environment, there is no doubt that the financial crisis negatively affected the EU position in the global market. The EU economy has lost market shares that can only partially be explained by the on-going expansion of emerging markets and their integration into the global economy. The magnitude of the loss clearly suggests that the consequences of the crisis on the EU economy have been more pronounced than in the case of its trade competitors.

Trade specialisation patterns after the crisis

The predominance of global value chains (GVCs) has important consequences for the functioning of the international trade system. GVCs worked as a transmission channel during the financial crisis and their impact spread to countries that were not directly affected by the crisis but experienced a significant deterioration in trade performance. From the perspective of the traditional trade theory, the major motivation for a partial reallocation of production abroad would be to reduce costs. However, new trade theories provide additional drivers of international outsourcing. The possibility to reap the benefits of scale economies, an increasing demand for product differentiation, imperfect competition are the most prominent examples.¹⁰ While the posi-

tioning of the EU in the international production process is discussed in the next section, this part will focus on the trade specialisation of the EU and its major trading partners (the US, China and Russia). Based on production factors intensity, this sectoral analysis tries to outline how the structure of comparative advantages and the allocation of resources across sectors in these economies changed after the crisis.

The higher (lower) the Revealed Comparative Advantage (RCA) index is the stronger (weaker) the trade performance of a given country in a particular area of industry (box 1). The calculations of the RCA indices cover only merchandise trade and not commercial services. The analysis was performed for two years which were considered to be the most representative for the pre- and post-crisis periods: 2006, when trade grew in line with the long-term average and the year 2013, for which the most recent data was available in the UN COMTRADE data base (mid 2014). Calculations based on trade statistics expressed in value added would be preferable. However, they require more detailed sectoral trade data than is currently available in the Trade in Value Added (TIVA) database developed by the OECD and WTO (by mid-2014).

Box 1: Revealed comparative advantages (RCA) – a modified version of the RCA index

The most popular indicator of a country's trade specialisation is the revealed comparative advantage (RCA) index first proposed by Balassa (1965)¹. It measures a country's exports of a commodity relative to its total exports and the corresponding export performance of a set of countries. However, in order to estimate the specialisation of economies which are involved in international outsourcing and, in order to take into account two-way trade flows between countries, a modified version of the RCAs index developed by CEPII seems to be a more accurate measure of specialisation. It is based on net trade and not exclusively on export performance.¹ The modified formula used for calculating the RCAs index is presented in Annex 1.

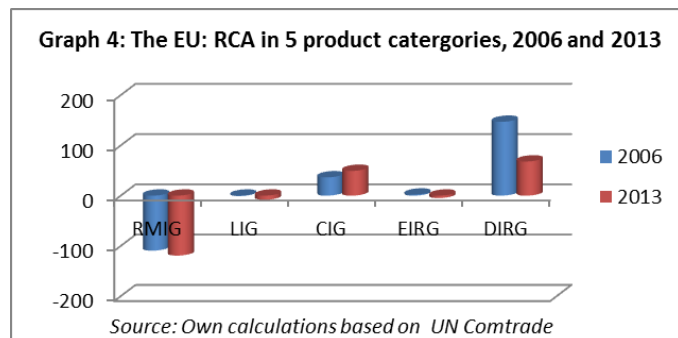
The methodology developed by CEPII allows estimating the contribution of different product groupings to the cyclically adjusted trade balances of the particular country. The overall specialisation patterns can be compared between countries but not the absolute figures obtained for the different categories since the 'structural' trade balance is an indicator of how indi-

¹⁰ Galar M. (2012) Competing within global value chains, ECFIN Brief, No 17

vidual countries allocate resources to their own specific industries.¹

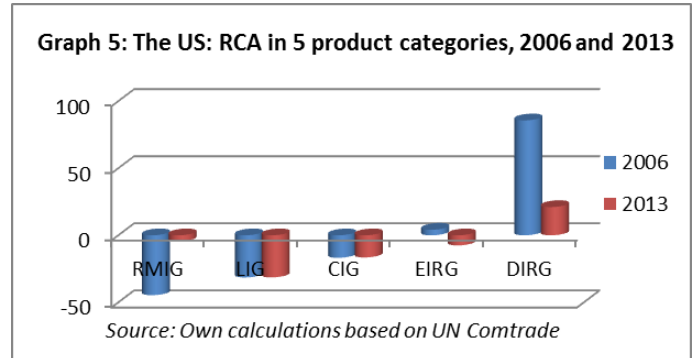
Finally, in order to calculate the RCA indices for different goods, the SITC values have been divided into five different sub-sectors, accordingly to factor intensity used for production. These five categories include: raw material-intensive goods (RMIG), labour-intensive goods (LIG), capital-intensive goods (CIG) and research-intensive easy to imitate (EIRG) and research-intensive difficult to imitate goods (DIRG). More detailed breakdowns of each of these product categories are presented in Annex 2.

The overall EU advantages and disadvantages remained broadly similar but tended to be eroded in knowledge intensive goods (graph 4). The EU registered an advantage in research-intensive and capital goods in both years (2006 and 2013). However, the comparative advantage in research-intensive difficult to imitate goods (DIRG) was significantly less pronounced in absolute terms in 2013 as compared to 2006. The EU also became even more disadvantaged in raw material-intensive goods after the crisis.

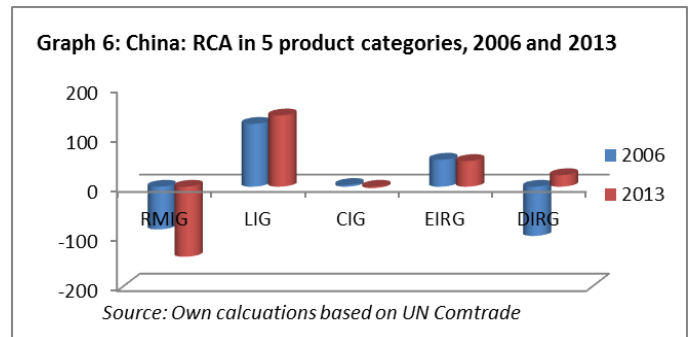


The US follows a similar pattern in case of research-intensive goods but, as expected, it has developed a relative advantage in raw material intensive goods. The RCA index in this category was negative in 2006. This evolution could be explained by strong investment in gas and oil in recent years. High-tech exports (as a % of total manufactured exports) have decreased significantly in the US from 30% in 2006 to 18% in 2012.¹¹ However, the US enjoys in parallel a strong comparative advantage in services that are not captured by this index.

¹¹ World Bank data on high-tech exports can be found here: <http://data.worldbank.org/indicator/TX.VAL.TECH.MF.ZS/countries/1W?display=graph>



Important cross-sectoral shifts can be observed for China. The economy developed comparative advantage in research-intensive difficult to imitate goods.

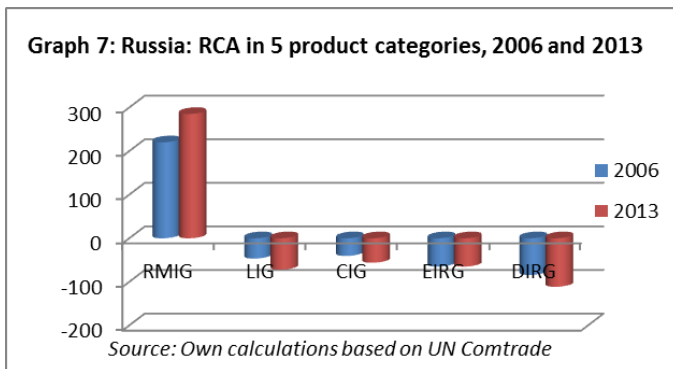


This impressive performance in research intensive sectors can be attributed to rising investments in skills development and in domestic R&D efforts coupled with growing FDI in knowledge intensive activities (OECD 2012). Spending on R&D in China has increased significantly between 2006 and 2012, compared to the US and the EU.¹² In parallel, China became even more strongly disadvantaged in raw-material intensive goods.

The Russian economy remains strongly dependent on raw materials The RCA index for raw material intensive goods even increased in 2013 as compared to 2006. Therefore, the analysis cannot point to any sign of diversification of the Russian economy, rather the opposite. The negative RCA index deepened in 2013 for capital and research-intensive difficult to imitate goods.

¹² R&D expenditure in China increased from 0.9% in 2000 to 1.98% of GDP, a share comparable to those in the EU (2.06% of GDP) in 2012. R&D expenditure in the US decreased from 2.62% to 2.49% of GDP in the same period. For more information on gross domestic expenditure on R&D, see: The WB database <http://data.worldbank.org/indicator/GB.XPD.RSDV.GD.ZS?page=1> and Eurostat website: [http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/File:Gross_domestic_expenditure_on_R%26D,_2002%E2%80%9312_\(%25_of_GDP\)_YB14.png](http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/File:Gross_domestic_expenditure_on_R%26D,_2002%E2%80%9312_(%25_of_GDP)_YB14.png)

Graph 7: Russia: RCA in 5 product categories, 2006 and 2013



To complement this analysis based solely on trade in goods, a macro-sector specialisation analysis (primary sector, manufacturing and services) shows that the EU increased its specialisation in services from 2002. According to CEPII (2013) this is not a consequence of the recent crisis. The EU specialisation in services has begun before the crisis but has not increased since 2007.¹³ Thus, the impact of the crisis, even if more pronounced in merchandise trade, also had negative consequences on trade in commercial services.

To sum up, the analysis of revealed comparative advantages confirms the far-reaching impact of the crisis. Moreover, the landscape has evolved further with China catching up in areas originally covered by advanced economies. Indeed, China is now a major driver of global R&D, having doubled its share of GDP over 2008-2012 in a bid to escape a 'middle income trap'.¹⁴ The EU still enjoys comparative advantages in knowledge-intensive goods and in services but, when comparing to its immediate competitors, reforms are needed in order to secure Europe's position on the global market and to strengthen its international competitiveness. A high-productivity strategy for competitiveness needs to be based on openness and innovation, with investment in R&D and in education and skills as major building blocks.¹⁵

Participation in global value chains

The role of global value chains and its impact on international trade flows has been widely discussed in the economic literature.¹⁶ The aforementioned TiVA database devel-

oped by OECD and WTO, which allows measuring trade in value added, has provided an important complement to traditional measures of international trade.¹⁷ This section first outlines the most relevant implications of measuring trade in value added for the EU and globally, before discussing evolutions in GVCs.

Firstly, despite strong trade linkages between the EU Member States, the EU as a whole became more open towards the rest of the world in the last two decades. The domestic value added content of EU exports in 2009 was 86%, falling down from 90% in 1995. The relatively high proportion of domestic value added indicates strong regional economic integration among EU Member States, while its decrease indicates that integration of the EU into the global economy has not slowed down.

Secondly, trade measured in value added reveals a much greater share of services in the extra-EU trade and globally, compared to gross measures. While services comprise on average about two-thirds of GDP in most developed economies, they typically account for less than one-quarter of total trade in goods when measured traditionally. Accounting for the value added produced by the services sector in the production of goods, the services content of total gross exports is over 50% in most OECD economies.¹⁸ The share of services in EU exports was 54% in 2009 (in value added terms) - almost twice as high compared to the share in gross terms.¹⁹ Between 1995 and 2009, the proportion had increased by some 10pp, bringing trade in services to the forefront of the policy agenda.

Finally, trade measured in value added terms changes the size of bilateral trade balances. For the EU, it implies i.a. that the deficit with China is less significant in value added terms, mainly reflecting value added created in the EU and

a changing world; OECD (2013) *Interconnected Economies: Benefiting from Global Value Chains*.

¹⁷ The TiVA database presents trade statistics and indicators expressed in value added terms. They are derived from the OECD Input-Output Tables, which were integrated into a global system using additional information on Bilateral Trade in goods by Industry and End-use (BTDIxE), International Trade in Services (TIS) and STAN industry databases. The data base is still work in progress therefore limitations exist such as the number of countries and the time span captured by the dataset. <http://www.oecd.org/industry/ind/measuringtradeinvalue-addedanoecd-wtojointinitiative.htm>

¹⁸ OECD (2013) *Interconnected Economies: Benefiting from Global Value Chains*

¹⁹ This is due to the fact that services embodied in production and trade of manufacturing goods have been decomposed in the database expressed in value added terms.

¹³ CEPII (2013) *EU External Competitiveness: Recent Developments*

¹⁴ OECD (2014) *Science, Technology and Industry Outlook*

¹⁵ Bucher A., Pichelmann K. (2013) *Securing European competitiveness in a global perspective*, ECFIN Policy Brief No 25

¹⁶ See for instance: Fung Global Institute (FGI), Nanyang Technological University (NTU), and World Trade Organization (WTO), 2013, *Global value chains in*

embodied in Chinese exports. Analogously, the EU trade surplus with the US is relatively bigger than when measured in gross terms.²⁰

For international comparison of countries' positioning in GVCs, the participation index proposed by Koopman et al. (2010)²¹ is used (see box 2).

Box 2: The GVC participation index

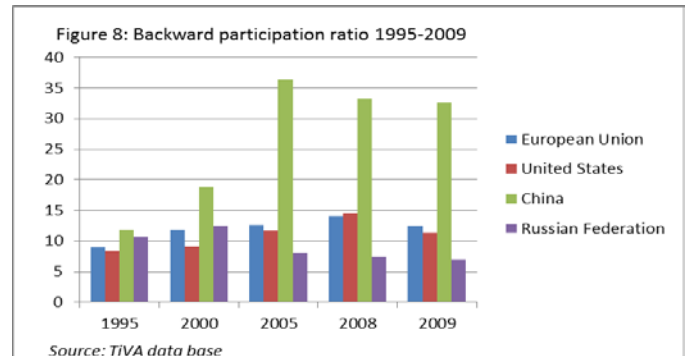
The participation index, developed by Koopman (2010), measures the share of exports involved in a vertically fragmented production process. 1 It is expressed as a percentage of gross exports and is composed of two parts: backward and forward participation.

1) Backward participation: It provides an indication of the contribution of foreign industries to the exports of a country by looking at the foreign value added embodied in the gross exports. The indicator measures the value of imported inputs in the overall exports of a country (the remainder being the domestic content of exports).

2) Forward participation: this indicator measures the contribution of domestically produced intermediates to exports in third countries. In other words, it is the share of exported goods and services used as imported inputs to produce other countries' exports.

Large economies such as the UE (when analysed as a single entity) and the US source more intermediate production domestically) and therefore their participation indices will be relatively smaller than those of small open economies that source more inputs abroad and produce more inputs used in GVCs (intra-EU trade is not included in the calculations of the EU indices).

Overall China drives the shifts in global value chains patterns. Figure 8 compares backward participation indices for 4 selected economies, including the EU (extra-EU). The size of the EU backward participation is comparable to that of the US, but the ratio masks significant differences between Member States (discussed in the following part of this section).

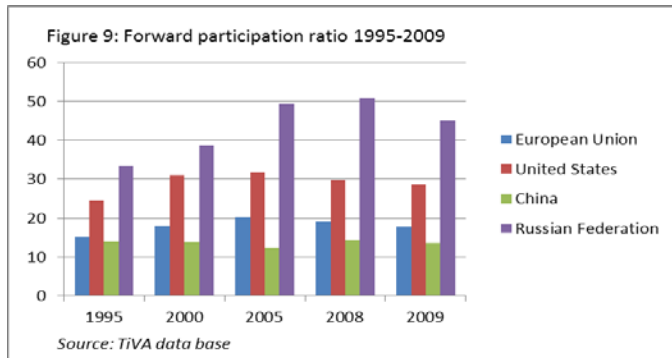


The strong backward participation of China and its increase between 1995 and 2005 reflects its role as an assembly platform of parts and components embodying value added created elsewhere. As outlined in the previous section, China enjoys a strong comparative advantage in labour-intensive goods that explains the rather lower domestic value added in Chinese gross exports compared to the EU and the US. The situation started to change in the second half of the last decade with China moving up the value chain. This shift of the role of China in GVCs was supported by its ability to develop a comparative advantage in knowledge-intensive goods. Thus, in line with previous findings, the share of foreign value added in Chinese exports decreased between 2005 and 2007 and remained stable during the crisis. Interestingly, its advantage in labour-intensive goods has not diminished in parallel.

The strong forward participation of the EU and US has been gradually eroded. In international comparison, both the EU as whole and the US participate in the upstream part of GVCs what is reflected in higher forward than backward participation. The US forward participation ratio is almost 3 times higher than its backward participation share. In the case of the EU, the picture is more nuanced given the existing differences between Member States in this respect. The increasing forward participation of the EU and the US up to the late 2000s (figure 9) reflects strong comparative advantages of both economies in knowledge – intensive goods. Reflecting the erosion of these advantages, the forward participation of both economies diminishes somehow in recent years. Data limitations (2009 is the most recent year in the TiVA data base) do not allow assessing how the interaction between the major economies and their ability to export value added has developed in the most recent period.

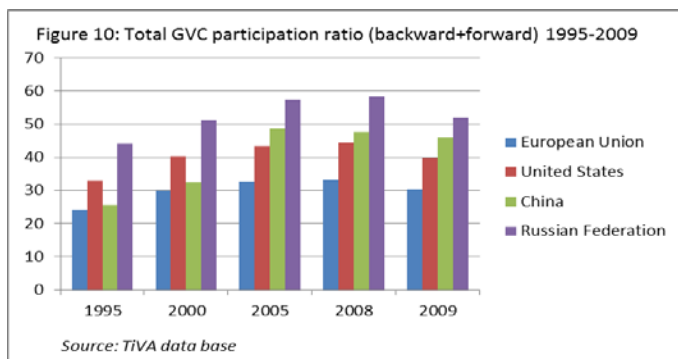
²⁰ Galar (2013) EU trade negotiations from a global value perspective, ECFIN Economic Brief nr 28

²¹ Koopman et al. (2010) Give credit where credit is due. Tracing value added in global production chains. NBER Working Series, Working Paper 16426



The results for Russia confirm the conventional wisdom of its strong dependency on natural resources. The GVC participation of Russia is mainly based on providing raw materials, thus the forward participation index - the value added created in Russia and embodied in other countries' exports - is relatively high. In general, this is typical for raw material-reach economies and it is fully in line with the strong RCA index of Russia in this category, both before and after the crisis.

The total participation in GVCs increased in all countries under analysis up to the outbreak of the global crisis and diminished in 2009 (figure 10).

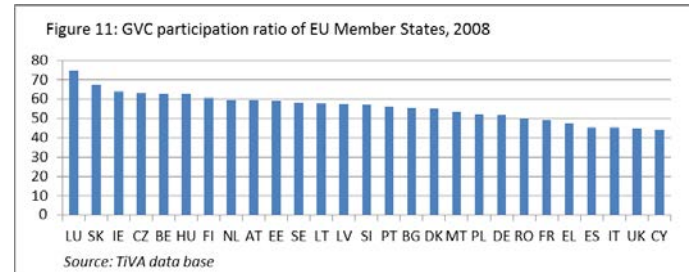


This is true not only for countries hardly hit by the crisis, like the EU or the US, but its impact on the GVC participation was proportionally spread across the world and between developed and developing countries. According to the WTO (2014), the total GVC participation of developed economies dropped from 50.7% to 47.2% while the index for developing countries decreased from 54.4% to 50.9% between 2008 and 2009.²²

In order to present a more complete picture, figure 11 shows the GVC participation indices by EU Member State. Small and open economies (like Luxembourg, Belgium or some

²² WTO (2014) World Trade Report

Central European MS) exhibit high backward participation ratios comparable to those of 'Asian Tigers'. As stressed before, trade in Europe is strongly concentrated within regional value chains developed within the EU market.



Some former transition countries that joined the EU in 2004, like Slovakia, the Czech Republic or Hungary, started to specialise around electronic and automotive value chains revolving in large part around Germany where the foreign content of exports rose significantly. This process (often called *Factory Europe*) is sometimes compared to similar patterns that emerged in Asia (*Factory Asia*), reflecting in particular China's emergence and rapid integration into GVCs.²³

To sum-up, participation in global-value chains offers opportunities to increase gains from international trade. Facilitating such trade requires more than reducing domestic trade costs although this is a critical precondition for participation. International co-operation is needed to reduce the trade-impeding effects of duplicative regulatory policies (Hoekman, 2013). EU trade negotiations with the US and Japan, economies that cover some half of world trade, have the ambition to tackle regulatory barriers to trade that should bring sizable economic benefits to the EU and the global economy.

Conclusions

The crisis has had a significant impact on international trade. Even if the EU has secured its position as a global player in international trade, with the largest relative market shares, the specialisation patterns of the largest economies kept changing and the traditional advantages of advanced economies, like the EU and US, started to erode. In contrast, China developed comparative advantages in knowledge intensive goods and became a major driver of global R&D. Participation in GVCs has increased globally before the cri-

²³ OECD (2013)

sis with the EU engaged in both regional value chains around the 'Factory Europe' as well as globally. The outbreak of the crisis resulted in a decreased production sharing not only across countries hardly hit by the crisis. Its adverse impact on GVCs' participation was proportionally spread across the globe and between developed and developing countries. The slowdown in forward participation in the case of the EU raises some concerns on how to keep pace with a changing global environment and to secure Europe's position in GVCs. Facilitating trade in global value chains requires in parallel lower domestic costs within the European Single Market as well as further liberalization of international trade. Not surprisingly, the G20 Leaders' Communique from Brisbane underlines that 'trade and competition are powerful drivers of growth (...). We need policies that take full advantage of global value chains'.²⁴

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²⁴ G20 Leaders' Communique, Brisbane Summit, 15-16 November 2014

Annex 1: RCA indicator based on the trade balance (CEPII)

According to equation (0), the revealed comparative advantage is standardised by total trade for the exporting country considered.

$$RCA_{icl}^t = \frac{1000}{(X_{i..}^t + M_{i..}^t)} * \left[(X_{icl.}^t - M_{icl.}^t) - (X_{i..}^t - M_{i..}^t) * \frac{(X_{icl.}^t + M_{icl.}^t)}{(X_{i..}^t + M_{i..}^t)} \right] \quad (0)$$

with:

$X_{i..}^t$ and $M_{i..}^t$ respectively country i total exports and imports in year t

$X_{icl.}^t$ and $M_{icl.}^t$ respectively country i total exports and imports of products belonging to the cluster cl in year t

$(X_{icl.}^t - M_{icl.}^t)$ the observed trade imbalance of country i for the cluster cl in year t .

$\frac{(X_{icl.}^t + M_{icl.}^t)}{(X_{i..}^t + M_{i..}^t)}$ the weight of cluster cl in country i exports in year t .

$(X_{i..}^t - M_{i..}^t) * \frac{(X_{icl.}^t + M_{icl.}^t)}{(X_{i..}^t + M_{i..}^t)}$ the theoretical imbalance of country i for the cluster cl in year t .

Source: CEPII

Annex 2: Breakdown of total trade by factor intensity

Raw Material Intensive Goods

SITC 0 Food and Live Animals

SITC 2 Crude Material, Inedible, Except Fuels (excluding 26)

SITC 3 Mineral Fuels, Lubricants and Related Materials (excluding 35)

SITC 4 Animal and Vegetable Oils, Fats and Waxes SITC 56 Fertilizers

Labour-Intensive Goods

SITC 26 Textile Fibers

SITC 6 Manufactured Goods Classified Chiefly by Material (excluding 62, 67, 68)

SITC 8 Miscellaneous Manufactured Articles (excluding 88, 87)

Capital-Intensive Goods

SITC 1 Beverages and Tobacco

SITC 35 Electric Current

SITC 53 Dyeing, Tanning and Colouring Materials

SITC 55 Essential Oils and Resinoids and Perfume Materials; Cleansing Preparations

SITC 62 Rubber Manufactures, n.e.s.

SITC 67 Iron and Steel

SITC 68 Non-Ferrous Metals

SITC 78 Road Vehicles

Easy-to-Imitate Research-Intensive Goods

SITC 51 Organic Chemicals

SITC 52 Inorganic Chemicals

SITC 54 Medicinal and Pharmaceutical Products

SITC 58 Plastics in Non-Primary Forms

SITC 59 Chemical Materials and Products, n.e.s.

SITC 75 Office Machines and Automatic Data-Processing Machines

SITC 76 Telecommunications and Sound Apparatus and Equipment

Difficult-to-Imitate Research-Intensive Goods

SITC 57 Plastics in Primary Forms

SITC 7 Machinery and Transport Equipment (includes semiconductors / excludes 75, 76, 78)

SITC 87 Professional, Scientific and Controlling Instruments and Apparatus, n.e.s.

SITC 88 Photographic Apparatus, Optical Goods n.e.s; Watches and Clocks.

Source: Yilmaz (2002) based on earlier work by Hufbauer and Chilas (1974)