

# **QUARTERLY REPORT ON THE EURO AREA**

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Highlights in this issue:

- Focus: The export performance of the euro area
- Quantifying the causes of the crisis in the euro area
- How has the financial crisis affected cyclical differences within the euro area?
- Assessing the sources of non-price competitiveness

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## EDITORIAL

The euro-area recovery remains on track although the renewed market turbulence seen over the past two months shows that uncertainty and downside risks remain high. Recoveries following financial crises tend to be more gradual and more moderate than 'conventional' recoveries as they are held back by weak domestic demand and tight credit conditions. The ongoing recovery will be no exception: According to the Commission's spring forecast, near-term growth prospects remain rather subdued, with the recovery gaining traction only towards the end of this year and into next. Overall, the euro-area economy is projected to grow by just below 1% in 2010 and 1½% in 2011. The recovery path is set to be bumpy, however, with an uneven pace of growth across Member States. This reflects differences in the scale of the adjustment challenge across economies and the policies being pursued.

Recent hard and soft indicators are in line with our spring forecast. At 0.2% quarter-on-quarter, GDP growth in the first quarter came in slightly stronger than both our expectations and the outturn at the end of last year (0.1% q-o-q). Driven by a sharp rebound in world trade, industrial production has increased by 5% since the beginning of the year and is now set on a robust growth path. Some sentiment indicators eased in May but the overall level of confidence remains high and consistent with solid growth.

Tensions stemming from developments in sovereign bond markets have spilled over into other parts of the financial markets. Capital markets have suffered heavy losses amid intense volatility over the last couple of weeks. Concerns about the degree of contagion from the Greek fiscal crisis and doubts about the strength of the economic recovery have intensified.

To reassure financial markets and stem financial market risks at large, a comprehensive policy response has been put in place. It caters for immediate financial needs but also sets out an ambitious reform programme to make sure that past policy mistakes are not repeated.

Beginning of May, the Commission, ECB and IMF reached an agreement with the Greek authorities on an economic programme supported by loans amounting to €110 billion. The financial package will include €80 billion in bilateral loans provided by euro-area Member

States together with a €30 billion loan by the IMF under a Stand-By Arrangement. Bilateral loans by euro-area Members will be pooled and coordinated by the Commission.

A few days later, the Council and the Member States agreed on a comprehensive package to provide assistance to any Member State in serious financial distress. The package includes a regulation establishing a European financial stabilisation mechanism with a lending capacity guaranteed by the EU budget of up to €60 billion loans. The governments of the euro-area Member States also agreed to establish a European financial stability facility. If needed they will provide additional assistance for up to €440 billion through a special purpose vehicle – guaranteed by participating Member States – that will expire after 3 years. The activation of these loans will, of course, be subject to strong conditionality.

An effective response to the sovereign crisis should not only rest on financial assistance packages, notwithstanding their importance, but also on a credible consolidation strategy. It is essential to ensure sound fiscal positions of all Member States and return to a path of sustainable growth. Our consolidation strategy must be based on three principles. First, a coordinated but differentiated approach is essential: countries with no fiscal space should accelerate the pace of consolidation already now in 2010 while countries with more fiscal space should confirm their projects and start in 2011. Some Member States (e.g. Spain, Portugal and Greece) have already announced new consolidation measures and more ambitious fiscal targets for 2010-11. Second, consolidation should be growth friendly. Expenditure cuts are normally better for growth than tax rises, albeit some tax rises may not be avoidable. Third, consolidation must be accompanied by significant structural reforms to enhance growth, competitiveness and fiscal sustainability. As in the case of fiscal consolidation, structural reforms should be targeted to removing country specific growth bottlenecks.

Beyond the immediate action to deal with the sovereign crisis, it is time to draw the lessons from the crisis. The crisis has - dramatically exposed the weaknesses of the current institutional set-up of the EU in general and the euro area in particular. We need to step up our

efforts and improve our governance system in order to tackle these weaknesses at their root and avoid similar stresses in the future. Reforms to the system of coordination and surveillance of economic policies are necessary for all EU-27 Member States, but successful governance reforms are of existential importance for the euro area.

To this end, the Commission adopted a Communication on 12 May which lays out a range of proposals to reinforce economic policy coordination in the EU. The proposals are framed around three main building blocks. First, we need to take steps to ensure a more rigorous surveillance of public debt and sustainability, and a deeper ex ante coordination of fiscal policy, so as to ensure that the EU dimension is appropriately reflected when national governments decide on their budgets. Second, our surveillance framework and policy coordination must be broadened beyond fiscal issues to macroeconomic imbalances and competitiveness developments. To achieve stronger policy coordination in the fiscal and structural areas, the Communication proposes to establish a "European Semester" for economic policy coordination, so that Member States would benefit from early coordination at European level as they prepare their national stability and convergence programmes and their national reform programmes. Finally, the financial assistance measures agreed recently must be turned into a permanent and robust crisis resolution mechanism for the euro area. Most of the proposals pertain to the EU as a whole, but a more demanding approach is proposed for the euro area. These Commission proposals were discussed and endorsed to the very large extent by the latest European Council.

Last quarter, we stressed that the crisis had increased awareness of the need for a decisive response to ensure proper functioning of the euro area. It is good to see that we are indeed seizing this opportunity and are moving ahead towards a more effective governance system in the euro area.

Turning to the analytical work presented in this issue of the Quarterly Report on the Euro Area, we focus on the export performance of the euro area. The past two years have highlighted the role of foreign trade as a transmission channel during economic crises and the exposure of the euro area to swings in world trade. Short-term projections also point to persistent weaknesses in

domestic demand in the euro area and to a recovery that is largely driven by exports. Given the central role played by exports in the dynamics of the euro-area economy both in the recent past and the near future, we discuss how the crisis will affect the euro-area's export capacity.

Our assessment is reasonably upbeat. Euro-area exporters have performed relatively well in the years preceding the crisis and did better than generally acknowledged. Despite a substantial appreciation of the euro's exchange rate, losses in market share were more contained than for the US or Japan. This reflects a strong position in some fast-growing markets such as Russia and new EU Member States, although the presence in China still remains somewhat weak. The euro area appears insufficiently specialised in research-intensive and ICT sectors. But euro-area exporters performed well in some key export sectors that acted as powerful export engines. Among those were both fast-growing high-tech sectors such as pharmaceuticals, but also medium-tech and slower-growing ones such as machinery and transport. There is also evidence that exporters have responded to increased price competition by improving product quality. Overall, their competitive position appears relatively strong, which augurs well for their capacity to exploit the opportunities offered by the recovery in world trade. This will, however, require tackling a number of important medium-term challenges, including a shift of the driving force of world trade from advanced to emerging economies in Asia and Latin America and a potentially lasting negative effect of the crisis on demand in some important euro-area trade partners.

MARCO BUTI

DIRECTOR-GENERAL

## Focus

### I. The export performance of the euro area

*Euro-area exporters have performed relatively well during the period spanning the launch of the euro up to the onset of the global economic crisis. Notwithstanding a substantial appreciation of the euro's real effective exchange rate, losses in market share were more contained than for the US or Japan. Euro-area exporters benefited from a strong position in fast-growing destinations such as Russia and new EU Member States, which more than offset a comparatively weaker position on the Chinese market. Judging by traditional indicators of comparative advantage, the sectoral structure of the euro-area exports does not appear particularly strong, with a higher specialisation in labour intensive goods than the US or Japan and a weaker specialisation in research-intensive and ICT sectors. But euro-area exporters performed well in some key export sectors, which worked as export engines. Among those were fast-growing, high-tech sectors such as pharmaceuticals, but also medium-tech, slower-growing ones such as machinery and transport. There is also evidence that exporters have withstood competition by improving product quality. Notwithstanding a relatively good pre-crisis performance, euro-area exporters have been strongly affected by the crisis and face a number of medium-term challenges. These include the shift of the driving force of world trade from advanced to emerging economies and a potentially lasting negative effect of the crisis on demand in some important trade destinations.*

The past two years highlighted the role of foreign trade as a transmission channel during economic crises. The global economic crisis was associated with a sharp slump in world trade which imposed a heavy toll on growth in the euro area. This focus section reviews the export performance of the euro area before and during the crisis with a view to assessing the potential challenges faced by euro-area exporters in a post crisis world. Section I.1 discusses pre-crisis developments in euro-area exports and relates them to developments in various price and non-price competitiveness factors. Section I.2 reviews the behaviour of euro-area exports during the crisis and Section I.3 draws some lessons on the medium-term challenges faced by euro-area exporters. Section I.4 concludes.

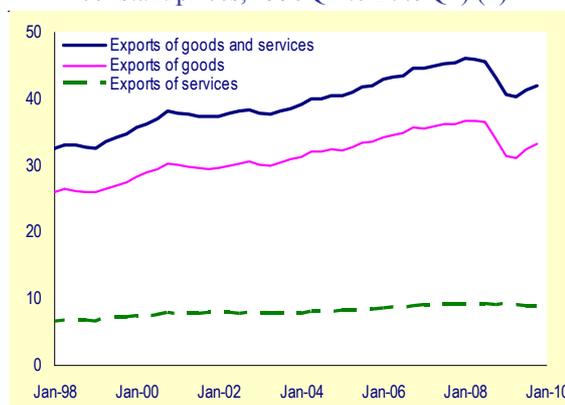
#### ***I.1. Pre-crisis developments in euro-area exports***

##### **A fairly strong pre-crisis performance...**

Total euro-area exports of goods and services (i.e. intra and extra) expanded rapidly during the decade preceding the crisis, growing in real terms at about 5-6% annually. As a result, the share of exports in euro-area GDP gained more than 10 pp between 1998 and 2007 (Graph I.1). Trade has been severely hit by the global economic crisis and the ratio of exports to GDP lost 5 pp in 2008-09. Exports shed more than 17% in volume between their peak in 2008Q1 and their trough in 2009Q2. Signs of recovery have been visible since the second half of 2009 but the level of exports still remains well below its pre-crisis peak.

As shown in Graph I.1, real exports of goods and of services expanded at a broadly comparable pace over the period. Nevertheless, services managed to sustain somewhat faster price growth and the share of services in total nominal exports increased significantly and now exceeds 30%. The impact of the crisis and the ensuing rebound were significantly stronger for goods than for services.

**Graph I.1: Export of goods and services, euro area (intra- and extra-EA, in % of GDP at constant prices, 1995Q1 to 2009Q4) (1)**



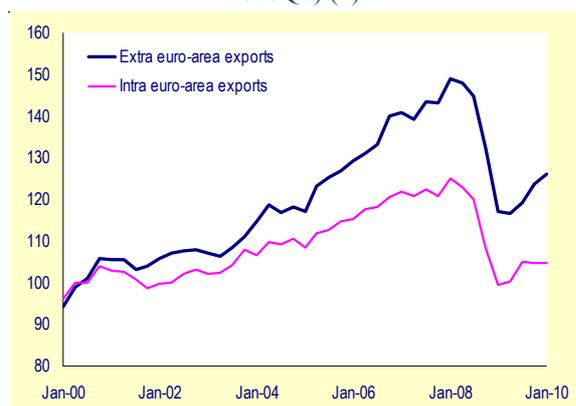
(1) Based on quarterly national account data.

Source: Commission services.

National accounts for the euro area currently still lump together intra and extra-euro-area exports. Only trade data for goods provide a breakdown into intra- and extra euro area destinations. They indicate that extra-euro-area exports grew much faster, in real terms, than intra-euro-area trade during the decade preceding the crisis with a pace of expansion nearly twice as high (Graph I.2). The growth gap is however much lower in nominal terms reflecting much more muted inflation in

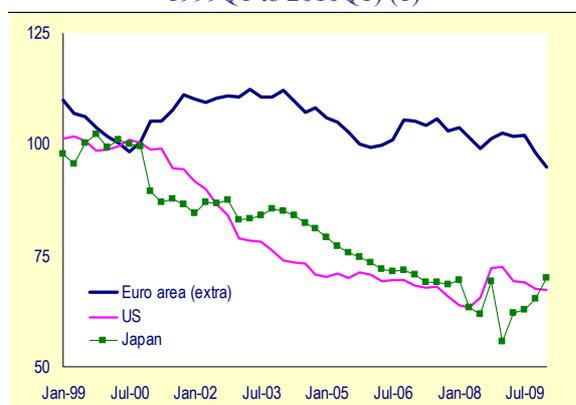
extra euro-area than intra euro-area export prices. In addition to possible exchange rate factors, differences in the various export markets' growth rates and differences in the product composition of the two types of trade, this could also be an indication that exporters wield more pricing power inside than outside the euro area.

**Graph I.2: Extra and intra euro-area exports of goods** (volume index 2000=100, 2000Q1 to 2010Q1) (1)



(1) Based on goods trade statistics.  
**Source:** CPB, Commission services.

**Graph I.3: Export market shares, euro area, US and Japan** (current prices, index 2000=100, 1999Q1 to 2010Q1) (1)



(1) Euro-area exports cover extra euro-area trade only. Based on goods trade statistics.  
**Source:** CPB, Commission services.

The euro area's performance over the decade preceding the crisis compares quite favourably with the US and Japan. In volume terms, extra-euro-area exports grew significantly faster than in the US over that period, although more slowly than in Japan. In nominal terms, however, the performance of the euro area stands out. Since the mid- to late 1990s, most advanced economies have experienced a significant erosion in the share of their exports in total world trade, reflecting the

emergence of new major players, most notably China.

Losses in market shares have however been considerably more contained for the euro area than for the US or Japan (Graph I.3). The comparatively strong position of the euro area on the basis of nominal trade data is suggestive of a product and geographical specialisation that affords higher pricing power.

**... that cannot be explained by exchange rate developments**

Price and cost competitiveness is one of the key determinants of the export performance. New estimations of medium-term exchange rate elasticities presented in Box I.1 suggest that a 10% appreciation of the euro real effective exchange rate (REER) leads to 5-6% drop in extra euro-area exports of goods in the medium term. The 25 to 30% appreciation of the REER (depending on concept used) from its 2000 trough to its pre-crisis peak has probably curbed annual euro-area export growth by more than 1.5 pp.

**Table I.1: Changes in real effective exchange rates and export market shares (1)**

	Euro area	US	Japan
	2002Q1-2008Q2		
Change in REER	24.1	-26.8	-17.0
Change in market share (value)	-9.6	-28.4	-21.0
Change in market share (volume)	-19.3	-3.1	6.4

(1) Changes in REER: in %; changes in market shares in pp. Markets shares are measured by the ratio of goods exports to total world imports.

**Source:** Commission services.

Nevertheless, as shown in Table I.1, differences in export performance between the euro area, the US and Japan in the years preceding the crisis are difficult to explain on the basis of exchange rate developments. For instance, between 2002 and 2008, the euro real effective exchange rate experienced a strong appreciation while, both US and Japan exporters benefited from large gains in price competitiveness. Differences in market share developments over that period are difficult to relate to these swings in exchange rates.

This is just another evidence of the importance on non-price competitiveness factors in advanced economies. Section II.1 in this report provides an econometric analysis of the importance of non-price factors for euro-area exports. The analysis focuses mostly on technological factors and highlights the importance of innovation and product quality. For instance, R&D spending and

*Box 1.1: Euro-area export demand equations*

Standard export demand equations regress real exports on foreign income and relative export prices. Based on this framework estimates of export price and income elasticities for the euro area are presented below, using quarterly data between 1989Q1 and 2009Q3. Exports are defined as extra-euro area exports of final and intermediate goods, deflated by export unit value indices. Foreign income is defined as the weighted average of the real GDP of 25 trading partners (8 before 1995, chain linked), with weights proportional to the inverse distance of the trading partners. This choice of weights avoids the possible endogeneity problem inherent to standard export shares used as weights in the literature. Finally, relative export prices are measured by the real effective exchange rate (REER). A CPI-based REERs is used, computed by DG ECFIN vis-à-vis 25 competitor countries since 1995 (8 before 1995, chain linked). The resulting baseline specification is:

$$\ln x_t = \beta_0 + \beta_1 \ln y_t^* + \beta_2 \ln reer_t + e_t \quad (1)$$

where t indexes time,  $x_t$  denotes real exports,  $y_t^*$  denotes foreign income,  $reer_t$  denotes the real effective exchange rate and  $e_t$  is the disturbance. Given that the series are non-stationary the estimation was carried out in a cointegration framework using a Dynamic Ordinary Least Squares (DOLS) estimator with four leads and lags.

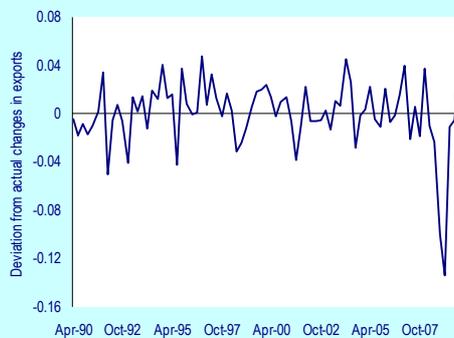
Next to the baseline regressions, specifications with imported intermediate products as an explanatory variable are estimated as well. Arguably, if exported output makes use of imported intermediate products, then the expected sensitivity of exports to exchange rate variations is lower because, in case of appreciations, firms benefit from lower import prices of intermediates. Including the import of intermediate goods as additional explanatory variable in the regression will control for this effect.

Dependent variable	Log of extra-euro-area exports	
	(1)	(2)
Log of foreign income	1.55*** (0.063)	1.27** (0.305)
Log of REER (ECFIN)	-0.52*** (0.102)	-0.59*** (0.129)
Log of intermediate imports		0.15 (0.208)
No. of observations	76	71
R <sup>2</sup>	0.987	0.991

Newey-West standard errors are shown in parentheses.

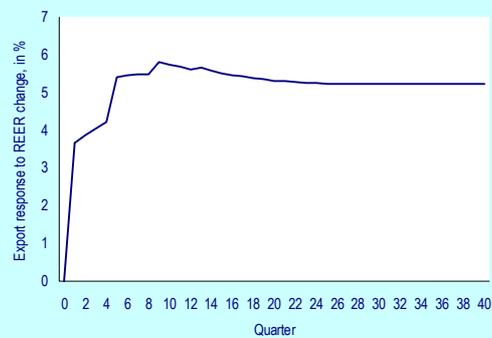
Results show that long-term elasticities to the REER range between 0.4-0.6 in absolute value, while the elasticity of exports to changes in foreign income ranges between 1.2-1.6. The REER elasticities are higher when intermediate imports are controlled for, in line with the argument for including them. However, the direct effect of intermediate imports on exports cannot be estimated precisely as these coefficients are not significant. The corresponding Error Correction Models (ECMs) permit to estimate the speed of adjustment of exports to their long-run equilibria. They indicate that the half life of exports is approximately 4 quarters.

**Residuals from the ECM of regression (1)**



Source: Commission services.

**Export response to 10% REER depreciation**



Source: Commission services.

(Continued on the next page)

*Box (continued)*

The ECM can be used to answer two timely questions as well. The first is whether the drop in export volumes, observed in late 2008 and early 2009, can be treated as a usual response of trade to GDP changes. The left-hand panel of the graph above, which shows the residuals from the ECM of regression (1), suggests otherwise. The recent slump was clearly out of the ordinary, with exports falling much more sharply than what the equation would suggest on the basis of the slump in world GDP. Moreover, the graph also shows that the following rebound is quite strong in historical comparison. This decoupling between exports and GDP is, however, not a purely euro-area phenomenon as indicated by large swings in the ratio of world exports to world GDP over the period. The second question is how the recent devaluation of the euro affects exports. The right-hand panel of the graph presents the export response to a 10% permanent decrease in the REER based on the same ECM. The long term increase in exports is 5.2%, 80% of which is realised in the first year and the remaining part in the second year. The model indicates slight overshooting, which is adjusted slowly and is eliminated by the end of the fifth year.

patents are reported to be positively correlated with exports of goods. The remainder of the present section takes a different (non-econometric) approach and analyses the structural strengths and weaknesses of the euro-area exports in terms of its geographical and product market specialisation.

### A fairly supportive geographical specialisation

The geographical specialisation of euro-area trade reflects to a considerable degree its trading partner's geographical proximity. The euro area trades predominantly with the rest of Europe which absorbs more than 50% of its exports if Russia is included. In contrast, Asia or Latin America are destinations of much lesser importance than for US or Japanese exporters (see Table I.2). The euro area ships a share of its exports to the BRICs (Brazil, Russia, India and China) that is slightly larger than the US's but considerably lower than the Japan's. The biggest part of this is accounted for by Russia with China playing a comparatively more modest role

In pre-crisis years, the euro-area's geographical specialisation proved to be conducive to export growth. For instance, simple calculations show that the geographical structure of euro-area exports was somewhat more supportive than that of the US or Japan from the beginning of the decade to the onset of the crisis.<sup>(1)</sup> Although the euro area is less well positioned than the US or Japan in some critical emerging markets like China, this has tended to be more than offset by a comparatively strong position on fast growing European markets, including new EU Member States, Russia and other emerging European

<sup>(1)</sup> Cross-country comparisons of the effect of the geographical structure can be assessed by calculating what export growth would have been if market shares had remained constant on all geographical destinations.

economies. Obviously, whether a specific geographical specialisation is supportive or not is period-dependent and, as will be discussed in Section I.3, a structure that was supportive in pre-crisis years may turn out to be unfavourable in post-crisis years.

**Table I.2: Geographical breakdown of exports, euro area, US and Japan (in %) (1)**

	Share of total exports in 2007			Import growth
	Euro area	US	Japan	2000-07 (1)
US	13.1	-	20.4	1.1
Brazil	1.2	2.1	0.6	5.5
China	4.1	5.6	15.3	16.2
India	1.5	1.5	0.9	15.7
Russia	4.5	0.6	1.5	21.8
Africa	5.8	2.0	1.6	7.7
DAE (2)	4.5	8.7	21.8	4.3
Euro area	-	15.7	11.1	5.8
EFTA	7.1	1.8	0.6	4.8
UK, DK, SE	21.2	5.0	2.7	3.6
Latin America (excl. BR)	2.9	17.7	3.8	2.8
Other Asia	9.8	13.3	13.9	4.0
Other Europe	5.8	0.8	0.6	12.7
Non-euro NMS	14.1	0.7	1.0	12.8
other	4.3	24.5	4.3	4.8
Total	100	100	100	5.2
of which:				
OPEC	5.6	4.2	4.5	9.4
Total BRICs	11.4	9.9	18.2	14.0

(1) Average annual growth in EUR. (2) Hong-Kong, South Korea, Malaysia, Singapore, Thailand.

*Source:* Commission services.

Looking at how the euro area has responded to the emergence of new trading partners, the picture is somewhat less encouraging. The euro area has, to some extent, adjusted to the changing geographical structure of world import demand by channelling exports to fast growing markets. In particular, the shares of the BRICs and of fast growing European markets in total euro-area exports have increased more or less steadily over the 2000-07 period. Nevertheless, much of this shift reflects the intrinsic dynamics of these new

markets as the euro area has tended to lose market shares vis-à-vis these two broad destinations in recent years. The losses partly reflect the emergence of new global players but, worryingly, they have generally been larger for the euro area than for the US or Japan. This points to some form of erosion in the euro area's relative advantage in terms of geographical specialisation.

**A relatively weak sectoral structure of exports in terms of factor intensity and technology...**

The sectoral composition of exports can be analysed by looking at sectors aggregated according to their factor intensity or technology content. <sup>(2)</sup> This shows that euro-area exports are mainly specialised in capital- and research-intensive goods, especially in those that can be further classified as 'difficult to imitate' (Table I.3). However, in contrast to the US and Japan, the euro area also exhibits a small comparative advantage in labour intensive goods. Furthermore, its specialisation in research-intensive goods that are difficult to imitate is less strong than in the US or Japan.

**Table I.3: Sectoral specialisation of exports (1995-2007) (1)**

	Euro area		USA		Japan	
	Average	Change	Average	Change	Average	Change
Factor intensity						
Research intensive						
- difficult to imitate	1.16	0.07	1.45	0.20	1.58	-0.02
- easy to imitate	1.02	0.14	1.08	-0.07	1.08	-0.27
Capital intensive	1.28	0.07	0.87	-0.01	1.75	0.38
Labour intensive	1.05	-0.01	0.75	0.12	0.40	0.04
Raw materials intensive	0.49	-0.10	0.66	-0.25	0.09	0.05
Technology content						
High tech	0.94	0.13	1.50	0.09	0.84	-0.47
- of which ICT	0.51	-0.01	1.04	-0.40	1.22	-0.82
Medium-high tech	1.18	0.03	1.11	-0.02	1.61	0.08
Medium-low tech	0.90	-0.11	0.75	-0.02	0.91	-0.04
Low tech	0.81	-0.09	0.64	-0.07	0.19	-0.02

(1) Balassa index of revealed comparative advantage

Source: Commission services.

When exports are classified according to their technology content, the US stands out with a strong comparative advantage in high-tech products, whereas the euro area and Japan rather specialise in medium-technology goods. Both the US and Japan have a strong position in ICT sectors, which are a subset of high-technology goods. In contrast, the euro area is particularly disadvantaged in this group of goods.

<sup>(2)</sup> Compare e.g. Baumann, U., F. di Mauro (2007), "Globalisation and euro area trade. Interactions and challenges", ECB Occasional paper series No. 55.

Overall, the static analysis of the indicators of so-called revealed comparative advantage does not point to a strong competitive position of euro-area exports. However, as discussed in the next two paragraphs, the dynamic picture appears somewhat more favourable.

World trade developments in the decade before the crisis were marked by the integration into the world economy of large and dynamic emerging markets, in particular the BRICs. Due to a different level of economic development, their export structure is rather different from that of industrialised economies (see Box I.2). This export structure is changing rapidly over time and is becoming more similar to that of advanced economies. The change has been particularly visible in China, which has been rapidly changing its export structure towards more research intensive goods and ICT products in particular.

In the US and Japan, the counterpart to the changing product structure in emerging markets' exports has been a steady loss (particularly in Japan) in the comparative advantage in ICT industries. In contrast, and rather surprisingly, the euro-area export structure has remained remarkably stable over time. This is true for both labour-intensive exports, where the euro area has kept its slight comparative advantage, and ICT exports, where the comparative disadvantage has persisted, but markets shares remained rather stable. At the same time, comparative advantage in the broad high-technology sectors (which includes ICT) has even increased slightly.

The rapid development of communication technologies and a fall in transport costs have enabled multinational companies to split up production process internationally, offshore some stages of production or even individual tasks. <sup>(3)</sup> These trends are boosting bilateral trade in intermediate goods and components. For this reason, any analysis of export structure needs to be complemented by an analysis of trade balances as an apparently strong competitiveness position on the basis of export data may conceal increasing outsourcing and deteriorating trade balances.

A closer look at trade balances indeed points to a weaker position of the US and Japan in the ICT sector, suggesting that their strong export performance in this sector is built on rising

<sup>(3)</sup> Baldwin, R. (2006), "Globalisation: the great unbundling(s)", Prime Minister's Office, Economic Council of Finland. Grossman, G. E. Rossi-Hansberg (2006), Trading tasks: a simple theory of offshoring", NBER Working Paper 12721.

outsourcing. However, trade balance data do not alter the picture significantly for the euro area, with exception of the sector 'easy to imitate research intensive goods'. In this sector the persistent comparative advantage of the euro area on the basis of export data has come at the expense of a deteriorating trade balance.

### **... has been compensated by a strong position in some key sectors...**

The fact that the euro area lacks clear competitive advantages in terms of factor or technology intensities seems to be at odds with its relatively good performance in terms of market shares. The apparent puzzle is due to the fact that growth in world trade before the crisis is not straightforwardly associated with any specific factor or technology intensity. Although trade in high-tech industries such as ICT or pharmaceuticals indeed grew fast, other, lower-tech sectors such as metals or chemicals also recorded fast rates of growth.

Moreover, euro-area exporters have done well in some sectors that constitute a large part of euro-area exports. These are both high-tech sectors such as pharmaceuticals, which were one of the fastest-growing manufacturing sectors before the crisis, but also medium-tech sectors such as machinery or cars, where growth in world trade was around average for manufacturing goods. The euro area's market shares in these sectors remained more stable or increased faster than in the case of US or Japan. The robust performance, together with large size, made these sectors powerful engines of euro-area exports.

### **... and steady improvements in product quality**

An additional strength of euro-area exports is their positioning in high-quality segments within a given product group. The fact that euro-area exporters increased market shares in some industries, where competition is high both from advanced economies (such as pharmaceuticals or machinery) or from emerging economies (such as metalworking or labour-intensive sectors in general) at a time of an appreciating currency suggest strong gains in non-price competitiveness. Indeed, there is some evidence that euro-area exporters have secured strong positions in high-price segments across various sectors thanks to their capacity to sell high-quality products. To the best of our knowledge no empirical study is available for the euro area as a whole, but data for the EU show that European producers tend to be

positioned more upmarket than their US or Japanese counterparts and that the importance of high quality products in total exports is increasing (see Curran and Zignago (2009) or Baldwin and Ito (2008)).<sup>(4)</sup> This up-market positioning has, at least so far, partly shielded euro-area exports from competition of emerging economies and can, in particular, explain relatively high and stable specialisation in labour-intensive goods.

Overall, the above assessment paints a mixed picture of the euro area's export structure. On the one hand, euro-area exporters managed to perform relatively well in pre-crisis years, compared to other advanced economies. This was due to strong world demand in sectors where the euro area had a strong specialisation but also to further gains in market shares and high product quality. Nevertheless, the relatively low specialisation in high-tech goods and especially in ICT products and higher specialisation in labour-intensive ones is a potential weak spot and could weigh on export performance in the future.

## ***1.2. Trade developments during the crisis***

The financial and economic crisis caused a very sharp fall in world trade.<sup>(5)</sup> According to CPB data, the volume of world goods trade fell peak to-trough by 18 % between 2008Q1 and 2009Q1. Exports of the euro area, which is closely integrated with the world economy, followed a similar path. Eurostat's trade statistics show that extra-euro-area export volumes fell by almost 22% peak to trough (2008Q1-2009Q2). Euro-area's main competitors were also affected, but to a different extent. The peak-to-trough fall in US exports (2008Q3-2009Q2) was similar to the euro area's, while Japan's exports slumped by 40% (2008Q1-2009Q1). Meanwhile, exports of emerging economies were comparatively resilient falling by 15% peak-to-trough (2008Q2-2009Q1).

Euro-area exports to all geographical regions were affected by the crisis, led by some hard-hit European countries and some very open south-east Asian economies. There were pronounced

<sup>(4)</sup> Curran, L. and S. Zignago (2009), 'The evolution of EU and its Member States' competitiveness in international trade', report prepared by CEPPII-CREM ATCLASS consortium, DG Trade, European Commission.

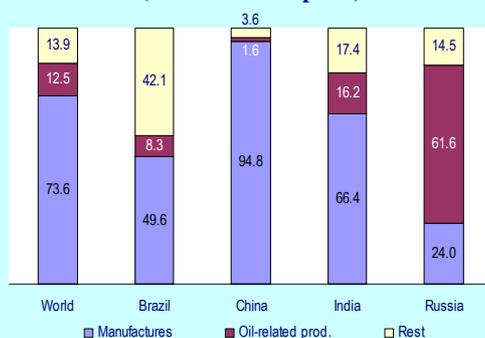
Baldwin, R.E. and T. Ito (2008), 'Quality competition versus price competition goods: An empirical classification', NBER Working Papers 14305.

<sup>(5)</sup> For the analysis of the slump in world trade and its impact on the euro area see Quarterly Report on the Euro Area No 3/2009.

## Box I.2: Export development of the BRICs

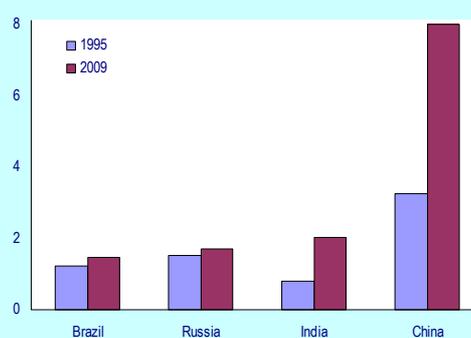
The growing role of emerging market economies, in particular the role of China and India, is one of the most outstanding economic transformations in the past decade. Recently, as the world economies are emerging from the deepest crisis since the Great Depression, this ascent is reflected in the BRICs' <sup>(1)</sup> (Brazil, Russia, India, China) contribution to GDP growth and in encouraging growth prospects in the coming years <sup>(2)</sup>. By 2015, using IMF forecasts, the BRICs are to reach 29% of global GDP (based on PPP), with the EU and the US falling further.

**Export compositions by product groups**  
(in % of total exports)



Source: Commission services.

**Share in world trade (in %)**



Source: Commission services.

Between 1995 and 2009, the share of BRICs in world trade has increased markedly, particularly for China and India, mirroring growth developments in these emerging economies. As a result, China now accounts for 8% of total world trade and India 2% while the respective shares of the other BRICs remain smaller (see right panel of the chart above). A noteworthy feature of BRICs' trade is the rising importance of intra-BRICs trade since 2000. On average, total intra-BRICs trade has doubled since 2000, up from around 6% to around 12% of their total trade <sup>(3)</sup>. Another noteworthy feature is the heterogeneity of the product composition of trade across the four countries. As illustrated in the left panel of the graph above, the share of manufactured goods in total exports of goods is comparable to the world average (about 75%) only in the case of India. In Brazil and Russia, this share is much lower, due to the importance of commodity exports in the goods exported by these countries. China stands out as exporting almost exclusively manufactured goods. The heterogeneity is even larger for intra-BRICs trade: typically, the commodity content of exports from other BRICs to China is much larger than to the rest of the world, except in the case of Russia. One caveat, however, in assessing recent trade developments for BRICs (including intra-regional), is the large commodity content of exports. The recovery in commodity prices since the start of 2009 translates into increasing trade values between BRICs, but this does not necessarily correspond to an increase in real terms.

The changing composition of the exports of the BRICs over time shows evidence that some of these economies have been moving up the value chain.<sup>(4)</sup> The first table hereafter illustrates this move up the value chain in the cases of China and India. In these two countries the share of research intensive goods in total exports has increased substantially since the mid-1990s, particularly for the "easy to imitate" sub-category but also, in the case China, for the "difficult to imitate" one. These gains have been mostly achieved at the expense of the share of labour intensive goods. Similar, although smaller changes are visible in Brazil, while Russia have increased their comparative advantage in primary sectors. The second table hereafter shows a clear move towards higher-tech industries in China, Brazil and to lesser extent India, while Russia remain positioned in the medium-tech industries.

In sum, emerging market economies are a major driving force in the recovery of the world economy, but they constitute a rather heterogeneous aggregate. In future these economies will likely gain more economic weight while the currently advanced countries will see their relative weight further decline in world GDP. Going forward, the

<sup>(1)</sup> Goldman Sachs' 2003 economic paper on "The Building BRICs for the World Economy to come".

<sup>(2)</sup> Commission spring forecasts estimate that the GDP of BRICs grew by 3½% in 2009, while in the countries of the G20 GDP contracted by 2%. In 2010 and 2011, BRIC countries are expected to grow by 7½-8% while G20 countries are seen to achieve 3½% GDP growth in these years.

<sup>(3)</sup> Source: IMF DOTS data.

<sup>(4)</sup> Similar conclusions are found in the literature, see Baumann, R., R. Araujo and J. Ferreira (2010), 'As Relações Comerciais do Brasil com os demais BRICs', ECLAC Working Paper LC/BRS/R.221, CEPAL, Brasília, February.

(Continued on the next page)

Box (continued)

BRICs will certainly remain the focus of analysts, while other dynamic emerging economies may also deserve further attention (e.g. South Africa or Indonesia).

Balassa index of revealed comparative advantage (1995-2007)								
	Brazil		China		India		Russia	
	Average	Change	Average	Change	Average	Change	Average	Change
Factor intensity								
Research intensive								
- difficult to imitate	0.57	0.09	0.65	0.37	0.25	0.22	0.23	-0.12
- easy to imitate	0.40	0.01	1.30	0.92	0.53	0.13	0.19	-0.12
Capital intensive	1.38	-0.27	0.48	0.06	0.65	0.21	1.15	-0.51
Labour intensive	0.73	-0.16	2.23	-0.41	2.61	-0.38	0.26	-0.04
Raw materials intensive	2.09	-0.20	0.46	-0.52	1.17	-0.07	3.36	0.05
Technology content								
High tech	0.40	0.22	0.71	0.77	0.33	0.15	0.35	-0.02
- of which ICT	0.18	0.08	1.01	1.32	0.08	0.03	0.12	0.00
Medium-high tech	0.79	0.11	0.57	0.19	0.45	0.27	0.69	0.02
Medium-low tech	1.21	-0.39	1.04	-0.02	0.86	0.38	3.16	-0.55
Low tech	1.62	0.13	1.84	-0.56	2.41	-0.43	0.58	-0.11

Source: Commission services.

differences in developments in various product groups. On the one hand, non-cyclical sectors, such as food, beverages or pharmaceuticals proved relatively resilient, while trade in raw materials and manufacturing collapsed. Services were overall more resilient than goods, but exports of transport and financial services were also severely affected.

After a broadly flat second quarter of 2009, world trade staged an impressive upturn and by end-2009 was growing by 11% compared with the trough in 2009Q1. High frequency data show that the momentum continued further early 2010.

Euro-area exports have also recovered. The recovery has been concentrated in Asia (particularly China and India), Latin America and Australia. Other markets, including main euro-area trade destinations, such as other EU countries, Russia and the US have lagged behind. For some markets, the seemingly sluggish recovery is a reflection of their relative resilience during the fall in trade at the beginning of 2009. This is the case for Africa and OPEC as well as EFTA, although to a lesser extent. Among EU destinations, the differences in dynamics have been very large: Poland, Romania and Sweden have been recovering vigorously, while the Baltic

countries, after a massive fall in 2009, have remained broadly flat (Table I.4).

Table I.4: Euro-area export growth to various destinations (volumes - % change)

	2008Q1-2009Q1	2009Q1-2009Q4
Intra euro area	-20.4	5.4
Extra-euro area	-21.3	5.5
Non-euro-area EU	-25.3	5.1
Non-euro-area		Recent
Member States (1)	-27.2	6.1
UK	-24.3	4.6
EFTA	-11.2	1.1
CIS	-36.9	1.2
Russia	-37.6	3.1
Africa	1.8	-1.3
US	-23.8	0.5
Latin America	-23.3	14.8
Brazil	-22.0	28.7
ASEAN (2)	-20.1	12.8
China (3)	-13.0	21.8
Japan	-26.6	8.1
India	-24.1	26.8
Near and Middle East (4)	-13.5	-0.7
Australia and Oceania	-20.6	12.9
OPEC	-0.4	-5.7

(1) Poland, the Czech Republic, Hungary, Bulgaria, Romania, Lithuania, Latvia, Estonia; (2) Brunei Darussalam, Indonesia, Cambodia, Laos, Myanmar, Malaysia, Philippines, Singapore, Thailand, Vietnam; (3) Excluding Hong Kong; (4) Israel, United Arab Emirates, Saudi Arabia and Iran.

Source: Commission services.

These differences in the geographical distribution of the pick-up in trade activity have translated into differences in the strengths of the recovery in the euro area and its competitors. While euro-area exports grew by 5.5% between 2009Q1 and 2009Q4, US exports increased by 13% and Japan by 34%. These differences reflect a much bigger exposure of the US and Japan to the dynamic regions of Latin America and Asia.

**Table I.5: Euro-area exports of goods: sectoral breakdown (volumes - % change)**

	2008Q1-2009Q1	2009Q1-2009Q4
Food and beverages	-7.6	3.3
Raw materials	-20.2	21.7
Crude materials, exc fuels	-22.0	24.0
Manufactured goods	-24.4	7.0
Chemicals	-10.2	8.7
Machinery and transport equip.	-29.3	6.8
Other manufactured goods	-24.1	6.1

*Source:* Commission services.

Looking at the various trade sectors, the recovery has so far been more evenly distributed across products than the slump. The only sector that stands out for growing much faster than other product groups is crude materials excluding fuels (SITC 2), which includes such products as rubber and metalliferous ores. Manufactured goods have been recovering faster than food, but the difference has not been as pronounced as during the slump. Also, the differences among various manufacturing sectors have been rather limited. Services, where the impact of the crisis was more muted than for goods, do not yet seem to have registered a recovery.

### ***1.3. Looking ahead: what are the medium term challenges in a post-crisis world?***

The trade recovery is now gathering momentum on the back of strong import demand in emerging markets. Euro-area exports will be further stimulated by the recent depreciation of the euro. Since its peak last October, the euro's real effective exchange rate has lost close to 10%. Based on the estimates provided in Box I.1, the depreciation, if it persists, could boost exports by about 5%, with much of the gains taking place already in 2010. <sup>(6)</sup>

This is probably a conservative estimate based on relatively low estimates of the price elasticity of euro-area exports. As discussed further in Box I.3, recent empirical research has pointed to much larger estimates of trade price elasticities at the sectoral than at the aggregate macroeconomic level. This could indicate the existence of a downward bias in aggregate macroeconomic estimates and suggests that the sensitivity of euro-area exports to exchange rate fluctuations could be higher than the estimates presented in Box I.1.

Recent positive developments in exports and competitiveness should, however, not breed complacency. The crisis is indeed likely to leave a persistent mark on the structure of world trade. The euro area's export performance has proven to be relatively robust in pre-crisis years but euro-area exporters now face at least three important medium-term challenges: the emergence of the BRICs as the main driving force of world trade, an ongoing deleveraging trend in some parts of the world and possible excess supply in key sectors. The euro area's export performance in the medium term will in part depend on how successful euro-area exporters will be in tackling these challenges.

### **The BRICs are likely to turn progressively into the main driving force of world trade**

Emerging markets have played a key role in the recent recovery of world trade and are projected to become its main driving forces. For instance, according to the latest IMF World Economic Outlook, the BRICs are likely to account for 29% of world GDP by 2015 (on a PPP basis), against 24% in 2009. The same four countries are set to deliver more than 40% of world real GDP growth over the period, with all emerging markets combined accounting for close to 70% (Table I.6.)

As discussed in Box I.2, the BRICs form a relatively heterogeneous group. Their export specialisation is still rather different from that of industrialised economies as they show a relative specialisation in labour-intensive, raw materials-intensive as well as medium- and low-technology goods. However, the emergence of the BRICs has several noteworthy implications for euro-area exporters.

<sup>(6)</sup> Although the depreciation is likely to have a positive impact on exports and hence growth in the short term, its longer-term

impact on GDP is less certain, as the depreciation seems to be associated with increased risk premia.

Table I.6: **Projected contribution to world growth, BRICs (in pp – 2009 to 2015) (1)**

Country	Shares in 2009 world GDP		Growth	Contribution to 2010-15 growth	
	Based on US\$	Based on PPP	2010-15	Based on US\$	Based on PPP
Brazil	2.7	2.9	4.3	0.1	0.1
China	8.5	12.5	9.8	0.8	1.2
India	2.1	5.1	8.2	0.2	0.4
Russia	2.1	3.0	4.1	0.1	0.1
BRICs	15.4	23.5		1.2	1.9
Emerging and developing economies		46.1	6.6		3.0
World	3.5	4.5		3.5	4.5

*Source:* IMF.

First, despite very high investment rates (at least in China and India), emerging economies have comparatively low capital stocks.<sup>(7)</sup> Convergence processes will require sustained high levels of investment. Monthly export data do not yet point to significant product differences in the strength of the recovery but surveys clearly show a stronger improvement of manufacturers' export expectations for investment goods than for other goods. A rebalancing of world growth towards "capital hungry" emerging markets constitutes an opportunity for euro-area exporters of machinery and equipment who have shown a persistently strong competitive position in recent years.

Second, rapid growth in emerging economies and notably in the BRICs will fuel private consumption in these regions. This will in turn affect the composition of world trade in consumption goods. Whereas rapid growth will generate new demand for luxury goods in emerging markets, a traditional stronghold of euro-area manufacturers, its most important implication will probably be the rapid emergence of a middle class with rising but still relatively moderate purchasing power. Meeting such demand will also require manufacturing low-cost consumption goods, a segment on which euro-area exporters – with a strength in high-quality high-price goods – may not be very well positioned.

Finally, the emergence of the BRICs will also have implications on the supply side. As highlighted in Section I.1 and in Box I.2, there is already evidence that China and India have been changing their export structure since the mid-1990s, with a significant increase in the share of

research intensive goods and ICT in total exports, as well as a decreasing share of labour intensive goods. There is also ample anecdotal evidence that emerging economies are boosting their business innovation capacity with a view to producing goods of medium to high quality at low prices.<sup>(8)</sup> Although euro-area exporters have so far coped relatively well with the moving upmarket of some emerging countries, competitive pressures may well rise substantially further in some market segments where the euro area has traditionally shown a competitive advantage.

#### **The ongoing deleveraging trend in some parts of the world will weigh on demand**

The global financial crisis has entailed a partial unwinding of global imbalances. In particular, rising risk premia and changing attitudes towards risks have triggered a deleveraging process in some advanced and emerging economies (mostly European) which had accumulated high levels of private or public sector debt and significant current account deficits. In these countries, protracted deleveraging processes in the private sector or fiscal consolidation are likely to weigh on domestic demand in the years to come.

A persistent deleveraging trend could be a handicap for euro-area exporters which have traditionally been strong suppliers to a range of countries which entered the crisis with sizeable deleveraging needs and/or current account deficits.

<sup>(7)</sup> Although pockets of over-investment cannot be excluded in countries such as China due to heavy investment subsidies in some privileged sectors (notably export sectors).

<sup>(8)</sup> There is in particular evidence of competition from cheap products in sectors such as cars, computers and mobile phone. See The Economist, 'The World turned upside down', A special report on innovation in emerging markets, April 17<sup>th</sup> 2010.

*Box I.3: Aggregate versus disaggregated estimation of trade elasticities*

Trade elasticities are key parameters in evaluating the trade balance effect of exchange rate movements. The Marshall-Lerner conditions state that starting from a balanced external position and under the assumption of full pass-through, depreciating exchange rates improve the trade balance only if the sum of the absolute value of export and import elasticities is above unity. However, trade elasticity estimates are far from robust and there is an important difference in magnitude between estimates based on aggregate and disaggregated data.

Most empirical analyses using aggregate trade data obtain trade elasticities around unity, but in some cases values well below one can be found as well. Estimated elasticities vary quite widely depending on sample and methodology, as the extensive review of Goldstein and Kahn (1985) demonstrates. Box I.1 in this section presents estimates of a long-run export price elasticity of 0.5 for the euro area, while the ECB Area Wide Model uses an elasticity derived from an estimated export equation of about 0.6. Di Mauro et al. (2008) report a price elasticity of 0.6 for the period 2000 to 2007, down from an estimated 1.05 prior to 2000. Similarly, low values between 0.5 and 0.6 are found in recent IMF estimates of the export elasticity for the United States.

In contrast, studies using disaggregated data at industry level find considerably higher response of trade volumes to relative price changes. To the best of our knowledge, these disaggregated studies have so far focused mostly on import elasticities but their general conclusions appear to hold for export elasticities as well. Kee, Nicita and Olarreaga (2008) estimate import price elasticities for more than 100 countries at the HS6 product category disaggregation and obtain an average estimated import elasticity of 3.12, with standard deviation of 8. Broda, Limao and Weinstein (2008) estimate import demand and export supply elasticities at highly disaggregated level based on the methodology of Feenstra (1994). These results also confirm the high average elasticities at disaggregated level and the large dispersion of these elasticities across products. Using the same methodology, Imbs and Mejean (2009) estimate industry-level import elasticities for the US. One added value of this analysis is that it aggregates the industry specific elasticities into a theoretically-founded, macro import elasticity, which is estimated to equal 4.5. Imbs and Mejean (2009) also show that not allowing for industry-level elasticities, but rather assuming a common elasticity similarly to aggregate studies results in a macro elasticity of 2. This indicates that aggregation bias can play an important role, just as suggested by Orcutt (1950): "Goods with relatively low price elasticities can display the largest variation in prices and therefore exert a dominant effect on the estimated aggregate price elasticity, thereby biasing the estimate downwards".

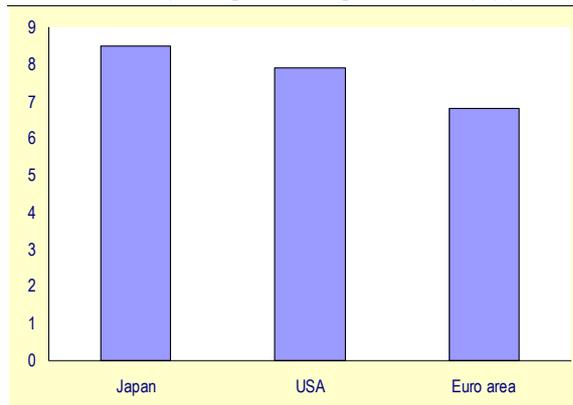
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On average, euro-area export destinations are running current account deficits, notably in large trading partners such as the US and the UK but also in a large part of the new EU Member States.

The impact of the deleveraging will weigh on import dynamics of euro-area trading partners. Graph I.4 shows that external demand is projected to grow less rapidly for the euro-area than for the US and Japan in 2010-11.

Graph I.4: **Forecast foreign demand growth 2010-11** (average annual growth in %) (1)

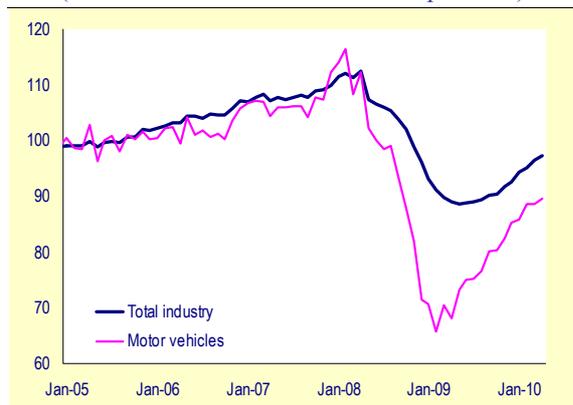


(1) Export-weighted foreign real imports of goods and services in major trading partners. Commission Spring 2010 Forecast.  
**Source:** Commission services.

**Signs on excess supply in some key sectors**

The global financial crisis has left deep scars in some industrial sectors, exacerbating structural weaknesses and forcing a – partly necessary – restructuring. This is obviously true for the housing and financial sectors but also, and more problematically so (for euro-area exports), in the automotive industry. This latter sector has been an important driver of euro-area export growth in the years preceding the crisis, accounting for more than 10% of overall growth in exports of goods. The automotive industry is however facing structural overcapacity problems in Europe as well as in the US and Japan and these problems have been magnified by the crisis.<sup>(9)</sup>

Graph I.5: **Automotive production, euro area** (index 2005=100 – Jan. 2005 to Apr. 2010)



**Source:** Commission services.

Despite a rebound since the middle of 2009, output in the automotive sector in March this year was still 24% lower than at its pre-crisis peak (16% in the case of manufacturing as a whole) (Graph I.5). Competitive pressures in the sector are likely to intensify in the years to come, in particular with the emergence of low-cost producers in some emerging countries.

**I.4. Conclusion**

Euro-area exporters have performed relatively well during the period spanning the launch of the euro up to onset of the global economic crisis. Notwithstanding a substantial appreciation of the euro's real effective exchange rate, losses in market share were more contained than for other major advanced economies such as the US or Japan. Euro-area exporters benefited from a strong position in fast-growing destinations such as Russia and new EU Member States, which more than offset a comparatively weaker position in other emerging markets and in the Chinese market in particular. Overall, the euro area benefited from a slightly more supportive geographical specialisation than the US or Japan.

Judging by traditional indicators of revealed comparative advantage, the sectoral structure of euro-area exports does not appear very conducive to growth. The region shows a stronger specialisation in labour-intensive goods than the US or Japan and a weaker specialisation in research-intensive and ICT sectors. Nevertheless, euro-area exporters performed well in some key export sectors, most notably pharmaceuticals, machinery and transport, which acted as powerful export drivers. There is also evidence that exporters have weathered the competition by raising product quality.

Notwithstanding a relatively good pre-crisis performance, euro-area exporters have been strongly affected by the crisis. Although world trade is now recovering on the back of fast growth in emerging economies, the euro area faces a number of medium-term challenges. These include the shift of the driving force of world trade from advanced to emerging economies with potential strong implications both on the supply and the demand side. The crisis has also triggered a deleveraging process that will have a lasting negative impact on domestic demand in some important trade destinations. Finally, the crisis has also highlighted the existence of structural imbalances in some key export sectors such as the transport sector.

<sup>(9)</sup> See for instance European Commission (2009), 'Responding to the crisis in the European automotive industry', Communication from the Commission COM(2009) 104 final.

## II. Special topics on the euro-area economy

*Macro models can be used to quantify the relative importance of various factors in explaining the recent recession in the euro area. An analysis based on the latest version of the Commission's QUEST III model shows that the drop in euro-area GDP after the middle of 2008 can be explained by a number of factors, in particular a strong fall in productivity and a decline of investment. While the decline of investment was common to both the euro area and the US and linked to deteriorating financial conditions, the cyclical behaviour of productivity contrasted strongly between the euro area and the US, signalling a very different response of the labour market to the crisis. The slump in world trade played an important role in deepening the recession. In contrast, the bursting of the housing bubble and the tightening of credit conditions for households had only a relatively moderate impact on the euro-area economic performance. The modelling exercise also shows the stabilising role of fiscal stimulus packages in the euro area.*

*Business cycle convergence is an important ingredient to a smooth functioning of the euro area. While cyclical synchronisation has remained high in the euro area since its inception - i.e. Member States' cyclical peaks and troughs have remained closely aligned – a period of cyclical dispersion took place during 2006-2008. It marks an accentuation of differences in business cycle amplitudes with historically high positive output gaps in Ireland, Greece, Spain and Finland. Elevated private demand supported by excessive credit growth was the main driver of the increase in output gaps in the first three of these countries, whereas strong exports fostered by booming world trade played a central role in Finland. Business cycle convergence increased again during the financial crisis as deleveraging triggered a sharper drop in demand and in activity in IE, EL and ES than in the rest of the euro area and as the slump in world trade took a heavy toll on Finland. The convergence may, however, be only temporary and diverging forces could resurface in the medium-term. In IE, EL and ES, both supply and demand are likely to be durably affected by the ongoing deleveraging process and these Member States could face a protracted period of sluggish growth relative to the rest of the euro area, leading again to a period of higher output gap differences within the euro area.*

*Economic theory suggests that price competitiveness is only one of the factors affecting export performance but relatively few empirical analyses include non-price competitiveness factors among its determinants. The objective of this section is to illustrate the role that some non-price competitiveness factors can have in explaining export performance. The focus is on competitiveness drivers related to innovation and the business environment, the former captured as R&D intensity and the latter as enforcement contracts conditions. The results show that innovative economies with favourable conditions for doing business export more, confirming that understanding better export performance requires going beyond traditional determinants such as external demand and price competitiveness.*

### II.1. Quantifying the causes of the crisis in the euro area

The financial crisis that started in 2007 was of an unprecedented scale in post-war economic history. It was marked by the biggest drop of GDP since the Great Depression and affected virtually all sectors. It also triggered a strong policy response from governments, which helped in saving economies from a complete collapse.

A number of factors contributed to the crisis. There is wide agreement that buoyant credit growth, excessive leverage and historically low levels of risk premia in the US but also in various European countries drove the boom and contributed to a property bubble, which eventually burst and revealed severe problems in an over-

leveraged banking sector.<sup>(10)</sup> There is also little doubt that the globalized financial sector was one of the main channels through which the crisis was transmitted outside the United States.<sup>(11)</sup> Other plausible factors include the bursting of the stock market bubble, global imbalances and possibly a sudden revision of productivity growth expectations in the US (see Kahn and Rich 2007 and Kahn 2009).<sup>(12)</sup>

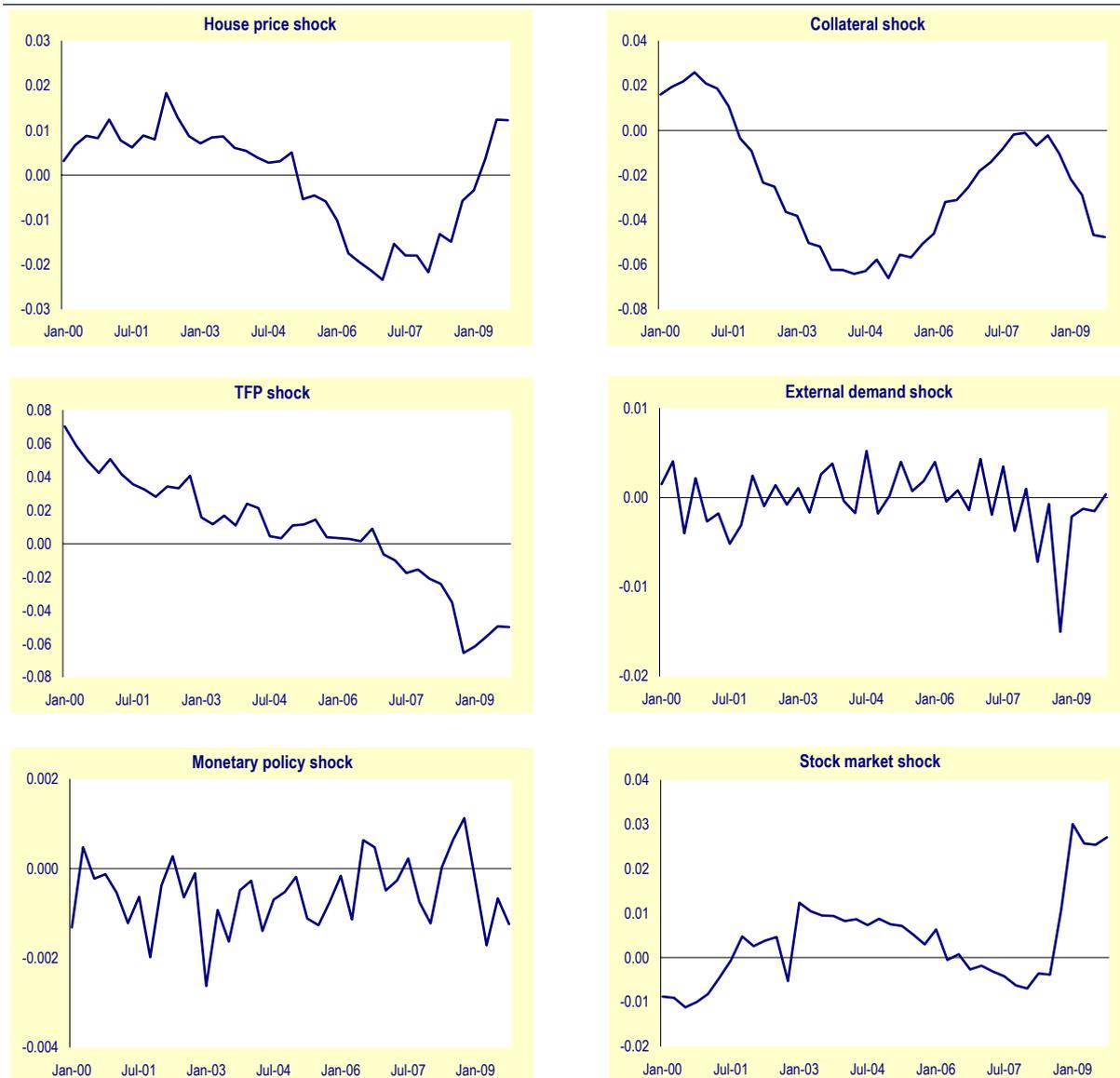
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<sup>(10)</sup> European Commission (2009), 'Economic crisis in Europe: Causes, consequences and responses', *European Economy*, July. European Commission (2009) 'Annual Report on the Euro Area 2009'

<sup>(11)</sup> European Commission (2009) *ibid.*

<sup>(12)</sup> Kahn, J. A. (2009). 'Productivity swings and housing prices', *Current Issues in Economics and Finance*, Vol. 15(3), Federal Reserve Bank of New York. Kahn, J. A. and R. W. Rich (2007), 'Tracking the new economy: using growth theory to detect changes in trend productivity', *Journal of Monetary Economics*, Vol. 54, pp. 1670-1701.

Graph II.1.1: Developments in underlying shocks to key model variables (2000-2010)



Source: Commission services.

While it is likely that all these factors contributed to the slump, their relative importance is much less obvious. This comment applies both to the crisis in the US and, perhaps even more significantly to the euro area, where idiosyncratic factors might have played an important role. These include, for example, domestic property and stock market bubbles but also external conditions, like the slump in foreign demand. This section describes the results of an attempt to quantify the relative importance of these factors for both the boom and the bust in the Euro area.

**Looking more closely at a range of possible supply and demand factors**

For this analysis we use the latest estimation of the QUEST III model for the euro area that includes data up to the last quarter of 2009. The structure of the QUEST III variant used for the estimation allows to account for the standard supply and demand factors that affect the economic cycle, like TFP growth, monetary policy or fiscal policy, as well as factors whose prominence has been fully recognized only in the current financial crisis, namely stock market and housing bubbles as well as changing credit market

conditions.<sup>(13)</sup> The evolution of some of these variables, as identified by the model, is depicted in Graph II.1.1.

The model generates a path for households' access to mortgage credit, which shows a strongly cyclical pattern in *lending conditions*. After the dot-com bubble burst in 2001 there was a very rapid deterioration of households' access to credit in the euro area. It reached a trough in 2004 and then was followed by a gradual improvement of access conditions with a peak in the 2<sup>nd</sup> half of 2007. It is worth noting that the 2007 peak was visibly below the peak observed during the dot-com bubble in 2000-2001. This suggests that lax credit policy by banks in the euro area was not a major factor for the boom preceding the crisis. Households' access to credit has tightened again since the 2<sup>nd</sup> half of 2007 in the euro area, however, the pace of the tightening appears to be slowing down.

The *monetary policy* in the model is driven by a standard Taylor rule. Taylor rule assumes that the interest rate systematically adjusts to changes in inflation and output. The shock to monetary policy is then identified in the model by deviations of the actual policy rate from the interest rate implied by the Taylor rule. Positive deviations are interpreted as restrictive policy stance, while negative deviations suggest expansionary stance.<sup>(14)</sup> As can be seen in Graph II.1.1., the magnitude of the shocks during the recession remained subdued. This suggests that policy interest rate in the euro area did not deviate much from the one implied by the developments in output and inflation.

*Asset price* bubbles have been blamed for having played an important role in the recent boom-bust cycle. Two distinct estimates of possible bubbles related to corporate and housing investment are given in Graph II.1.1. Bubbles are identified as declining risk premia for corporate and housing investment respectively. A continuous fall of risk premia is an indication of the build up of a bubble,

while a rapid increase points to a bursting of a bubble.<sup>(15)</sup>

As can be seen from Graph II.1.1 there was no strong indication of a bubble on the euro area stock markets in the period directly preceding the outbreak of the financial crisis. On the other hand, the pronounced increase in the risk premium observed during the crisis reflects a sudden pessimism of investors and a flight to safety which is not entirely explained by economic fundamentals.

By contrast, there is some evidence of a house price bubble, with house market premia slowly starting to decrease already in 2003 and dropping sharply between the 2<sup>nd</sup> half of 2004 and the beginning of 2007. Since 2007 (and preceding the onset of the global economic crisis), house price risk premia have been rising sharply, which is consistent with the view that the house price bubble started to deflate in 2007. It should be noted though that the estimated magnitude of the fluctuations in risk premia for *the euro area* is considerably smaller than what was estimated on US data.<sup>(16)</sup> This is suggestive of a much sharper boom-bust cycle in housing markets in the US.

According to the results of our estimation, the growth rate of the euro area *Total Factor Productivity* (TFP) in the period between 2000 and the last quarter of 2009 has been significantly below its pre-2000 level.<sup>(17)</sup> The decline in TFP further accelerated towards the end of 2008 with the start of the recession. This deterioration in productivity is likely to have a cyclical character

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<sup>(13)</sup> For the detailed description of the structure of a similar model estimated for the US as well as the empirical strategy followed to identify bubbles and financial constraints see Ratto M, W. Roeger and J. in 't Veld (2010), 'Using a DSGE model to look at the recent boom-bust cycle in the US', *European Economy Economic Paper*, no. 397.

<sup>(14)</sup> Note that according to this definition near-zero policy rate does not necessarily imply expansionary policy; such a rate can also be consistent with deflation or strongly negative output growth.

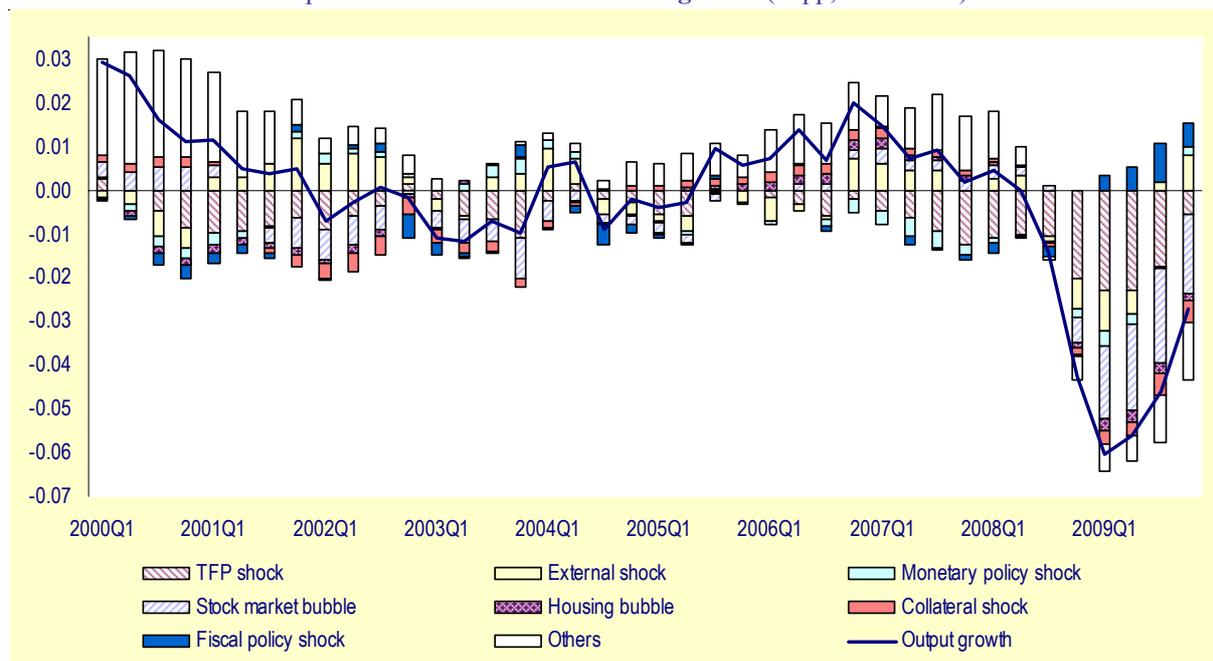
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<sup>(15)</sup> More technically, shares and housing investment in QUEST III are priced according to standard arbitrage conditions that require the current price of an asset to be linked to the present discounted value of the income stream from owning this asset in the future. However, unlike more traditional models, QUEST III does not impose that the current price is exactly equal to the present discounted value of investment. A non-zero difference between the two can be interpreted as an additional risk premium. To the extent that this risk premium does not reflect economic fundamentals, it can be associated with the emergence of a bubble.

<sup>(16)</sup> See Ratto M, W. Roeger and J. in 't Veld (2010), *ibid.* Euro area averages, however, potentially hide more pronounced house price volatility in a limited number of individual Member States.

<sup>(17)</sup> The TFP shock shown in the graph is defined as the logarithm of TFP de-trended using the average TFP growth rate calculated over the whole period of estimation (1990-2009). The visible downward trend that resulted from this transformation suggests that the current TFP growth rates are considerably lower than those that prevailed prior to 2000. This is consistent with trend estimates using the Commissions production function methodology which suggests that labour-augmenting TFP growth has fallen by roughly 1% since the end of the 1990s.

Graph II.1.2: Contributions to GDP growth (in pp, 2000-2010)



Source: Commission services.

and be linked to at least two crisis-specific phenomena: the composition effect and labour hoarding. Concerning the first, it is likely that the decline in world trade hit especially severely the comparatively more productive euro-area manufacturing sector, while in the other economies (for example the US) the effects of the crisis spread across a larger range of sectors or may have even hit low productivity sectors more severely (e.g. construction). As to the second phenomenon, the European labour market is characterized by significant labour adjustment costs, which prevent European employers from easily shedding workers in order to preserve competitiveness. This effect was strengthened by efforts of European firms to retain qualified personnel and policy measures targeted at cushioning the impact of the recession on the labour market<sup>(18)</sup>. To the extent that these factors are mainly cyclical, one could expect that a reversal of the TFP decline should accompany the end of the recession<sup>(19)</sup>.

Apart from a small dip immediately after the burst of the dot-com bubble, growth in *external demand* during the years 2004-2007 remained relatively

stable and contributed positively to growth in 2006-07. However, since the beginning of the financial crisis in the 2<sup>nd</sup> half of 2007, the euro area has experienced a series of strong negative shocks, with the most unfavourable external conditions observed in the last quarter of 2008. In the second half of 2009, external demand visibly improved, a likely effect of the return to strong growth in many emerging economies.

### A model-based GDP growth decomposition exercise

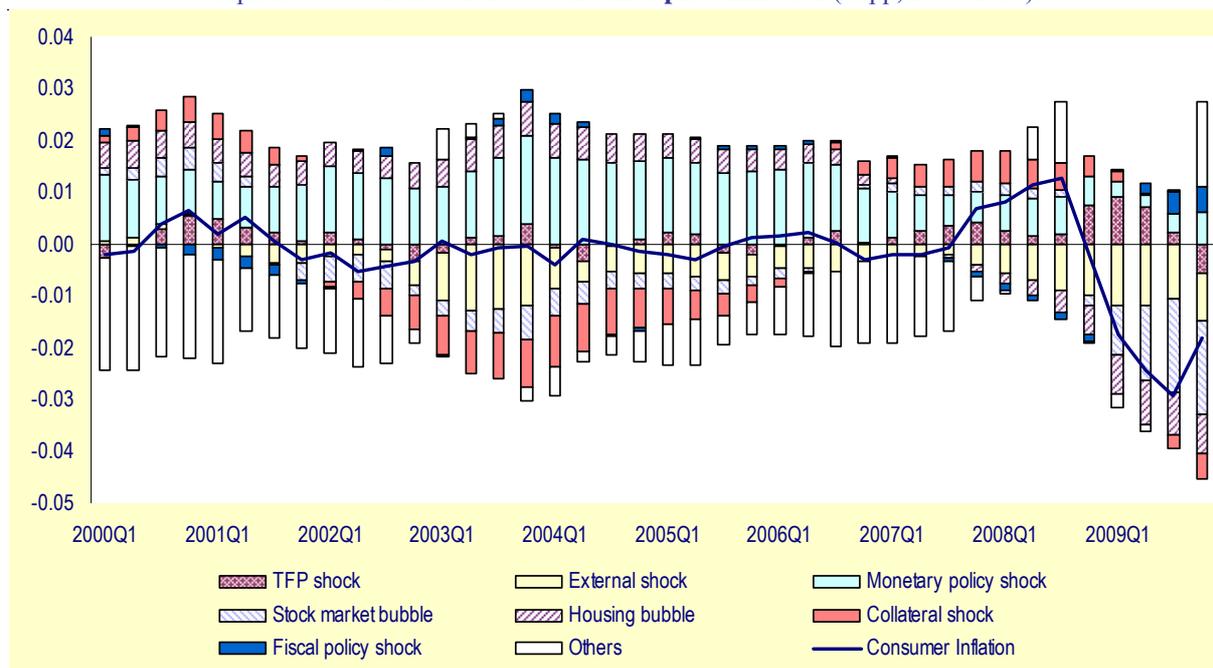
How have the factors identified above contributed to GDP growth and inflation over the last 10 years? The discussion concentrates on the period after 2004 which captures both the boom and the bust. The decomposition of GDP into its most important driving forces can be found in Graph II.2.3.

The results of the estimation reveal that changes in households' *access to credit* as well as *housing and stock market bubbles* only mildly contributed to the mini boom of 2004-2007. In 2006 and the beginning of 2007, favourable *external conditions* had an additional strongly positive impact on euro

<sup>(18)</sup> A.Arpaia, N. Curci (2010), EU labour market behaviour during the Great Recession, European Economy. Economic Papers. 405.

<sup>(19)</sup> The model controls for capacity utilisation, but this variable alone is unable to pick up all the cyclical factors in the economy.

Graph II.1.3: Contributions to consumer price inflation (in pp, 2000-2010)



Source: Commission services.

area GDP. It is notable that *monetary policy* appears relatively restrictive during the boom <sup>(20)</sup>.

Also declining *TFP* growth rates contributed negatively to GDP growth over that period. Finally, other factors, which have not been explicitly accounted for in the decomposition, also contributed to GDP growth during this period <sup>(21)</sup>. Turning to the recession, the factors emphasised at the beginning of this section explain almost completely the growth of euro area GDP since 2007. Two factors, the slump in total factor productivity and the increase in the stock market risk premium, are found to have played a major role in the 2007-2009 crisis. The former effect appears especially strong as it combines, as earlier explained, two independent developments: a permanent structural fall in TFP trend growth rates in euro area in the 2000s and a cyclical slump of TFP due to unfavourable composition effects and labour hoarding <sup>(22)</sup>.

The effect of the increase in stock market premium is consistent with the previously formulated hypothesis that the euro area experienced a negative investment shock over that

period.<sup>(23)</sup> Unfavourable external conditions, presumably having to do with the collapse in world trade from the last quarter of 2008 until mid 2009, appear to have had some negative effect on euro-area GDP growth during the crisis. This is consistent with the view that factors that originated outside the euro area played an important role in deepening the recession. By contrast, the bursting of the housing bubble and the tightening of credit conditions for households had a relatively moderate impact on the euro area's economic performance. Finally, government fiscal packages are found to have had a strong positive effect on GDP growth in every quarter of 2009, confirming the significance of the coordinated European effort for pulling the euro area out of the crisis. Fiscal measures began to show a detectable impact in the first quarter of 2009, which suggests a relatively short implementation lag.

The contribution of different shocks to consumer price inflation during the decade is shown on Graph II.1.3. The graph suggests that in the

<sup>(20)</sup> See footnote 14.

<sup>(21)</sup> An important factor is improved labour supply conditions.

<sup>(22)</sup> The cyclical effect may still be overestimated due to the problems in properly disentangling temporary and lasting shocks to TFP.

<sup>(23)</sup> In the model as it is specified now, the fall in investment is attributed to a rise in the stock market risk premium, but unlike in the case of housing investment a further decomposition into tightening of lending conditions and a negative equity bubble shock is not yet possible. In other words, the identified investment shock might reflect restricted access to credit as much as the collapse in equity markets.

middle of the decade, the ECB compensated negative shocks to inflation arising from the external side, subdued investment and credit constraints with a slightly expansionary monetary stance in order to stabilise inflation around its target rate.<sup>(24)</sup>

In the period directly preceding the most recent crisis, a relaxation of credit conditions led to a temporary spike in consumer inflation.<sup>(25)</sup> During the crisis, falling imports prices passed through into domestic inflation. The collapse in the stock market and the bursting of the housing bubble also exerted downward pressure on prices.

### Conclusion

This section has tried to quantify the importance of various factors which are regarded as relevant for explaining the recent recession in the euro area by using a macro model as an accounting device. The analysis shows that financial factors contributed positively to growth in the euro area prior to the onset of the crisis, but to a smaller extent than for private demand in the US. Easier

access to credit by households allowed for higher growth between 2005 and 2007 in the order of magnitude between 0.2 and 0.6% p.a. But especially in 2006 and early 2007 external conditions were equally important, while low productivity growth exerted a permanent drag on growth in the euro area. The analysis also shows that over this period, both fiscal and monetary policy were mildly countercyclical. The drop in euro area GDP since the middle of 2008 is made up of a number of factors, in particular a strong fall in productivity and a decline in investment. While the latter is common to both the euro area and the US and linked to stock market developments and a tightening of access to credit, the cyclical behaviour of productivity contrasts strongly between the euro area and the US, reflecting a very different response of the labour market. External demand had a strong negative effect on GDP from the last quarter of 2008 until mid 2009, while it contributed positively to growth in the last quarter of 2009. The empirical results confirm the positive role of fiscal stimulus packages for stabilising GDP growth.

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<sup>(24)</sup> Other important shocks for this period, not shown, include the mark-up shocks to prices and wages.

<sup>(25)</sup> Another important factor might have been the rapid surge in oil and commodity prices in 2007-2008. The current version of the estimated Euro Area QUEST III model does, however, not incorporate this sector of the economy. The spike in oil prices probably explains the positive contribution of the "other" factor in Graph II.1.3.

**II.2. How has the financial crisis affected cyclical differences within the euro area?**

Business cycle convergence between Member States is critical for a smooth functioning of EMU. It facilitates the coordination of economic policies and, in particular, the conduct of a single monetary policy. The divergence of business cycles makes policy coordination more challenging but also more important, and renders necessary a more differentiated policy approach in policies other than the monetary policy.

Earlier studies, based on data until 2005, concluded that Member States' business cycles were relatively closely synchronised and that the dispersion in output gaps within the euro area had narrowed since the mid-1990s.<sup>(26)</sup> This section provides an up-to-date analysis and discusses how cyclical differences have been affected by the crisis. It then looks ahead at the prospects of business cycle developments in the medium-term. The analysis focuses on Ireland, Greece, Spain and Finland, as these countries account for much of the recent changes in cyclical differences within the euro area.

The empirical literature proposes a wide range of statistical instruments to measure differences in business cycles. Much of the analysis presented in this section relies on one of the most straightforward tools to measure cyclical differences: the dispersion of output gaps.

An increase in this measure can, however, reflect two broad types of business cycle misalignments: a de-synchronisation (countries' cycles move less in tandem and differences in the timing of their cyclical peaks and troughs increase) or rising differences in cyclical amplitudes (cyclical peaks and troughs become more pronounced in some countries than in others). To better understand the underlying sources of (mis-)alignment, additional indicators which mostly capture (de)-synchronisation are also used here. These include the correlation of output gaps and comparisons of the timing of cyclical peaks and troughs.

<sup>(26)</sup> The issue has been analysed on three occasions in the Quarterly Report on the Euro Area: - Focus on 'Cyclical synchronisation within the euro area: what do recent data tell us?', Vol. 5, No. 2 (2006), - Focus on 'Growth differences in the euro area', Quarterly Report on the Euro Area, Vol. 4, No. 2 (2005), - Focus on 'Cyclical convergence in the euro area', Vol. 3, No. 2 (2004).

**Cyclical synchronisation has remained high within the euro area ...**

Updated indicators of cyclical correlation point to continuously high or increasing business cycle synchronisation within the euro area also after 2005.<sup>(27)</sup> Graphs II.2.1 and II.2.2 display the mean of the correlations of euro-area Member States' business cycles with the overall euro-area business cycle. The correlations are calculated for 4- and 8-year rolling windows, respectively –i.e. the number at a given point in time is the correlation for the 4 or 8 years to that point.

**Graph II.2.1: Mean output gap correlation, euro-area countries (8-year rolling window – in % -1983Q1-2009Q4) (1)**



(1) BE, DE, ES, FR, IT, NL and FI. The mean correlation is calculated as the non-weighted average of the correlations between the national and the euro-area output gaps.

Source: Commission services.

Based on the 8-year window, the correlation of business cycles across Member States indicates a clear upward trend in the last few years. The correlation based on the 4-year rolling window shows, however, a less clear picture, with a moderate decrease in cyclical synchronisation around the years 2005-2006, followed by renewed convergence. This shorter window should, however, be considered with caution as it tends to be sensitive to small deviations in Member States' business cycles. In any event, both windows point to a very high degree of cyclical synchronisation in the euro area.<sup>(28)</sup>

<sup>(27)</sup> Throughout this section, the business cycle is measured by the output gap, i.e. the deviation from trend GDP in %. The trend is extracted using an HP filter. Due to data availability issues, the sample is restricted to seven euro-area Member States when using quarterly data: Belgium, Germany, Spain, Finland, France, Italy and the Netherlands.

<sup>(28)</sup> Some caution is however needed as some Member States with notably different business cycles could not be included in the calculations (e.g. EL and PT) due to lack of data.

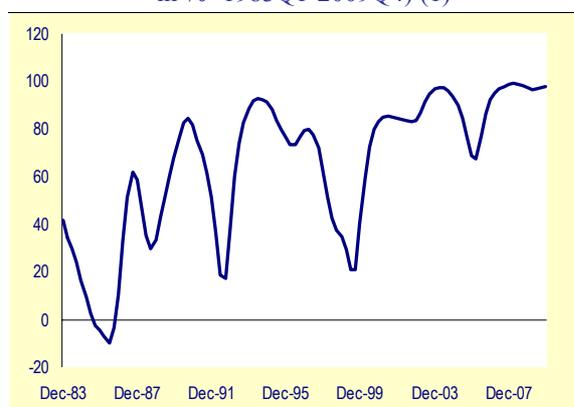
Table II.2.1: Member State differences in the timing of cyclical peaks and troughs during past recessions, euro area (based on the Economic sentiment indicator (ESI)) (1)

Recession 1989-1993		Recession 2000-2001			Recession 2007-2009		
Peak	Trough	Peak	Trough		Peak	Trough	
DE(-4)	IE(-2)	AT(-2)	DE(-5)	EL(-6) PT(-6)	MT(-3)	CY(-3)	
FR(+2) FI(+3) IT(+3) PT(+9)	LU(+4) EL(+7) FI(+7)	IE(+2) LU(+10) NL(+10) PT(+10) FI(+10)				IE(+3) IT(+3)	

(1) Numbers in brackets refer to quarterly distances from the euro-area peak and trough. A minus (plus) sign means that the country reached its peak (trough) after (before) the euro area peak (trough). One quarter distances are not included.

Source: Commission services.

Graph II.2.2: Mean output gap correlation, euro area countries (4-year rolling window – in % -1983Q1-2009Q4) (1)



(1) BE, DE, ES, FR, IT, NL and FI. The mean correlation is calculated as the non-weighted average of the correlations between the national and the euro-area output gaps.

Source: Commission services.

Survey indicators, such as the Economic Sentiment Indicator (ESI), confirm this picture, showing that cyclical synchronisation, as measured by Member States' similarity in the timing of cyclical peaks and troughs, has been on the increase in the euro area in recent years (Table II.2.1). Synchronisation was particularly high during the latest recession and the early stages of the ongoing recovery.

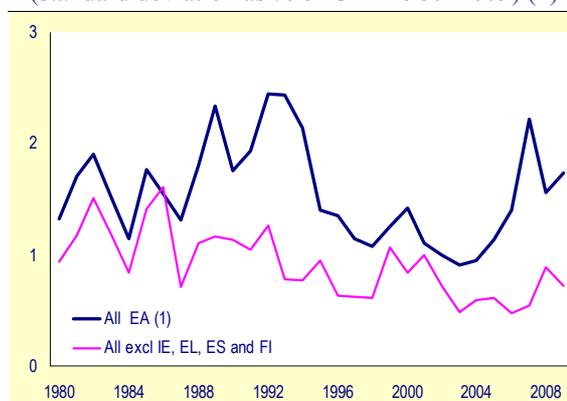
**...but there have been some signs of cyclical divergence in 2006-2008**

In contrast, measures of cyclical dispersion point to some divergence in Member States' business cycles within the euro area in 2006-2008 (Graph II.2.3). The dispersion of output gaps, measured by their standard deviation, was remarkably low until 2006, when it picked up and increased steadily until 2008, reaching a level last seen in the early 1990s.

This phase of divergence was followed by renewed convergence as from the second half of

2008 but to date cyclical differences remain significantly higher than over 1999-2005.

Graph II.2.3: Output gap dispersion, euro area (standard deviation as % of GDP 1980–2009) (1)



(1) Euro-area countries excluding newly acceded Member States (CY, MT, SK and SI).

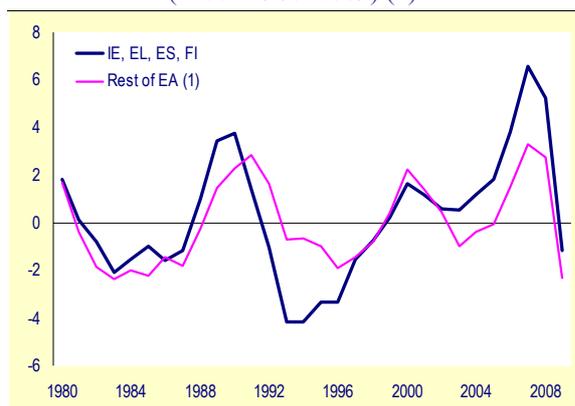
Source: Commission services.

Given that business cycle synchronisation (as measured by correlation) has, in the meantime, remained high or on an upward trend (depending on the windows considered), the business cycle divergence over 2006-2008 can only be explained by rising Member State differences in the amplitude of business cycles.

Looking more closely at individual Member States, much of the divergence can be ascribed to four countries: Greece, Spain, Ireland and Finland (Graph II.2.3). These countries entered the global economic crisis with a significantly higher positive output gap than the rest of the euro area (Graph II.2.4).

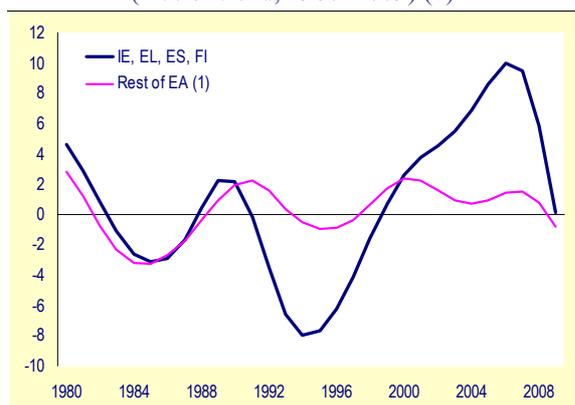
In the four above-mentioned countries, the large positive output gaps in the years preceding the crisis are mainly explained by very strong cycles of demand (see Graph II.2.5). In Finland, however, high exports on the back of booming world trade have also played a role.

Graph II.2.4: Average output gap (in % - 1980–2009) (1)



(1) Euro-area countries excluding newly acceded Member States (CY, MT, SK and SI).  
**Source:** Commission services.

Graph II.2.5: Average cyclical component of domestic demand, euro area (in % of trend, 1980–2009) (1)

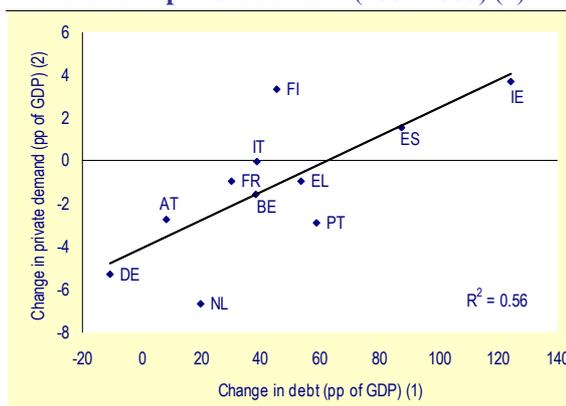


(1) Euro-area countries excluding LU and newly acceded Member States (CY, MT, SK and SI).  
**Source:** Commission services.

The phase of cyclical divergence in 2006–08 can, to a large degree, be traced back to credit markets. In all four countries (though somewhat less so in Finland and Greece), strong private sector demand was supported by strong credit dynamics and associated with a sharp increase in private sector debt. As shown in Graph II.2.6, the relationship between the change in accumulated debt and the change in private sector demand is very strong in euro-area Member States between 2001 and 2007.

The cyclical divergence therefore has much of its roots in very strong private-sector credit cycles in a few Member States. The effects of these credit cycles were magnified by overly loose fiscal policy in Greece or high exposure to world trade in Finland.

Graph II.2.6: Relationship between private sector debt and private demand (2001–2007) (1)



(1) Securities other than shares and loans, non-consolidated data.  
 (2) Final consumption expenditure and gross capital formation.  
**Source:** Commission services.

### Business cycle dispersion diminished during the crisis...

With a set of powerful symmetric shocks hitting the euro area in 2008, Member States entered the downturn almost at the same time (Table II.2.1). This meant that synchronisation was particularly high during the latest recession and the early stages of the ongoing recovery. Only Malta, Italy and Ireland had their latest cyclical peak at a slightly different time than the euro area as whole. In all Member States, except Cyprus, the recovery started in 2009Q2.

However, the fall in output gaps was differentiated across euro-area members. It was much higher in those Member States, which entered the recession with higher output gaps than in the rest of the euro area (IE, EL, ES and FI). As a result, business cycle differences narrowed significantly on account of reduced differences in cyclical amplitudes.

In Ireland, Greece and Spain, the main factor underlying the stronger decline in output gap was the larger fall in the cyclical component of domestic demand. In Finland, the sharp fall in output gap reflected a combination of weak domestic demand and the country's high exposure to world trade.

### ...but could widen again in the medium-term

In the short term, the financial crisis generated a differentiated fall in output gaps, which entailed a correction in the pre-crisis divergence. Business cycle convergence is expected to continue during the recovery period. Output gap dispersion, as

measured by standard deviation, is forecast to decrease further in 2010 and 2011 and come back to levels seen before 2006. <sup>(29)</sup>

In the medium term, however, cyclical differences could re-emerge. The driving forces behind output gap corrections have only started to unfold in Ireland, Greece and Spain. Output gaps could continue to fall and remain in negative territory longer than in the rest of the euro area. The possible renewed divergence in business cycles in the medium term would be the result of protracted structural adjustment processes of private demand in indebted countries as debt accumulated by households and non-financial corporations is progressively reduced.

**Table II.2.2: Deviation of consolidated debt (1) from the euro-area aggregate in 2008**  
(in percentage points)

	Households; non-profit institutions serving households	Non-financial corporations	Total
Ireland	48	70	118 (2)
Portugal	50	34	85
Spain	39	22	61
Netherlands	5	58	64
Belgium	-14	-12	-26
Italy	-4	-22	-26
Finland	-11	-7	-17
France	0	-11	-11
Austria	0	-9	-9
Germany	-15	0	-15
Greece	-18	-11	-29

(1) Securities other than shares and loans, expressed in percent of GDP.

(2) For Ireland, non-consolidated liabilities are reported due to lack of data.

*Source:* Commission services.

No one can determine precisely the speed and magnitude of adjustment to debt overshooting. Deviations from euro-area aggregate debt levels may however give a rough indication of the size of the effort needed. For instance, Ireland and Portugal show a level of private sector debt that is, respectively, 118 and 61 pp higher than the euro-area average (Table II.2.2). In order to reduce the debt-to-GDP ratio by about 30 to 40 pp (about third or half of these differences), the adjustment processes in Ireland and Portugal would be long-lasting. Ireland would need 3 to 4 years, assuming an adjustment speed of 11.4% of GDP per year (which corresponds to the surplus of its private sector balance in 2009) and Spain

would need 5-7 years with a surplus of 6.1% of GDP (its private sector surplus in 2009).

An additional factor expected to slow adjustment and contribute to a protracted period of large negative output gaps in indebted countries is the significant reallocation of supply needed as a response to persistent weakness in domestic demand. The emergence of substantial excess capacity, particularly in the non-tradable sector, will most likely take some time to be reallocated to other productive uses. Changes in domestic relative prices of non-tradables *vis-à-vis* tradables as well as rechanneling of capital and labour resources from the non-tradable to the tradable sector will need to occur. Price and wage flexibility will thus influence the speed of the adjustment processes. <sup>(30)</sup>

## Conclusion

Business cycle synchronisation is high in the euro area, probably reflecting the fact that shocks have so far been rather symmetrical across euro-area Member States. The increase in cyclical differences in the period 2006-2008 can mainly be attributed to differences in business cycles amplitude between Ireland, Greece, Spain and Finland, on the one hand, and the rest of the euro area, on the other hand. These were in turn driven mainly by excessive private demand fostered by unprecedented credit growth. The financial crisis brought business cycles closer in line due to a strong correction in the credit and private demand dynamics in Ireland, Greece and Spain. In Finland, the fall in output gap came from a downward adjustment of domestic demand coupled with a drop in net exports.

Looking ahead, business cycle differences could widen again in the medium-term as indebted countries could suffer from a prolonged period of sluggish growth. Adjustment to excessive private sector debt could indeed turn into protracted processes in these countries, involving both long periods of weak domestic demand and important restructuring on the supply side. Besides contributing to domestic growth, structural reforms aimed at increasing price and wage flexibility as well as at supporting resource reallocation would contribute to maintain business cycles more aligned.

<sup>(29)</sup> Commission Spring economic forecast 2010.

<sup>(30)</sup> European Economy 1 (2010), 'Surveillance of Intra-Euro-Area, Competitiveness and Imbalances'

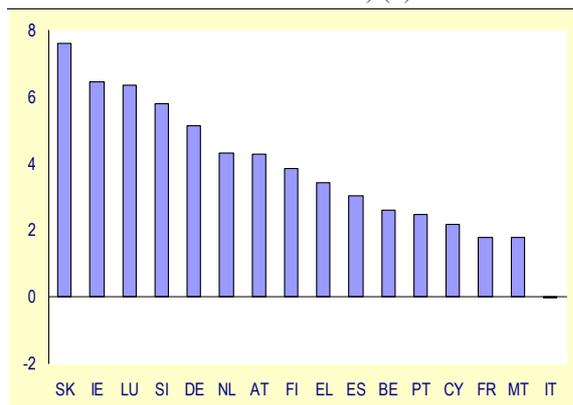
**II.3. Assessing the sources of non-price competitiveness**

**Diverse export performances within the euro area**

Over the recent years, export performance has been far from homogeneous across euro-area Member States. As shown in Graph II.3.1, while some countries have experienced average annual growth of exports (intra and extra euro-area) of around 8% in the past 10 years (IE, SK), others have shown a poor export performance, with growth rates of around 2-3% (IT, BE, MT).

The disparity in export performance can be explained by a number of factors, of which the strength of foreign demand and relative prices (price competitiveness) are generally seen as critical by many economists.

**Graph II.3.1: Real export growth, euro-area Member States** (average annual growth in % – 1998-2009) (1)



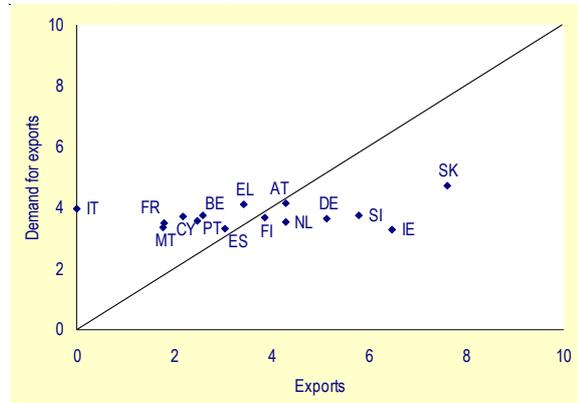
(1) Export of goods and services.  
 Source: Commission services.

The available empirical evidence shows, however, that these two traditional factors can only go some way in explaining Member State differences in exports growth.

Graph II.3.2 plots the average real export growth and external demand across euro-area countries. The relationship between the two variables is relatively weak. Since the mid-1990s, there have been significant country differences in the strength of foreign demand as measured by the potential size of each country's export markets but these differences alone can only account for a fraction of the heterogeneity of export performances. This means that there have been large differences in the countries' relative ability to exploit foreign demand. Particularly Ireland shows a comparatively high ability to exploit

export demand, while Malta and Italy and to a lesser extent Belgium and France have not taken full advantage from raising export demand.

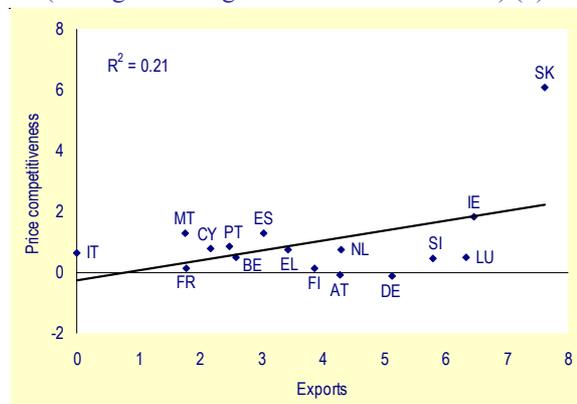
**Graph II.3.2: Export growth and foreign demand, euro-area Member States** (average annual growth in % – 1998-2009) (1)



(1) The external demand variable measures the potential growth in size of a country's export markets. The indicator is calculated as real total imports of main partners (35 industrialised countries) weighted by country's exports to these countries.  
 Source: Commission services.

Graph II.3.3 relates the growth of real exports to the growth of price competitiveness (as measured by the REER) over 1998-2008. The correlation is also weak and has the wrong sign. However, external demand and price competitiveness taken together account for a significant part of export growth. In fact, in a simple panel regression external demand and the REER explain around 55% of the variance of exports in euro-area countries. With almost half of variance unexplained, this also shows that 'residual' factors other than the exchange rate and external demand need to be taken into account.

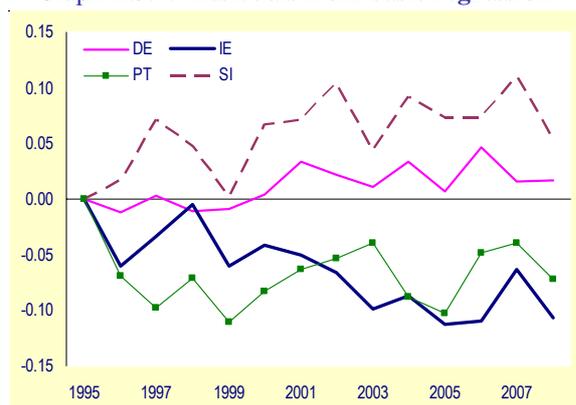
**Graph II.3.3: Export growth and price competitiveness, euro-area Member States** (average annual growth in % – 1998-2009) (1)



(1) Price competitiveness is measured by the CPI-based REER.  
 Source: Commission services.

Country residuals from such a panel regression indicate whether exports developments can be attributed to factors others than foreign demand and price competitiveness. Countries for which the error component presents a systematic path over time might be experiencing an improvement or a deterioration of omitted variables such as non-price competitiveness factors driving export performance (for countries where there is a trend in the residuals see Graph II.3.4).

Graph II.3.4: Residuals from basic regression



(1) Residuals of a regression in first differences with real exports as a function of price competitiveness and foreign demand.

Source: Commission services.

A first set comprises countries which enjoy a systematic upward path of the residuals. For these countries, the effect on exports of omitted/unobservable variables seems to be an improvement of exports performance over time with respect to what could be achieved only from demand and prices' behaviour. Slovenia and to a lesser extent Germany belong to this group. In the second set are countries like Portugal and Ireland, which show a negative systematic path of the omitted variables. This could for example correspond to a decrease of the quality of exported goods. Finally, the third group contains the countries for which the residual dynamic is either almost stable or too volatile (not displayed in the graph). Note however that these residuals are net of the effect of constant over time, country specific effects.

### Non-price competitiveness matters

The evidence above suggests that price competitiveness is only one of the factors determining export performance and that more insights are needed into what lies behind the so-called non-price competitiveness component. There is not a unique definition of non-price

competitiveness. Non-price competitiveness factors include a broad range of elements such as product quality, technological advantage, industry specialisation, business environment, etc. Using only price competitiveness indicators in empirical analyses to explain export performance assumes that underlying factors driving non-price competitiveness are irrelevant or can be appropriately captured in country differences in the REER or foreign demand elasticities. For the euro area, even though the focus on price competitiveness may be justified as price and foreign demand explain to a considerable extent aggregate export developments, this is not the complete picture, particularly when trying to understand Member State differences in export performance.

In order to reduce the complexity of such an exercise, this section focuses on a limited number of non-price competitiveness factors, namely technological aspects as proxied by R&D expenditures and business environment proxied by enforcement contracts conditions. Technological competitiveness and business environment factors are often mentioned in the literature although there are few studies with a euro-area dimension.<sup>(31)</sup>

Technological aspects of competitiveness could affect export behaviour in different ways. Highly innovative countries can be expected to export more. Innovation is crucial in the development of new varieties of goods and services as well as in producing products of higher quality than those available in the market. R&D intensity could be considered as a proxy for technological competitiveness. Graph II.3.5 shows average changes in R&D intensity across euro-area countries for the period 1994-2009. Obviously, such a measure does not capture all possible innovation efforts. Producers may for instance accumulate a knowledge-base which is useful for production without engaging in formal innovation activities. This could eventually lead to the development of high-quality and knowledge-intensive products.<sup>(32)</sup>

<sup>(31)</sup> See ECB (2005): 'Competitiveness and the export performance of the euro area', *ECB Occasional Paper Series* No. 30.

<sup>(32)</sup> The relationship between innovation and quality depends very much on the sector. For some sectors quality upgrading requires innovation (industries with vertical differentiation), while this may not be the case for other sectors (e.g. raw materials).

*Box II.3.1: Real exports and their determinants*

The table below summarises the results of a panel analysis of the determinants of real exports in euro area countries. The exports equation estimated is:

$$\ln(\text{exports}_{it}) = \alpha_i + \gamma \ln(\text{exports}_{it-1}) + \beta \ln(\text{demand}_{it}) + \delta \ln(\text{REER}_{it}) + \gamma \ln(\text{RD}_{it}) + \varepsilon_{it}$$

for  $t = 1, \dots, T$ , where  $\text{exports}_{it}$  is the volume of exports from country  $i$  at time  $t$ , demand measures world demand, REER is the real effective exchange rate, and the vector RD is R&D intensity. Country-specific fixed effects ( $\alpha_i$ ) capture unobserved influences that remain constant over time. All other influences are contained in the error term  $\varepsilon_{it}$ .

The basic model includes a persistence element (the lagged dependent variable), the external demand and the real effective exchange rate. Both external demand and the real effective exchange rate show a statistically significant relationship with real exports (Column 1). The extended model in Column 2 tests the role of R&D intensity in determining export performance. Given the time span between investing in R&D and innovation output, R&D expenditures are lagged in the equation (by 3 years). The results show that innovative countries export more and the long-run effect of R&D on exports is important: a 10% increase in R&D intensity increases exports of goods by 1.7%. Given that the average increase in R&D intensity in the last decade is above 29% (all 16 countries are considered here) a 10% increase in R&D intensity seems fairly modest. Nevertheless there are large differences across countries and 5 of the euro-zone countries show growth rates under 10% (BE) or even negative (FR, LU, NL, SK). Other studies finding a positive effect of innovation on trade is Ioannidis and Schreyer (1997), Anderton (1999), European Competitiveness Report (2008).

<b>Exports and technology in the euro area</b>				
Dynamic panel regression. Dependent variable is log of real exports (1)				
	Basic regression (Estimations run on total exports)	R&D		Enforcing contracts (Estimations run on total exports)
		Total exports	Exports of goods	
Lagged exports	0.21**	0.23**	0.21**	0.10
REER	-0.28**	-0.35**	-0.38**	-0.01
Demand	0.76**	0.71**	0.71**	0.77**
Lagged R&D		0.13**	0.15**	
Interaction effect R&D (2)		-0.01		
Enforcing contracts (procedures)				-0.30*
Enforcing contracts (cost)				-0.83**

(1) Sample covers 12 euro-area countries (it excludes LU, CY, MT, SK) for the period 1995-2009. All variables are in logs. The fixed effects model is estimated using the Arellano-Bond estimator.

(2) The interaction effect is R&D intensity times the share of services in total exports. The variable tests whether services are less sensitive to technological developments.

\*\* Means significant at 5%, \* is significant at 10%.

*Source:* Commission services.

Since R&D investment is concentrated in high and medium-tech manufactures, it is expected that exports of services have a lower elasticity with respect to innovation than exports of goods. This lower sensitivity of services to R&D is captured by adding a variable interacting R&D with the share of services in total exports. The interaction effect is not significant, but its negative sign shows that technology/innovation tends to be more important for exports of goods than for exports of services. This interpretation is confirmed by a slightly larger coefficient for the R&D variable in the regression with only exports of goods. Other studies have found a positive long-run effect of R&D on exports of services (see for example Pain and van Welsum, 2004).

Estimating the impact of business conditions proxied by enforcing contacts indicators significantly reduces the sample (the indicator is only available for the period 2004-2009). The estimation results show that a high cost and a high number of procedures associated with enforcing contracts damages exports activities, although these results

*(Continued on the next page)*

Box (continued)

are only indicative and should be interpreted with caution given the low degrees of freedom (Column 3). A 1% increase in the number of procedures decreases exports by 0.3% and a 1% increase in costs decreases exports by 0.8%. The average euro-area number of procedures in 2009 was 31 thus a 1% reduction does not seem to be a big effort. However, the data for the 16 euro-area countries reveal that only 6 countries (AT, BE, ES, IE, PT, SK) have seen the number of procedures decreased during the period considered. As for the cost, the euro-area average in 2009 was 17.7% (of claim costs) but only two countries (FI, SI) have seen a decrease in the cost of enforcing contracts during 2004-2009.

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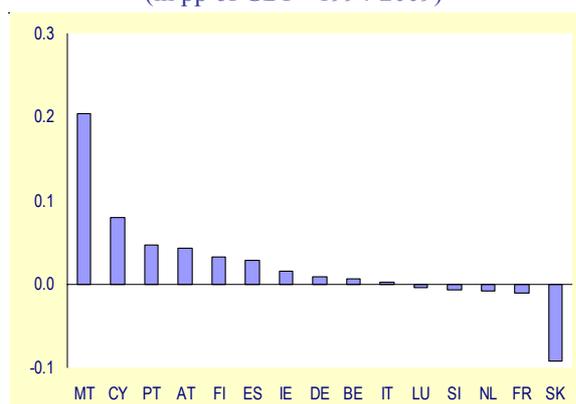
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**Graph II.3.5: Changes in R&D intensity**  
(in pp of GDP –1994-2009)



(1) For MT data covers 2002-2007; for CY 1998-2007; for LU 2000-2007.

Source: Commission services.

The link between export performance and innovation intensity is confirmed in the regression analysis presented in Box II.3.1, which attempts to quantify the role of a range of determinants of exports besides foreign demand and relative prices. The analysis confirms that innovative countries export more and that the long-run effect of R&D on exports is important: a 1% increase in R&D intensity increases exports by nearly 0.2% cent.

These results however have to be interpreted with caution as the link between technological competitiveness and exports is expected to vary across sectors. In particular, technological innovation is expected to be a more important determinant of high and medium-tech

manufacturing sector's exports. This calls for a deeper sectoral, disaggregate analysis on the role of innovation in explaining exports.

**Table II.3.1: Enforcing contracts across the euro area (2004-2009) (1)**

	Enforcing contracts (procedures)	Enforcing contracts (cost)
IE	0.7	1.5
SK	1.0	1.5
SI	1.0	1.1
FI	1.0	0.6
DE	1.0	0.8
LU	0.8	0.5
ES	1.3	1.0
AT	0.8	0.7
EL	1.3	0.8
NL	0.8	1.4
PT	1.1	0.8
FR	1.0	1.0
BE	0.9	0.9
IT	1.3	1.6

(1) Average (unweighted) number of procedures in euro-area: 31; average cost as a percentage of claim: 17.7%. No data available for MT, CY. Countries are ordered by decreasing exports growth rate.

Source: World Bank Doing Business indicators.

In addition to the factors already mentioned, export performance also depends on the business environment influencing countries' economic activity. To test for this possibility we use indicators related to enforcing contracts which could serve as a proxy for general business conditions. Table II.3.1 provides information on the number of procedures and cost associated with

enforcing a contract per country, compared with the euro-area average.

A number of countries perform relatively badly concerning the number of procedures (IT, ES, EL and PT), all of them also with below average export growth rate. The cost-related indicator shows a wider dispersion and a weaker correlation with exports growth. When controlling for price competitiveness and external demand (see Box II.3.1), the number of procedures and cost of enforcing contracts both have a strong negative effect on exports (particularly damaging is the cost-related variable).

A 1% increase in the number of procedures decreases exports in the long-run by almost 0.3%. The long-run impact of a 1% increase in the cost of contracts is a decrease in exports by 0.8%. This suggests that administrative burdens have a negative influence on exports and that there might be gains from a further streamlining of regulation concerning enforcing contracts. These results should, however, be interpreted with caution due to the small size of the sample.

### Conclusion

Price competitiveness and external demand are the conventional variables used to explain export growth. Indeed, the evidence is that these variables explain a major part of export growth in euro-area countries. However, there is still a large part that cannot be attributed to conventional factors, which is usually attributed to broad category of determinants called non-price competitiveness. This section analysed the role of two specific non-price competitiveness factors for export performance: innovation and business environment. The former one is proxied by R&D intensity and the latter by enforcement of contract conditions. Econometric analysis confirms the importance of these factors on exports: R&D intensity is associated with increasing exports while costs and procedures related to contract enforcement have significantly negative impact on exports. These results suggest that by creating favourable conditions for entrepreneurship and innovation in domestic economies policy-makers can help euro-area companies to take advantage of the ongoing rapid recovery in world trade.



### III. Recent DG ECFIN publications

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**Contributors to this issue are:**

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*N. Balta, G. Koltay, V. Rouxel-Laxton  
M. Żogała*

Quantifying the causes of the crisis in the euro area

*R. Raciborski*

How has the financial crisis affected cyclical differences within the euro area?

*A. Mordonu*

Assessing the sources of non-price competitiveness in the euro area

*J. Monteagudo*

Data assistance

*G.M. Isbasoiu*

Overall co-ordination and editing

*R. Felke and E. Ruscher*

**Comments on the report would be gratefully received and should be sent to the Editor-in-Chief:**

Servaas Deroose

Director – Macroeconomy of the euro area and the EU / Deputy Director General (acting)

Economic and Financial Affairs Directorate-General

European Commission

BU1 0/209

B-1049 Brussels

or by e-mail to [servaas.deroose@ec.europa.eu](mailto:servaas.deroose@ec.europa.eu), [eric.ruscher@ec.europa.eu](mailto:eric.ruscher@ec.europa.eu), [reinhard.felke@ec.europa.eu](mailto:reinhard.felke@ec.europa.eu)