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Quarterly Report on the Euro Area

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- Focus: Cross-border spillovers in the euro area
- ECFIN's medium term projections: the risk of 'secular stagnation'
- External rebalancing in the euro area: progress made and what remains to be done

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Another challenging year is coming to an end. On the positive side, real progress has been made towards the realisation of a banking union in Europe and several EU Member States have implemented significant structural reforms.

Despite this progress, however, the economic recovery remains fragile. The European Commission's autumn forecast projects real GDP growth of only 0.8 % in 2014, 1.1 % in 2015, and 1.7 % in 2016. This reflects the gradual fading of the legacies of the global economic and financial crisis with unemployment and debt levels expected to remain high and capacity utilisation levels low.

A comprehensive strategy addressing both demand and supply is needed to revitalise the euro area. This November, the new Commission under President Jean-Claude Juncker adopted a concrete and ambitious policy package, including the European Investment Plan. It is based on three mutually-reinforcing pillars:

Boost investment: Since the global economic and financial crisis, investment in the EU has declined significantly. Collective and coordinated efforts are needed to reverse this trend and set Europe firmly on the path of economic recovery. The Commission, together with the European Investment Bank (EIB) has launched a EUR 315 bn Investment Plan. This 'investment offensive' has three complementary strands. First, a new European Fund for Strategic Investment (EFSI) will be created to support the mobilisation of private capital for (i) public investment of European significance in energy, transport, broadband, education as well as research and innovation projects) and (ii) small and medium-sized companies. Second, the Commission and the EIB, in cooperation with the Member States, will select the appropriate projects.

.Finally, it remains indispensable to remove sectoral and other financial and non-financial barriers to investment to make Europe more competitive and attractive for investors.

The Investment Plan could be even more potent with the active collaboration of EU Member States. In particular, Member States are strongly encouraged to grant capital to the EFSI. The Commission will take a favourable position towards such capital contributions in its assessment of public finances under the Stability and Growth Pact

Renewed commitment to structural reforms: The release of the Alert Mechanism Report, which initiates the annual round of the Macroeconomic Imbalance Procedure, reveals that macroeconomic imbalances are still a major concern. Combined with longer-term trends such as population ageing, weak total factor productivity and the impact of the crisis on supply, these imbalances weigh heavily on economic growth. Structural reforms are the key to creating more flexible product, labour and services markets, improving business investment conditions and supporting investment in research and innovation. However, it may take some time for these reforms to bear fruit and boost investment, so rapid policy action via the European Investment Plan is needed.

Pursue fiscal responsibility: Despite the significant consolidation of public finances achieved in recent years, long-term control over deficits and reductions to public debt remain key to reducing uncertainty and ensuring sustainable growth. To achieve this, the EU's reinforced governance framework will have to be thoroughly implemented. While the aggregate fiscal stance of the euro area is appropriate given the fragility of the recovery and remaining debt sustainability concerns, the assessment of Member States' draft budgetary plans for 2015 reveals that several euro area countries are still at risk of failing to comply with the SGP. At the same time, countries with more fiscal space should make use of it to support demand. Further efforts should be made to prioritise productive investment, raise the quality of public expenditure and make tax systems more fair and efficient.

Full implementation of these priorities would help improve the growth outlook for the euro area.

Thank you for following the Quarterly Report on the Euro Area. Happy New Year!

I. Cross-border spillovers in the euro area

The recent crisis has underlined that the cross-border transmission of shocks can be rapid and powerful in the euro area, where trade and financial interlinkages are strong and where confidence effects have been shown to be an important transmission mechanism.

This article analyses the issue of cross-border spillovers in the context of the euro area. Close linkages imply that macroeconomic policies can have significant spillover effects. Cross-border spillovers from fiscal policy measures, for example, can be sizeable, with our model simulations showing that an increase in public investment in countries with fiscal space would generate significant positive spillovers to the rest of the euro area.

Spillovers from structural reforms are generally found to be positive but small. However, our simulations also show that the simultaneous implementation of structural reforms throughout the euro area would have a bigger effect on output than they would if implemented by countries in isolation, highlighting the benefits of coordinated policy action.

A review of the literature on spillovers from financial shocks shows evidence of contagion effects in general; spillovers between banks and between banks and sovereigns; and spillovers emanating from 'core' as well as 'peripheral' countries.

An analysis of sovereign co-risk measures in the euro area shows that spillovers across Member States are heterogeneous and asymmetric. Greece, Spain, Portugal and Ireland, for example, appear to be a source of spillovers among themselves but are also vulnerable to spillovers from a number of 'core' countries. Some 'core' countries, by contrast, appear to be a source of sizeable spillovers to other Member States without being considerably affected in return. ([1])

I.1. Introduction

The crisis highlighted that cross-border spillovers in the euro area can be large and pervasive. In particular, cross-border bank holdings and sovereign markets were powerful vectors of contagion during the crisis. A good understanding of cross-border spillovers within the euro area is therefore essential for policy coordination and design. This focus section discusses how various types of shocks propagate through the main spillover channels, with a particular focus on the euro area

Section 2 presents a conceptual framework for the analysis of spillovers and discusses the main stylised facts regarding trade and financial interlinkages in the euro area. Section 3 reviews the evidence on the cross-border transmission of fiscal policy shocks. Section 4 focuses on international spillovers from the adoption of structural reforms, while sections 5 and 6 analyse respectively the transmission of financial and confidence shocks. Section 7 looks at interactions between different shocks, while Section 8 concludes.

I.2. A framework for the analysis of spillovers

I.2.1. What are spillovers?

In what follows, cross-border spillovers are broadly defined as the result of a shock in one economy which is transmitted through any number of a variety of channels to another economy. This definition implies that the qualitative and quantitative nature of spillover effects depends on several dimensions:

- the transmission channels;
- the type of shock;
- the amplification or stabilisation mechanisms operating in the originating and receiving economies.

These elements are reviewed in the remainder of the section.

([1]) Section prepared by Francesca D'Auria, Staffan Linden, Daniel Monteiro, Jan in 't Veld and Stefan Zeugner.

I.2.2. Transmission channels

Trade channel

Trade linkages are a key transmission channel of several shocks. In simplified terms, trade spillovers can be seen as a result of two distinct effects:

- **A demand effect.** Any shock yielding changes in income is likely to translate into changes in demand for imported goods and services, generating spillover effects whose magnitude tends to increase with the intensity of the trade linkages. The size of the demand effect depends on factors including the monetary reaction to the demand shock, import propensity, and on the composition and value added embodied in trade partners' exports.

- **A competitiveness effect.** Shocks that affect the competitiveness of a country are likely to lead to changes in their terms of trade with an impact on import and export flows. These shocks can be the consequence of structural reforms or the endogenous response of firms and the economy as a whole to changes in the economic context.

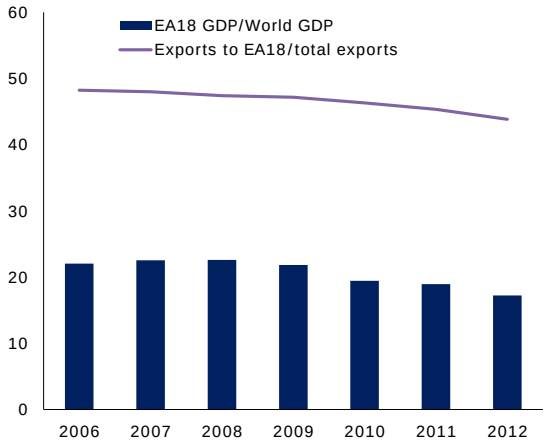
These effects can have different time profiles and can be mutually reinforcing or go in opposite directions.

Trade flows in the euro area intensified in the pre-crisis years, reflecting both global trends and increased economic integration. The sum of total exports and imports of the euro area countries increased from 75 % of their aggregate GDP in 2000 to 84 % in 2008. After a dip in 2009, export and import trade flows were back to 85 % of GDP by 2013. The weight of intra-euro area trade in the GDP of euro area countries also increased during most of the 2000s, with total exports and imports of goods within the euro area growing from 31 % to 36 % of GDP between 2000 and 2008. ([2]) However, the importance of intra-euro area trade has decreased somewhat since the crisis, falling to 32 % of GDP in 2013.

The observed increase in the degree of economic openness is partly the result of an increase in the integration of international value chains. In fact, from 2000 to 2011, the import content of the exports of euro area countries is reckoned to have risen by some 4 pps. Therefore, the observed increase in gross trade flows during the 2000s corresponds in part to an increase in the complexity of trade interlinkages. Overall trade linkages and the potential for related spillovers appear to have been strengthened during most of the 2000s in the euro area, although this trend is less clear for intra-euro area trade linkages, especially when accounted in value-added terms by deducting the import content of exports.

Nevertheless, trade linkages among euro area countries remain comparatively important, as evidenced by their propensity to export among themselves. In fact, the share of euro area-bound exports in the total exports of euro area countries is much bigger than could be expected from the relative economic size of the euro area (Graph I.1), as measured by its share in world GDP. In line with the literature on gravity models of trade, this can be understood as a consequence of several factors, including shorter physical distances and therefore lower transportation costs, absence of currency risks, a high degree of economic and institutional integration, and cultural and linguistic aspects.

Graph I.1: **Exports of EA18 countries**
(2006-2012, %)



Source: UN, World Bank, DG ECFIN calculations

In contrast to what can be observed in financial flows, the crisis did not entail any marked attenuation or reversion of the preference of euro area countries to trade among themselves. It is true that there is a slight weakening of this propensity over the past few years and in particular during the crisis period. However, the relative economic

([2]) The figures for intra-euro area trade do not include services due to data issues.

weight of the euro area also diminished during this period, which could explain the decrease in the share observed.

Financial channel

The financial channel operates through changes in cross-border financial flows and balance sheet exposures. Several transmission mechanisms can be identified:

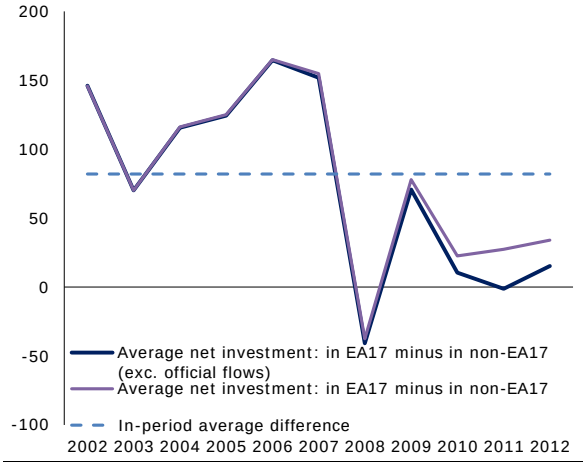
- **Spillovers via financial prices**. This is the standard channel through which financial shocks are transmitted across borders, according to interest parity and via risk premia effects. Since financial markets are globally integrated, changes to prices on any asset market usually transmit quickly into asset prices in other economies. This does not necessarily depend on the existence of shared fundamentals, but can be driven by portfolio rebalancing of investors active on several markets.

- **Spillovers via cross-border balance sheet exposures.** The financial crisis raised awareness on the importance of effects that go beyond the transmission of changes to asset prices and affect balance sheets in other economies. For households holding assets abroad, such wealth effects can affect consumption levels, while for corporations balance sheet effects can impact on domestic demand via investment and wage levels. In the case of banks, a balance sheet weakening can affect lending capacity.

- **Information spillovers.** Information spillovers are often based on the market participants' perception or anticipation of changes in economic fundamentals rather than on the actual materialisation of these changes and can be engendered by policy announcements. Information spillovers may be very relevant for explaining contagion effects, in particular in the context of 'wake-up call' effects, which occur when new information concerning a country leads to a reassessment of the vulnerability of other countries.

- Financial flows are notoriously more fickle than trade flows, allowing for rapid transmission and amplification of shocks through large changes or reversals. Graph I.2 depicts the average difference in net investment in euro area and non-euro area countries for euro area economies. As expected, euro area-bound net investment flows tend to be larger than net flows to non-euro area economies, notwithstanding the larger aggregate size of the latter, denoting a 'home preference' among euro area countries. From a net investment viewpoint, euro area countries were, on average, more bullish (or less bearish) on the euro area than on the rest of the world.

Graph I.2: **Average net foreign investment of EA 17 countries**
(2002-2012, bn EURs)



Source: Hobza A. and S. Zeugner (2014), 'Current accounts and financial flows in the euro area', Journal of International Money and Finance, vol. 48, pp. 291-313, DG ECFIN calculations

This trend came to a halt in 2008 and, in the following years, a preference for the euro area is much less apparent, especially when official flows are excluded. When compared with the in-period average difference in net flows, there is evidence of a reversion in the positive home bias. Box I.1 illustrates a paradigmatic case of a reversal in funding flows in the post-crisis period. As discussed in the box, France acted as major funding intermediary for the economies of southern Europe, but was pressured to disinvest in 2011. The resulting external funding gap was subsequently bridged by official flows.

Confidence channel

The confidence channel involves a direct transmission of changes in consumer and business sentiment in one country to confidence in another country. Given the strong correlation between confidence and economic activity, this is likely to have an impact on consumption and investment

Box I.1: The financial intermediation role of France

Capital flows from and to France played a central role throughout the crisis. Before the crisis, France acted as an intermediary between euro area debtors on the one side, and creditors from outside the euro area on the other side. Apart from Japanese and UK investors, French bonds were particularly sought by foreign central banks, presumably as a reserve asset. At the eve of the crisis, (2007), France found itself in a net debtor position (which was mostly in debt instruments) to non-EU countries, while French investors were in a net creditor position on most of the euro area, in particular Italy, Spain and Greece, but also Germany (see Chart 1a).

During the first stage of the crisis until 2010, French bonds were sought after as a safe haven asset. Foreign central banks increased their holdings of French bonds considerably. At the same time, German investors shifted out of Italian and Spanish debt, and used part of the proceeds to purchase French debt assets, turning the French net asset position on Germany from positive to negative until 2010 (see Chart 1b). In return, French investors had to invest their savings into assets abroad, and significantly increased their exposure to Italian and Spanish debt (from which German investors retreated at the same time). At the same time Italian and Spanish investors sold off their holdings of French debt, which compounded the increase in net French exposure to those two countries. Consequently, France intermediated financial flows and financial risk from Germany and outside the euro area to Spain and Italy, which still ran sizeable current account deficits at the time (see Chart 2a).

Chart 1a. **Net foreign assets of France (1)**
(2007, % of GDP of France in 2007)

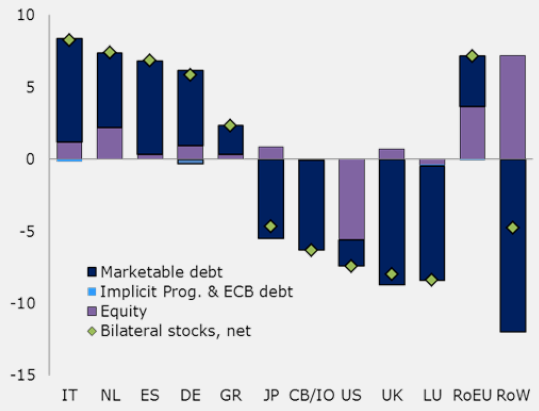
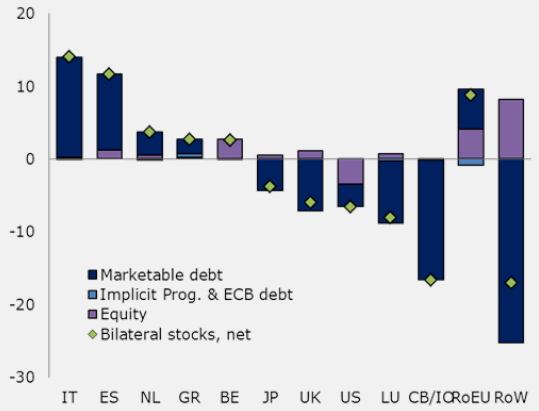


Chart 1b. **Net foreign assets of France (1)**
(2010, % of GDP of France in 2010)



Note: CB/IO: aggregate of 'SEFER' central banks and international organizations, as reported by IMF CPIS. RoEU: Remaining EU countries. RoW: Remaining non-EU countries.

Source: Hobza A. and S. Zeugner (2014): 'Current accounts and financial flows in the euro area', Journal of International Money and Finance, vol. 48.

In late 2011, the situation changed. There were market concerns about the exposure of French investors to Spain and Italy. In response, foreign central banks followed investors based in the US and the UK in selling off their holdings of French assets. German investors continued to buy up French debt, but that did not suffice to relieve pressure on French bonds. Consequently, the French financial sector had to reduce its exposure to Italy and Spain, which it did by selling of its bond holdings there (see Chart 2b). With that, the euro area periphery countries lost the last large scale investor willing to refinance their external debt. Market participants from outside the euro area periphery were unwilling to purchase Italian or Spanish bonds during late 2011, and 2012. In the wake of the French retreat from the periphery, Spanish and Italian financial sector had to rely on central bank funding, in order to cover their own refinancing needs, but also to purchase domestic bonds. The French retreat from periphery bond and interbank markets, forced by international capital markets, was therefore instrumental to the emergence of TARGET2 net liabilities of the euro area periphery.

(Continued on the next page)

Box (continued)

Chart 2a. **Net flows from(+)/to(-) France (1)**
(2008-2010, % of GDP of France in 2008)

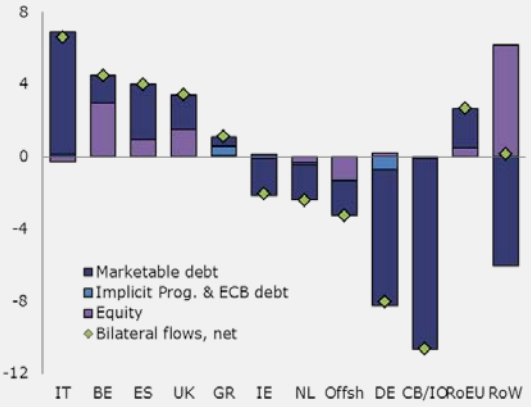
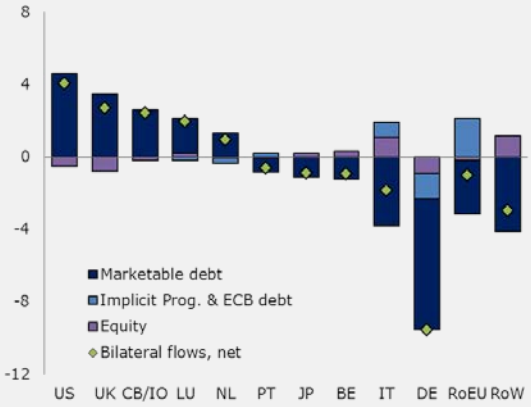


Chart 1b. **Net flows from(+)/to(-) France (1)**
(2011-2012, % of GDP of France in 2011)



Note: positive sign means net outflows from France, while negative signs mean net inflows to France. Note that asset sell-offs are included in the figures. For instance, the 'capital inflows' from Italy to France in 2011-12 actually stem from French investors selling off their exposure to Italian debt instruments.

Source: Hobza A. and S. Zeugner (2014): 'Current accounts and financial flows in the euro area', Journal of International Money and Finance.

decisions. This channel is likely to play a more important role between countries with close trade and financial links.

Institutional interlinkages and political economy effects

Alongside the 'traditional' transmission channels, shocks can forcefully transmit through the sharing of common institutions or common policy frameworks. This channel includes peer effects, mutual learning from best practices or sharing of common institutions or resources. These effects are hard to measure but can play a key role in the transmission of shocks, in particular in the context of a monetary union, as for example in the case of fiscal policy shocks or those resulting from the adoption of structural reforms.

In the euro area in particular, the single monetary policy, the common external exchange rate and the related absence of bilateral nominal exchange rates can strengthen spillover effects across euro area countries.

I.2.3. Shocks

The way the various transmission channels are affected depends on the nature of the shock at the origin of cross-border spillovers, implying that different types of shocks can have very different spillover effects. The next sections discuss how a number of key shocks spill over internationally via the various channels. The focus is on the cross-border transmission of fiscal policy shocks, implementation of structural reforms, financial shocks and confidence shocks. Given the need to restrict the analysis to a limited number of shocks due to space constraints, the choice is motivated by the fact that these shocks have played a key role in the euro area economy since the global financial crisis. Obviously, this does not exhaust the range of shocks that are of possible interest in the context of the functioning of the euro area.

I.2.4. Factors amplifying or mitigating spillovers

Various conditions relative to market structures and policy regimes can either amplify or mitigate spillover effects. For example, a high degree of trade openness facilitates the propagation of shocks across highly integrated economies. Nominal and real rigidities also play an important role in determining the amplitude and persistence of spillover effects, affecting the adjustment to shocks.

- The magnitude of financial spillovers depends on several factors, such as the degree of international portfolio diversification, the degree of prevailing risk aversion, the size and activity of multinational banks, access to funding, the degree of financial market integration and the nature of financial market regulations.

- Finally, a key role is played by the prevailing governance structure and fiscal regime (and in particular by the existence or absence of supranational risk sharing mechanisms) and by the monetary policy regime.

I.3. Spillovers from fiscal policy

Fiscal policy shocks, like other demand shocks, spill over to other countries mainly via the trade channel, with the demand and the competitiveness effects going in the same direction. An expansionary fiscal policy shock is likely to boost demand for goods and services produced abroad and lead to increases in prices and wages and an appreciation of the real exchange rate, implying a deterioration in competitiveness which benefits the exports of competing economies.

On the other hand, fiscal consolidations have a negative impact on the demand for imports and tend to improve competitiveness, with negative repercussions on competing economies' exports. Moreover, fiscal policy shocks can be accompanied by interest rate effects due to the response of monetary policy, which partially counterbalance the spillovers from the fiscal shock.

To the extent that fiscal policy decisions affect sovereign risk premia, the shock can also transmit internationally via the financial channel. Changes in fiscal policy and the perceived credibility of the measures announced can significantly affect financial market confidence and, in turn, sovereign risk spreads and the size of spillovers.

The operation of the various channels has been analysed in a number of modelling exercises, delivering mixed results. The response of monetary policy plays a crucial role. For example, Bénassy-Quéré (2006) finds that, in a monetary union, fiscal expansions accompanied by an accommodative monetary policy have, in most cases, positive spillover effects, but that if the common central bank does not accommodate the shock the effects on foreign countries are generally negative. ([3]) Similarly, Cwik and Wieland (2011) simulate the effects of the 2009-2010 German stimulus plan on France and Italy and conclude that these were negligible, due to the negative effect of euro appreciation engendered by higher interest rates. ([4])

Spillover effects also depend on the nature of the consolidation plan following a temporary fiscal expansion. For example, in a multi-country model with independent monetary policies, Corsetti, Meier and Muller (2010) find that a fiscal stimulus accompanied by a medium-term consolidation plan involving some reduction in spending generates positive spillovers, unlike a fiscal expansion based exclusively on future tax hikes, which yields higher long-term interest rates. ([5])

Econometric studies also reach mixed conclusions, but generally find some evidence of fiscal spillovers. Several papers estimate positive spillover effects from fiscal expansions in the euro area, with particular attention to the effects of a German stimulus, for example Bénassy-Quéré and Cimadomo (2006) and Beetsma, Giuliodori and Klaassen (2006), although these results have criticised by Wieland (2006) on the grounds that the analysis includes periods of flexible and fixed exchange rates. ([6]) Hebous and Zimmermann (2013) also estimate positive spillover effects from expansionary fiscal shocks in the euro area and find that euro area-wide shocks have larger output effects on individual countries than similar-size domestic shocks. ([7])

An important related issue is whether spillover multipliers vary over the business cycle. Auerbach and Gorodnichenko (2013) estimate multipliers of government spending spillovers for several OECD countries, finding that multipliers are larger during

([3]) Bénassy-Quéré A. (2006): 'Short-term fiscal spillovers in a monetary union', *CEPII Working Paper* 2006-13.

([4]) Cwik T. and V. Wieland (2011): 'Keynesian government spending multipliers and spillovers in the euro area', *Economic Policy* 26, pp. 493-549.

([5]) Corsetti G., A. Meier and J. Mueller (2010), 'Cross-border spillovers from fiscal stimulus', *International Journal of Central Banking* 6(1), March, pp. 5-37.

([6]) Bénassy-Quéré A. and J. Cimadomo (2006), 'Changing patterns of domestic and cross-border fiscal policy multipliers in Europe and the US', *CEPII Working Paper* 24. Beetsma R., M. Giuliodori & F. Klaassen (2006): 'Trade spill-overs of fiscal policy in the European Union: a panel analysis', *Economic Policy*, vol. 21(48), pp. 639-687.

([7]) Hebous S. and T. Zimmermann (2013): 'Estimating the effects of coordinated fiscal actions in the euro area', *European Economic Review*, 58, pp. 110-121.

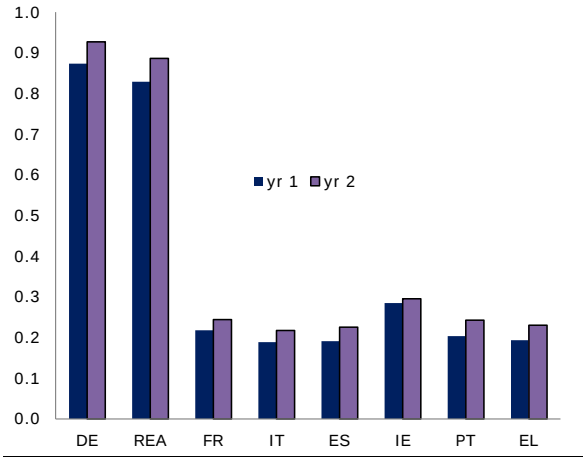
recessions, supporting the case for coordinated fiscal stimulus during economic downturns. They also find that multipliers are smaller in countries sharing a fixed exchange rate. ([8]) Spillovers of fiscal policy can be particularly large when interest rates are constrained by the zero lower bound (ZLB) and several countries take measures simultaneously (see Goujard, 2013, and in 't Veld, 2013). ([9]) Finally, several studies argue in favour of fiscal policy coordination in order to maximise the benefits or minimise the negative effects of fiscal shocks (see, for example, Bénassy-Quéré, 2006, and Hebous and Zimmermann, 2013).

Overall, the review of the available empirical literature indicates that cross-border spillovers of fiscal policy can be sizeable in the euro area, especially when cyclical conditions are weak and/or monetary policy is constrained by the zero lower bound.

This conclusion is particularly relevant when assessing fiscal policy in the euro area at the current juncture. The Commission's recent assessment of the draft budgetary plans of euro area Member States indicates that the fiscal stance for the area as a whole is currently broadly neutral but that several Member States are not expected to meet their obligations under the Stability and Growth Pact. ([10]) Preserving a neutral stance while ensuring full compliance with the SGP would require a rebalancing of fiscal policies across countries so as to exploit the fiscal space available under the rules in some countries. The empirical literature reviewed in this section suggests that, in the current situation of negative output gap and monetary policy operating at the ZLB, such a rebalancing could be associated with significant positive spillover effects.

These spillovers can be illustrated using the European Commission's QUEST model (see in 't Veld, 2013). The version of the model used includes seven countries separately (Germany, France, Italy, Spain, Ireland, Portugal and Greece) and the rest of the euro area (REA) as an aggregate block. The simulations consider the effects of a temporary two-year increase in government investment in Germany and in the REA (as many of these countries are assumed to have fiscal space) of 1 % of GDP. Graph I.3 reports the GDP effects by country/region.

Graph I.3: **Fiscal stimulus in core euro area countries: GDP effects (1)**



(1) First and second year GDP effect (% difference from baseline) for a temporary increase in public investment of 1 % of GDP in Germany and rest of EA.
Source: QUEST simulations, in 't Veld (2013).

The impact multiplier in the Member States which carry out the increase in investment is not particularly large (between 0.8 and 1) due to the relatively high degree of openness of these countries. But the GDP effect is persistent even after the stimulus is discontinued, as productivity is higher. Import leakage leads to relatively high spillovers to other euro area countries, boosting GDP by between 0.2 and 0.3 %.

I.4. Spillovers from growth-enhancing structural reforms

Similarly to fiscal policy shocks, structural reforms generate cross-country spillovers mainly through the trade channel. However, in this case, the demand and the competitiveness effect tend to counterbalance each other. Structural reforms stimulate growth and therefore generate positive demand effects for partner economies but also increase domestic competitiveness, with a negative effect on competing countries.

Modelling exercises assessing the effects of structural reforms generally find positive but small spillover effects. Bayoumi, Laxton and Pesenti

([8]) Auerbach A. and Y. Gorodnichenko (2013): 'Output spillovers from fiscal policy', *American Economic Review,* 103, pp. 141-46.
([9]) Goujard, A. (2013): 'Cross-country spillovers from fiscal consolidations', OECD Economics Department Working Papers, No 1099. in 't Veld, J. (2013): 'Fiscal consolidations and spillovers in the euro area periphery and core', European Economic Paper, No 506.
([10]) European Commission (2014), '2015 Draft budgetary plans of the euro area: overall assessment of the budgetary situation and prospects', COM(2014) 907, 28 Nov 2014.

(2004) assess the effects of a reduction in euro area price and wage mark-ups to US levels and find positive output spillover effects to the rest of the world of about 1 % of GDP. ([11]) Everaert and Schule (2006) also analyse the effects of a reduction in product and labour markets' mark-ups in the euro area, estimating limited spillovers as domestic supply and demand tend to increase proportionally as a result of the reforms. ([12]) Similar results are obtained by Forni, Gerali and Pisani (2010) for the Italian economy. ([13]) Dao (2008) reports positive but small spillovers from labour market reforms in Germany to the rest of the euro area. ([14])

Given the key role of innovation for growth, structural reforms which aim to increase investment in R&D and the analysis of knowledge spillovers deserve particular mention. For example, Coe and Helpman (1995) and Coe, Helpman and Hoffmaister (2009) find that foreign R&D has an important effect on domestic productivity and that the impact increases with the degree of openness of a country. ([15]) Bottazzi and Peri (2007) estimate elasticities of the domestic stock of knowledge to international knowledge for fifteen OECD countries, finding values which range between 0.2 and 0.5. ([16])

In conclusion, the literature finds limited spillovers from structural reforms, except for the potential spillovers from policies promoting innovation. However, there is still a strong case for taking into account potential spillovers from structural reforms and for considering the implications of (a lack of) coordination across countries, in particular within the euro area. The synchronisation of reforms offers leeway for an easing of monetary policy, resulting in faster adjustment and a reduction of transition costs (see e.g. Everaert and Schule, 2006, and Forni, Gerali and Pisani, 2010).

The spillover effects from the adoption of structural reforms in the euro area have also been analysed using a semi-endogenous growth version of the Commission's QUEST model. ([17]) For the purpose of the simulations discussed in this section, it is assumed that Member States reduce by one-half the gap vis-à-vis the three best performing countries in the EU for a set of structural reform indicators covering a wide range of areas. ([18]) This makes it possible to assess the effects of a comprehensive reform package, while previous studies mostly focused on the impact of specific measures, such as reductions in price and wage mark-ups.

Graph I.4 shows the GDP effects of structural reforms in the euro area after 5, 10 and 20 years when acting alone and in the event of simultaneous reforms. In the second scenario, the growth impact per Member State is therefore composed of growth spurred both by domestic reform and by a 'spillover' component resulting from other Member States reforming at the same time. The adoption of structural reforms has a positive effect on growth and leads to competitiveness gains vis-à-vis other Member States and countries outside the euro area. ([19])

GDP effects are larger when all countries implement reforms jointly, as shown by the difference between the two bars in Graph I.4.

([11]) Bayoumi T., D. Laxton and P. Pesenti (2004): 'Benefits and spillovers of greater competition in Europe: a macroeconomic assessment', *International Finance Discussion Papers*, 803, Board of Governors of the Federal Reserve System.

([12]) Everaert L. and W. Schule (2006): 'Structural reforms in the euro area: economic impact and role of synchronisation across markets and countries', *IMF Working Paper* 137.

([13]) Forni L., A. Gerali and M. Pisani (2010): 'The macroeconomics of fiscal consolidations in a monetary union: the case of Italy', Bank of Italy *Economic working paper* No 747.

([14]) Dao M. (2008), 'International Spillover of Labour Market Reforms', IMF Working Paper No 113.

([15]) Coe D. and E. Helpman (1995), 'International R&D spillovers', *European Economic Review*, vol. 39(5), pages 859-887. Coe D., E. Helpman and A. Hoffmaister (2009), 'International R&D spillovers and institutions', *European Economic Review*, vol. 53(7), pages 723-741.

([16]) Bottazzi L. and G. Peri (2007), 'The International Dynamics of R&D and Innovation in the Long Run and in the Short Run', *Economic Journal*, 117(March), pp. 486-511.

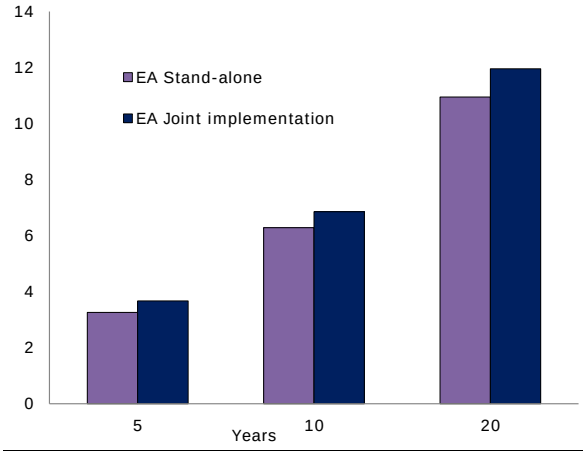
([17]) See Varga J. and J. in 't Veld (forthcoming 2014), 'The potential growth impact of structural reforms in the EU: a benchmarking exercise', *European Economy, Economic Papers* for a detailed description of the simulations. Also see for a description of the model and results from previous exercises: Roeger, W., J. Varga and J. in't Veld (2008): 'Structural reforms in the EU: a simulation-based analysis using the QUEST model with endogenous growth', *European Economy, Economic Papers*, No 351; D'Auria, F. A. Pagano, M. Ratto and J. Varga (2009): 'A comparison of structural reform scenarios across the EU member states: simulation-based analysis using the QUEST model with endogenous growth', *European Economy Economic Paper*, No 392; Varga, J., W. Roeger and J. in't Veld (2014): 'Growth effects of structural reforms in Greece, Italy, Portugal and Spain', *Empirica*, 41, pp. 323-363; Varga J. and J. in 't Veld (2013): 'The growth impact of structural reforms', *Quarterly Report on the euro area*, Vol. 12, Issue 4.

([18]) These include market competition and regulation, R&D expenditure, skill structure, tax structure, labour market participation, unemployment benefit 'generosity' and active labour market policies.

([19]) The model allows for positive confidence effects as it captures the effects of higher expected permanent income due to higher growth and assumes a large share of households can borrow and consume more today in anticipation of higher income tomorrow.

Spillovers are modest, due to partly counterbalancing demand effects (which boost exports in other countries) and competitiveness effects (which operate in the opposite direction). However, they tend to be positive and overall output gains are about 10 % larger than in a scenario where each country acts alone. The presence of positive GDP spillovers illustrates the benefits from coordination, as the adoption of joint reforms boosts GDP more than in a situation in which each country acts alone.

Graph I.4: **GDP effects of structural reforms: acting alone vs simultaneous reforms (1)**



(1) Percentage deviation from baseline
Source: QUEST simulations, Varga and in 't Veld (2014)

I.5. Spillovers from financial shocks

I.5.1. The evidence on financial spillovers

Cross-country financial spillovers and contagion have been at the core of policy discussions since the onset of the financial crisis. Financial market shocks transmit to other countries via the various transmission mechanisms identified in Section 2.2, i.e. via financial prices, balance sheet exposures and information spillovers.

A key distinction when discussing the transmission of financial shocks is that between interdependence, which refers to the correlation across financial markets during normal states of the world, and contagion. While there is no full agreement on the definition of contagion, most studies define contagion as the spillover effects taking place beyond the linkages explained by fundamentals or as the extreme amplification of spillover effects. ([20])

The evidence in support of contagion during the crises preceding the global financial crisis is mixed. ([21]) On the other hand, most studies provide evidence of a considerable increase in interdependence over time. Empirical evidence of contagion effects is generally restricted to the recent crisis.

For example, Forbes (2012) analyses correlations in stock market returns since the 1980s to mid-2012 and concludes that interdependence increased considerably over the period, especially in the euro area. Alter and Beyer (2014) find evidence of growing interdependence between euro area sovereigns and banks over the period 2009-2012. ([22])

Contagion effects in the euro area have been documented by several studies. Many of these focus on the transmission of financial shocks across sovereign bonds. For instance, Missio and Watzka (2011) find evidence of contagion during the period 2009-2010 and observe, in particular, a strong link between Portuguese, Spanish, Italian and Belgian yield spreads and Greek spreads. ([23]) Claeys and Vasicek (2014) analyse the bilateral linkages between EU sovereign bond markets over the period 2000-2012, estimating significant spillover effects which have increased substantially and permanently since the start of the financial crisis. However, they find that contagion during the crisis has been limited to the occasions of request

([20]) For a discussion of alternative definitions of contagion, see Constancio V. (2012): 'Contagion and the european debt crisis', *Financial Stability Review,* No 16, Banque de France. Also Forbes K. (2012): 'The 'Big C': Identifying Contagion', *NBER Working Paper* 18465.

([21]) For example, King and Wadhwani (1990) find evidence of contagion during the 1987 stock market crash. However, Forbes and Rigobon (2002), after correcting for heteroskedasticity, find no evidence of genuine contagion for the 1987 stock market crash, the 1994 Mexican crisis and the 1997 Asian crisis, but only of higher correlation due to increased volatility. Bekaert, Harvey and Ng (2005) find evidence of contagion caused by the Asian crisis but not by the Mexican crisis.

([22]) Alter A. and A. Beyer (2014): 'The Dynamics of Spillover Effects during the European Sovereign Debt Turmoil', *Journal of Banking and Finance* 42, pp. 134-153.

([23]) Missio S. and S. Watzka (2011): 'Financial Contagion and the European Debt Crisis', *CEsifo Working Paper,* No 3554.

for financial assistance by Greece, Ireland and Portugal. ([24])

Favero (2012) uses a Global Vector Autoregressive (GVAR) model to analyse the co-movement of bond spreads within the euro area. The paper finds a significant non-linear relationship between spreads and fiscal fundamentals and evidence of contagion effects during the financial crisis. ([25]) Similarly, De Santis (2012) develops a vector error correction model applied to the period September 2008-August 2011 and finds that developments in euro area long-term government bond yields are explained, beside the country-specific credit risk and an aggregate regional risk factor, by a spillover effect from shocks to the Greek credit rating, which appears to have considerably affected spreads in countries with weaker fundamentals. ([26])

In a recent paper, Lucas, Schwaab and Zhang (2014) estimate euro area joint and conditional sovereign default probabilities using data on prices of credit default swaps (CDSs) over the period 2008-2013. ([27]) The paper finds evidence of spillover effects influencing the likelihood of sovereign default and of significant time variation in risk dependence (which increases in times of stress) between countries.

The literature also provides evidence of significant spillover effects between sovereign and private risk and across equity markets. For instance, De Bruyckere et al. (2012) focus on the risk spillovers between European banks and sovereigns in both directions over the period 2006-2011, using CDS spreads and finding significant evidence of spillover effects. As expected, risk spillovers are found to be stronger between banks and their home country and linked to bank capital adequacy. ([28])

De Haan and Mink (2013) analyse the effect of, respectively, news about Greek public finances and news about the Greek bailout on bank stock prices in 2010 for 48 banks included in the EU stress tests. ([29]) They find that news concerning a bailout (but not news concerning public finances) have a significant effect also for those banks with little direct exposure to Greece. This is interpreted as an indication that financial markets consider news about the Greek bailout as a signal about governments' willingness to use public funds for financial sector rescue operations. In addition, Portuguese, Irish and Spanish sovereign debt prices, which are included in the analysis, respond also to news about Greek public finances. ([30])

Ludwig and Sobanski (2014) analyse banking sector fragility linkages between euro area Member States over the period 2007-2010. ([31]) They find that spillover risks across national banking sectors increase markedly during periods of financial instability and that the epicentre of risk in the period before the crisis was the banking sectors of the periphery (mostly Portugal and Greece). As the crisis unfolded and stability measures were introduced, however, the banking systems of core countries increasingly became sources of fragility spillover. ([32])

Bekaert et al. (2014) analyse the transmission of the 2007-2009 financial crisis to 415 country-industry equity portfolios. They estimate statistically significant but small contagion effects from the US and the global financial sector across 55 countries. The paper also finds substantial contagion from domestic markets to individual domestic portfolios, with its severity inversely related to the quality of countries' economic

([24]) Claeys P. and B. Vasicek (2014): 'Measuring bilateral spillovers and testing contagion on sovereign bond markets in Europe', *ECB Working Paper*, No 1666.

([25]) Favero C. (2012): 'Modelling and forecasting yield differentials in the euro area. A non-linear global VAR model', *Working Paper* 431, IGIER, Bocconi University.

([26]) De Santis R. (2012): 'The euro area sovereign debt crisis — Safe haven, credit rating agencies and the spread of the fever from Greece, Ireland and Portugal', *ECB Working Paper,* No 1419.

([27]) Lucas A., B. Schwaab and X. Zhang (2014): 'Conditional euro area sovereign default risk', *Journal of Business and Economic Statistics,* 32(2), pp. 271-284.

([28]) De Bruyckere V., M. Gerhardt, G. Schepens and R. Vander Vennet (2012): 'Bank /sovereign risk spillovers in the european debt crisis', *National Bank of Belgium,* No 232.

([29]) De Haan J. and M. Mink (2013): 'Contagion during the greek sovereign debt crisis', *Journal of International Money and Finance,* 34, 102-113.

([30]) The distinction between 'wake-up call' effects, which occur when new information concerning a country leads to a reassessment of the vulnerability of other countries, and 'pure' contagion, which is not linked to fundamentals, assumes particularly relevance in the context of the analysis of the sovereign debt crisis.

([31]) Fragility linkages are assessed by applying Granger causality tests to daily values of Average Distance to Default (ADtD), which is an equity-market based banking sector fragility indicator.

([32]) Ludwig A. and K. Sobanski (2014): 'Banking sector fragility linkages in the euro area: Evidence for crisis years 2007–2010', *Economics Letters,* 125, pp. 451-454.

Table I.1: **Excess CoVaR: Conditional Co-risk estimates in basis points, 31 October 2014 (1)**

Affected country	Source country											
	AT	BE	DE	EL	ES	FI	FR	IE	IT	NL	PT	Average
AT	16	11	7	2	13	11	15	6	8	8	-3	8
BE	0	15	2	3	4	15	4	7	7	4	5	5
DE	1	3	5	2	2	3	4	1	2	1	2	2
EL	-5	-13	128	100	58	283	74	99	80	-73	79	71
ES	14	32	11	14	26	28	12	20	16	4	25	18
FI	1	3	3	1	1	6	3	3	2	2	1	2
FR	3	7	5	0	3	10	10	1	3	-1	2	4
IE	2	15	18	65	-3	-11	16	42	24	19	15	11
IT	3	12	9	10	5	16	13	6	26	-1	13	8
NL	2	4	6	5	2	4	4	4	1	8	1	3
PT	-1	24	16	27	2	25	29	20	31	-7	48	16
Average	3	12	9	13	3	11	11	8	10	3	7	8

(1) Greece is excluded in calculating the averages in row 12 and column 13. Data are only available until September 2011
Source: Bloomberg, Datastream and DG ECFIN calculations

fundamentals, which is interpreted as supporting the 'wake-up call' hypothesis. ([33])

I.5.2. Co-risk among euro area Member States

Although there is a growing literature on spillovers across sovereigns, the severity and the source countries of contagion are not well established. The analysis in this section presents a tool for monitoring bilateral risk spillover effects of sovereign credit risk in extreme market conditions.

One method to extract this information consists of tracking the market's view of how the credit risk of one sovereign affects other sovereigns, when it is in trouble. Such a co-risk model helps in disentangling bilateral relationships, while taking into account the non-linear properties of risk during times of stress. ([34]) The methodology applied is presented in Box I.2. ([35])

The main variable of interest is sovereign credit risk for the economies of 11 euro area Member States (see Table I.1), as represented by daily changes in credit default swap (CDS) spreads of five-year maturity. ([36]) The CDS spreads adjust to reflect new information that may have an impact on the credit risk of the economy. As CDS are primarily concerned with the situation when default occurs, which is an extreme and rare event, they are particularly useful in the present context, studying spillover effects in extreme market conditions. In addition, a set of common risk factors are used to control for changes in market and economic conditions that may affect the credit risk of a Member State other than the shock from the troubled Member State.

The results of the analysis are presented in Table I.1, where each cell contains the bilateral conditional co-risk at the end of October 2014. Co-risk is measured by excess CoVaR in basis points, which is the additional risk a Member State incurs above its own unconditional risk, the VaR. For example, if one Member State has a VaR of 10 bps., and a CoVaR vis-à-vis another Member State of 15 bps., the excess CoVaR is 5 bps. Thus, each row in the table features the change in the conditional credit risk borne by a Member State, which is induced by 'source' countries listed in the columns.

The co-risks are illustrated for when CDS spreads are high, i.e. at their 99th percentile. For example, Table I.1 shows that when the change in the

([33]) Bekaert G., M. Ehrmann, M. Fratzscher and A. Mehl (2014): 'The global crisis and equity market contagion', *Discussion Papers of DIW,* Berlin 1352, DIW Berlin.

([34]) The estimated model can generically be specified in the following way: Member State 1's credit risk is equal to Member State 2's credit risk when in trouble, plus a set of control variables. By trouble is meant that the Member State is experiencing a much larger change in the measured variable than normally. In fact, the event must be at the 99th percentile of the distribution. . The conditional co-risk measure called CoVaR can be expressed as: $CoVaR_{99}^{i|j} = \hat{\alpha}_{99}^{i|j} + \hat{\beta}_{q}^{i|j} VaR_{99}^{j} + \sum_{k=1}^{N} \hat{\gamma}_{k,99}^{i|j} F_k$, in which VaR_{99}^{j} is the unconditional risk represented by 99th percentile change in Member State j's CDS spread, and F_k are a set of common risk factors.

([35]) The estimated model can generically be specified in the following way: Member State 1's credit risk is equal to Member State 2's credit risk when in trouble, plus a set of control variables. By trouble is meant that the Member State is experiencing a much larger change in the measured variable than normally. In fact, the event must be at the 99th percentile of the distribution.

([36]) Credit default swaps are financial instruments that allow taking or transferring credit risk from one party to another. Credit default swaps are over-the-counter (OTC) products and are quoted in basis points per year — the so-called CDS spread. The CDS spread indicates the cost per year to either buy or sell exposure to the possibility of a default or restructuring of an underlying debt security. Thus, a buyer of a CDS contract incurs a yearly cost, an insurance premium to be paid, to hold the contract.

Box I.2: **The CoVaR methodology**

From a macro-financial stability and a sovereign risk management perspective, it may be critical to assess direct and indirect linkages at the country level. Doing so may help in understanding the systemic importance of individual economies. One way to uncover the bilateral linkages is via co-risk measures that capture the increase in risk of one country when another country falls into distress. Conditional value at risk (CoVaR) is one such measure that captures the degree of intensification of the risk, which was first developed by Adrian and Brunnermeier (2008). It takes into account the non-linear properties of risk, as correlations and the risk measure may change with the level of risk.[1]

Value at risk (VaR) is a common risk measure used in risk management, which tries to quantify the risk of loss on a portfolio. For example, the VaR of a portfolio of assets refers to the potential loss the portfolio may incur, over a given time horizon and at a specific confidence level. In this section, the context is somewhat different; the VaR of a Member State's economy is in terms of the probability of a sharp deterioration in its credit risk.[2] However, the VaR focuses on the economy concerned in isolation, and does not take into account the effect of other economies.

Using conditional value at risk (CoVaR) is one way of assessing the risk spillover effect that one Member State may have on another, i.e. the conditional risk of the economy. The CoVaR for one Member State is defined as the VaR of the economy conditional upon the VaR of another Member State's economy.[3]

A non-linear approach to estimate the conditional risk, the CoVaR, is to use quantile regressions. Quantile regressions extend the standard regression intuition – ordinary least squares – beyond the mean of the conditional distribution.[4] It allows the analyst to slice the distribution at the quantile of interest and obtain the corresponding cross-section of the conditional distribution.[5] This is particularly useful in the present context as the quantile regressions allow for estimating the CoVaR more or less directly, as the confidence level of the VaR corresponds to the quantile specified in the regression technique.

Following Wong and Fong (2010), the model estimated relates changes in the credit-default-swap (CDS) spread of one euro-area Member State with another's, using quantile regressions:[6]

$$\Delta CDS_i = \alpha_q^{i|j} + \beta_q^{i|j} \Delta CDS_j + \sum_{k=1}^{N} \gamma_{k,q}^{i|j} F_k + \varepsilon_q^{i|j};$$

where ΔCDS_i is the change in the CDS spread of country i, expressed as a function of the CDS spread of country j, ΔCDS_j, and a set of common risk factors F_k. The equation is estimated at the 99th quantile, denoted by q. The estimated coefficients, $\alpha_q^{i|j}$, $\beta_q^{i|j}$, and $\gamma_{k,q}^{i|j}$ provide a measure of how the credit risk of one country affects another at the 99th quantile of the distribution. The choice of quantile is arbitrary, but follows the examples of other researchers, which makes the results comparable across studies.

The set of common risk factors are used to control for changes in market and economic conditions that may affect the credit risk of a Member State other than the chock from the troubled Member State. The independent variables are represented by indicators that are commonly used in research and analysis of financial risk and stability: the business cycle, liquidity situation, risk aversion, general sovereign default risk, the risk premium, and the default risk in the interbank market.

1 Adrian T. and M. Brunnermeier (2011), 'CoVaR', NBER Working Paper, No. 17454, NBER.

2 VaR is defined as the daily change in a certain variable associated with the economy at a confidence level of $(1-q)$. The statistical representation is: $Pr(\Delta X \leq VaR_q) = q$, where ΔX is the change of the of the concerned variable in the economy and q is the probability of observing such an extreme change.

3 $CoVaR_q^{i|j}$ is the VaR_q^i of Member State i conditioned upon the VaR_q^j for Member State j. Statistically it can be written: $Pr(\Delta X^i \leq VaR_q^{i|j} | \Delta X^j \leq VaR_q^j) = q$

4 Standard regression analysis focuses on the mean relationship between variables and thus fails to provide a complete picture of what happens in periods of stress. In stressed periods, changes in a particular variable are by definition far from the mean, i.e. events occur in the tail of the distribution.

5 Quantile regressions was first introduced by Koenker and Basset (1978).

6 Wong, A. and T. Fong (2010), 'Analysing interconnectivity among economies', Working Paper, 03/2010, Hong Kong Monetary Authority.

(Continued on the next page)

Box (continued)

The conditional co-risk measure, which is analogous to a conditional value-at-risk measure, is obtained by substituting in the change in the CDS spread at the 99th percentile of country j, i.e. the VaR for country j, into the estimated equation:

$$CoVaR_{99}^{i|j} = \hat{\alpha}_{99}^{i|j} + \hat{\beta}_{q}^{i|j} VaR_{99}^{j} + \sum_{k=1}^{N} \hat{\gamma}_{k,99}^{i|j} F_k,$$

where the 99 signifies that parameters are estimated by the 99th quantile regression and that the 99th percentile of the empirical distribution of the CDS spreads have been used.

The analysis of the conditional credit risk represents a surveillance tool, as it reveals which countries are perceived as to be more connected to each other. The conditional co-risk measures are more informative than unconditional risk measures because they provide a market assessment of the increase in a Member States credit risk induced from its links to another country. Furthermore, the more relevant measure of conditional co-risk concern the measures under tail events, when policy actions and risk management are most important. Intuitively, when CDS spreads are at the 99th quantile of the distribution (the right tail of the distribution) this represents a period of distress.

Belgian sovereign CDS spread is at its 99th percentile, this implies a 32 bps. increase in the change in the Spanish CDS spread, a rise by 120 % compared with its unconditional VaR, estimated at 26 bps. Similarly, the table shows that the credit risk of Belgium conditional on the risk of Spain is 4 bps. higher than that corresponding to the 99th percentile of Belgium's own CDS distribution, i.e. 27 % higher. The co-risks are thus not necessarily symmetric and one country may have a greater impact on others. The shadowed cells contain each Member State's change in the CDS spread at the 99th percentile of the respective distribution, i.e. the unconditional VaR.

For most Member States, the conditional co-risk is higher than the unconditional risk in the shadowed cells along the diagonal of the table. On average, the VaR of the euro area at the 99th percentile increases by 8 bps. (the lower right corner in the table), or 38 %.

The right column presents the average co-risk for each Member State in the sample, which can be interpreted as its 'vulnerability' to stress in other Member States. Member States that are more vulnerable, i.e. have a higher average CoVaR, are more likely to experience a negative impact because of others. Unsurprisingly, beside Greece, the most vulnerable Member States are Spain, Portugal, and Ireland. If the relative increase is taken into account, Austria could also be considered as sensitive to stress in other Member States.

The last row in the table shows the average increase in the co-risk measures of other Member States at their 99th percentile when the economy is under the same stress, i.e. it measures how much impact one Member State has on the others, or how much risk originates from one country. Belgium, Finland, and France are found to be the Member States that have the highest impact on other Member States. One interpretation of these results is that Member States that commonly are counted among the 'core' euro-area Member States, but have high debt levels or very weak growth, have a relatively strong negative effect on the weaker economies in the euro area. However, these 'risk spreaders' are not themselves sensitive to events in, e.g. programme countries. Thus, spillover effects are asymmetric.

The averages hide several interesting bilateral relationships between euro-area Member States. First, Finland seems to be relatively unaffected by the performance of other Member States; the conditional measure of co-risk is rather similar to the unconditional one. However, developments in Finnish credit risk exert pressure on several other Member States. Finland is a strong proponent of the fiscal rules, but is in a long-lasting recession, with continuous budget deficits. A possible interpretation of this observation could be that if Finland were to experience a significant amount of stress in the future, this could induce renewed stress on sovereign debt markets. The results for France display similar features, although to a slightly lesser degree. Second, Ireland is mainly affected by events in the big core euro-area

Member States, like Germany, France, Italy, and the Netherlands. However, in September 2011, at the time of the restructuring of Greek debt held by private creditors, Ireland was the Member State most severely affected by the Greek event. Third, Spain and Portugal seems to be clearly linked to other programme countries, but also other Member States. Interestingly, however, Portugal is less affected by Spain than Spain is by Portugal.

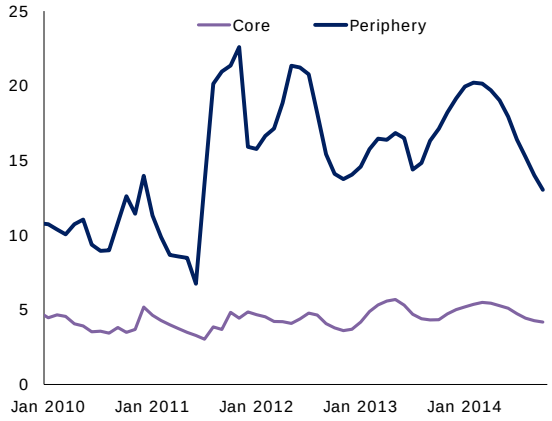
Time series of excess CoVaRs can be generated by estimating the model recursively at the end of each month starting in January 2010. The approach is static in the sense that the dataset used for estimating the model each month is the same except for an additional month of observations. However, these approximately 20 additional observations each month are sufficient to generate significant variability in the co-risk measure. The time-series analysis illustrates the persistence of the findings in Table I.1 and serves as a consistency check.

Graph I.5 shows the average CoVaR over time for two groups of Member States labelled *core* and *periphery*.([37]) It shows how Member States are affected by large changes in CDS spread of other Member States, i.e. how their vulnerability change over time. A fist observation is that the average CoVaR for core countries is relatively stable over time. A second observation is that CoVaR for the periphery countries is significantly higher for the whole period, and that the sharp falls in co-risk are coincident with important events signifying the sovereign debt crisis in the euro area. In the graph, the first large fall of the periphery series followed the agreement to bailout Ireland in November 2010. The second large fall in co-risk came after the agreement of a second bailout package for Greece in October 2011, which included a default on Greek sovereign debt vis-à-vis the private sector. Yet co-risks started to mount again afterwards. The stress period peaked in July 2012 when Draghi, President of the ECB, announced that the ECB was ready to do whatever it takes to solve the situation. With the formal announcement of Outright Monetary Transactions (OMT) at the beginning of September 2012 co-risk fell sharply.

([37]) Austria, Belgium, Germany, Finland, France and the Netherlands are labelled core countries. Ireland, Italy, Portugal and Spain are labelled periphery countries.

For policy makers, the illustrated use of co-risk measures can be used to assess financial interconnectivity in the euro area, in particular how the risk of one Member State may change when another country comes under stress. In terms of complementary background analysis, the tool offers at least two insights to policy makers, as it gives an indication of which Member States are vulnerable and it may show which Member States have a higher impact on others. Although the results presented in this section do seem to be consistent with actual events and often are in line with intuition, the results should be interpreted with caution. The analysis is based on a methodology that is relatively complex and requires a certain amount of assumptions that may affect the results, and make them difficult to interpret. For example, Table I.1 shows the outcome of 110 bilateral regressions; some are bound to be difficult to explain. The econometric results should therefore be considered with caution particularly when looking at individual countries.

Graph I.5: **Member States' vulnerability to shocks-Average excess CoVaR**
(Jan 2010-Oct 2014, basis points)



(1) Core is AT, BE, DE, FI, FR and NL. Periphery is ES, IE, IT and PT.
Source: Bloomberg, Datastream and own calculations.

I.6. Confidence spillovers

The recent crisis has been characterised by a significant decline in consumer confidence in the euro area. There is some evidence that changes in confidence in one country can spill over to other countries affecting confidence and ultimately real consumption abroad. Dées and Soares Brinca (2011) find evidence of confidence spillovers from the US to the euro area on the basis of regression analysis and of a two-region vector autoregression

(VAR) model (while shocks to euro area confidence do not appear to have an impact on confidence and consumption in the US). ([38]) Fei (2011) uses data for G7 countries and Spain and finds evidence of a confidence transmission channel from large countries to smaller countries. ([39]) Dées and Guntner (2014) analyse the propagation of confidence shocks across the US, the euro area and four EU countries taken individually in a factor augmented VAR (FAVAR) model. ([40]) They find that, in most cases, the transmission of confidence shocks is significant for foreign consumer confidence, lending support to the hypothesis of a confidence channel in the international transmission of shocks.

The role of consumer confidence spillovers in the euro area can also be analysed by making use of consumption and confidence regressions. Analysis has been carried out for a panel of euro area Member States over the period 1999-2012 (see D'Auria for a detailed discussion). ([41]).

Consumer confidence is measured by the Consumer Confidence Indicator developed by the European Commission as part of the Joint Harmonised EU Programme of Business and Consumer Surveys. The model includes a set of economic fundamentals as explanatory variables in order to isolate the role of consumer confidence and includes consumption and confidence equations. The results suggest that foreign confidence has a significant effect on domestic real consumption through its impact on domestic confidence, thereby lending support to the existence of confidence spillovers across euro area countries.

I.7. Shock interaction and spillovers

The previous sections analysed the cross-border spillover effects of different shocks separately in order to better focus on their transmission mechanisms. However, these shocks rarely occur in isolation, implying that there can be important interaction effects ultimately affecting the size and direction of the spillovers. Further work is needed to better understand these interactions and their implications for spillovers.

The main challenge for the EU and the euro area in particular, is currently to put in place policies to close the output gap while increasing potential output. This requires both demand and supply-side measures and a three-pronged strategy encompassing fiscal, structural and monetary policies. In this context, spillovers originated by policy decisions in these areas should be considered within an integrated approach, taking into account potential synergies and reinforcing/counterbalancing effects.

For example, the adoption of structural reforms, by making the economy more flexible and boosting growth, can facilitate fiscal consolidation. However, net cross-border spillover effects from reforms in different areas are likely to be dependent on the size and features of the specific measures considered. For instance, Weyerstrass et al. (2006) simulate the effects of combined structural and consolidation policies in the euro area and find that spillover effects depend on the relative importance of the different transmission channels. ([42]) Coordinated policies are also found to deliver more beneficial effects than non-cooperative policies.

Important interactions also occur between fiscal policy shocks and financial reforms. For example, in the context of the euro area, improved access to long-term financing and a complete Banking Union, by addressing financial fragmentation and ensuring financial stability, can strengthen positive spillovers from measures supporting productive investment. Furthermore, there are also interactions between financial shocks and macroeconomic policies. By improving an economy's fundamentals, fiscal and structural policies can reduce its exposure to financial contagion (in the form of wake-up calls) or help it adjust to contagion if it occurs.

Confidence effects can also interact significantly with other shocks. For instance, the adoption of structural reforms is generally accompanied by an

([38]) Dées S. and P. Soares-Brinca (2011): 'Consumer confidence as a predictor of consumption spending — Evidence for the United States and the euro area', *ECB Working Paper*, No 1349.

([39]) Fei S. (2011): 'The confidence channel for the transmission of shocks', *Banque de France Working Paper*, No 314.

([40]) Dées S. and J. Guntner (2014): 'The international dimension of confidence shocks', *ECB Working Paper,* No 1669.

([41]) See D'Auria, F. (2013): 'Cross-border spillovers in confidence', *Quarterly Report on the euro area*, Vol. 12, Issue 3 for a detailed discussion of the results.

([42]) Weyerstrass K., J. Jaenicke, R. Neck, G. Haber, B. van Aarle, K.Schoors, N. Gobbin and P Claeys (2006), 'Economic spillover and policy coordination in the Euro Area', European Economy Economic Papers 246.

improvement in expectations regarding future economic prospects, potentially leading to larger positive spillovers.

I.8. Conclusions

This article reviewed the evidence on cross-border spillovers resulting from a variety of shocks, with a particular focus on the euro area. Trade and financial interlinkages between euro area countries are strong and larger than could be expected given the relative economic size of the euro area. Since the onset of the crisis, there is evidence of a partial reversion of this 'euro bias' for financial flows but a marked attenuation of the trend is not observable for trade linkages.

Cross-border spillovers from fiscal policy measures can be sizeable, but this depends on several elements, such as the response of monetary policy and the composition of the intervention. Model simulations show that an increase in investment in countries with fiscal space would generate positive spillovers to the rest of the euro area.

Spillovers from the adoption of structural reforms are generally found to be positive but small, with the exception of the long-run effects of policies promoting innovation. Simulations with the QUEST model show that the simultaneous implementation of structural reforms in the euro area would lead to larger output gains than they would if adopted by countries acting alone, highlighting the benefits from coordination.

The crisis was characterised by large financial spillovers. The literature estimates significant spillover effects across sovereign bond markets and between sovereign and private risk. The analysis of bilateral spillover effects of sovereign credit risk in the euro area shows considerable heterogeneity across countries, with Greece, Spain, Portugal and Ireland being the most vulnerable to stress in other Member States and some 'core' countries having a large impact on other Member States without being considerably affected in return. Finally, there is also evidence supporting the existence of a confidence channel in the transmission of shocks across euro area countries.

II. Special topics on the euro area economy

II.1. ECFIN's medium term projections: the risk of 'secular stagnation' ([43])

Between spring and autumn 2014 the European Commission revised down its growth forecasts for 2014 and 2015. Other policy institutions have also lowered their projections for growth in the euro area and other regions, and the IMF warns that 'secular' (i.e. long-term) stagnation remains a risk. This paper presents DG ECFIN's medium-term projections and analyses how structural unemployment, productivity trends and investment have contributed to persistence of slow growth since the 'great recession'. The projections show that the decline in employment and productivity growth is not just a cyclical phenomenon. It is related to a slowdown in the growth rate of the working-age population, an increase in the non-accelerating wage rate of unemployment (NAWRU) and reduced trend total factor productivity (TFP) growth. However, the largest factor weighing on potential growth is low rates of capital formation. Apart from the slowdown in potential growth, deleveraging pressures are also exerting a negative effect on investment rates. Using the QUEST model, we cannot confirm that deleveraging will reduce growth permanently, as sometimes argued in the literature. An important reason for the protracted slowdown in euro area growth was the double-dip nature of the recession, which saw the financial crisis followed by the sovereign debt crisis. The second recession, in particular, highlighted the absence of supranational financial assistance mechanism in the euro area as well the need to address powerful fragmentation forces in financial markets. Since then, however, important steps have been taken, notably with the creation of the ESM and the establishment of a European banking union. The recently announced Investment Plan for Europe and a renewed commitment to structural reforms are also essential to counter risks of secular stagnation in the euro area.

Introduction

The European Commission cut its growth forecasts for the euro area (EA) for 2014 and 2015 by 0.4 percentage points (pps) and 0.6 pps. respectively between its spring and autumn 2014 forecasts. The IMF also revised down its global growth projection for 2014 by 0.3 pps., warning that 'Global growth could be weaker for longer, given the lack of robust momentum in advanced economies despite very low interest rates' (WEO, autumn 2014). The fact that investment has not picked up yet despite low interest rates could indeed signal a chronic demand shortage in the euro area. Secular stagnation therefore remains a risk. This section looks at the secular stagnation hypothesis from the perspective of DG ECFIN's potential growth estimates and medium-term projections until 2023. We first provide an assessment of recent growth trends, then discuss possible trend reversals. Finally we discuss the upside and downside risks associated with these projections, in light of the secular stagnation hypothesis.

Recent growth trends in the euro area

Actual GDP growth in the euro area has slowed considerably since the crisis, from an average annual rate of 2.1% over the 1999-2008 period to -0.4% between 2009–14. Projections show growth remaining subdued in the medium term, at an average of 1.4% p.a. from 2015 to 2024.

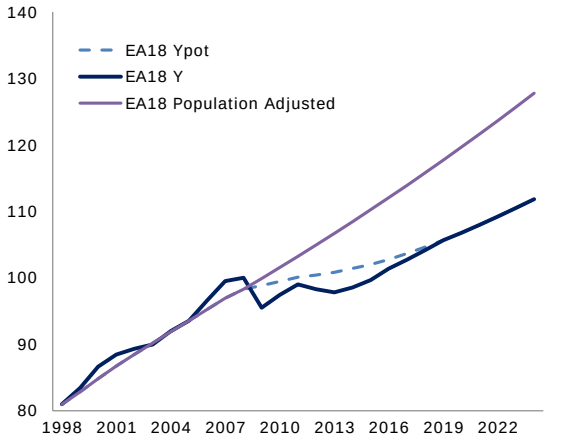
There has been a major cyclical slowdown — in fact a double-dip recession — but potential growth has also declined strongly, from an average of 2.0% in the same pre-crisis period to of 0.5% in the 2009-14 period.

Thus about three quarters of the growth slowdown is due to a decline in potential growth. Over the medium term it is projected that potential growth picks up again, to a rate of 1.0% over the period 2015–24. To make a rough estimate of the impact of the financial crisis on the projected output loss until 2014 and the outlook for 2023, we have to take into account a marked slowdown in the growth rate of the working-age population by 0.4% p.a. since 2009. This factor translates into a growth slowdown of about 0.3 pps. p.a. Thus a continued pre-crisis growth rate would have been 1.7% instead of 2.0%. As shown by Graph II.1.1, compared with this alternative path the medium-term projections generate a level of GDP which is about 9% lower in 2015. Recently, Ball

([43]) Section prepared by Werner Roeger.

(2014), ([44]) using OECD projections, has estimated an average output loss of 8.4% in 2015 for a sample of 23 OECD countries.

Graph II.1.1: **Various potential and actual output paths for the euro area**
(1998-2024, Index 2008=100)



Source: DG ECFIN calculations.

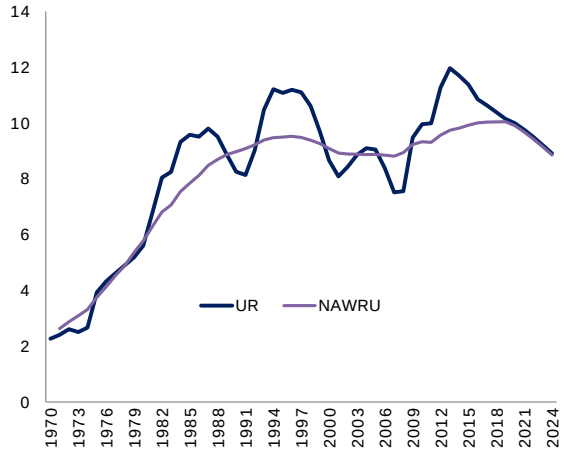
Analysing the growth slowdown

Growth has been weak since 2008, and even in 2014 euro area GDP has not reached its pre-crisis level. Such a long slump suggests that potential growth was reduced with the onset of the financial crisis. We can identify four reasons for a slowdown in potential growth: a decline in the growth rate of the working-age population, an increase in the NAWRU, a decline in trend TFP growth and a reduction in capital growth.

It appears that the decline in the total contribution of labour (trend hours) has lowered potential growth by 0.5 pps. since the onset of the crisis. Whereas in the 1999-2008 period the average contribution of labour to potential growth was 0.4 pps. p.a., for the 2009-14 period, labour had a negative contribution of potential growth of 0.1 pps. p.a. on average. However, only a growth reduction of 0.2 pps. can be attributed to an increase in the NAWRU. The drop in the growth rate of the working-age population (from 0.4% to 0.1%) has added another 0.3 pps. Since, according to these calculations, the NAWRU is now at its peak level, the impact of employment on growth will stop being negative and become positive from 2017 onwards. ([45])

For proponents of hysteresis effects — as revived by DeLong and Summers (2012), for example — this might be an optimistic scenario. On the other hand we also know from empirical analyses on NAWRU cyclicality (see Orlando, 2012) that unemployment in the euro area is subject to medium-term cycles, with hysteresis effects that do not last indefinitely. ([46]) In fact the NAWRU declined from 9.5% in the previous peak in the mid-1990s to 8.8% in 2007. A similar decline, as projected for the next 10 years, might nevertheless appear optimistic given that the last fall in the NAWRU occurred during a prolonged boom phase. However, labour market reforms enacted in various Member States after the crisis could be a trigger for a decline of the NAWRU this time.

Graph II.1.2: **Euro area NAWRU**
(1970-2024, %)



Source: DG ECFIN

A worrying supply-side phenomenon is that actual TFP levels have so far not returned to their 2007 peak (see Graph II.1.3). For the 2009–14 period, we still estimate reduced but positive annual trend TFP growth of 0.4 pps. compared with the average of the pre-crisis decade. This relatively small adjustment in trend TFP growth relative to actual TFP growth is mostly explained by a strong decline

([44]) Ball, L. M. (2014):'Long-term damage from the great recession in OECD countries', *NBER Working Papers No 20185*.

([45]) For a presentation of the NAWRU methodology see: F. Orlandi (2014): 'New estimates of Phillips curves and structural unemployment in the euro area', *Quarterly Report on the Euro Area*, Volume 13, Issue 1.

([46]) DeLong, B. and L. Summers (2012): 'Fiscal policy in a depressed economy', *Brookings Papers on Economic Activity*, Spring 2012, pp. 233-299; Orlandi,F. (2012): 'Structural unemployment and its determinants in the EU countries', *European Economy — Economic Papers*, 455.

Table II.1.1: **Potential and per capita growth, euro area**

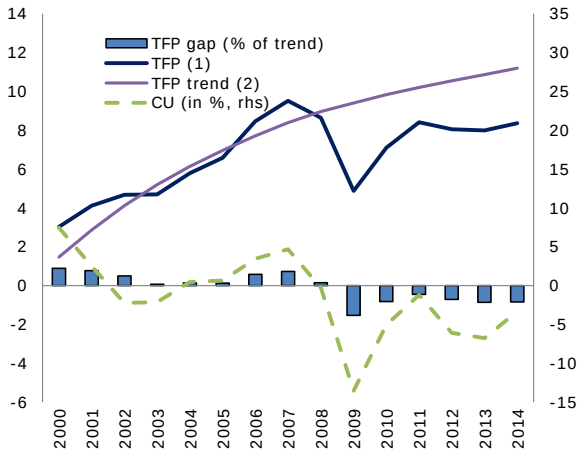
EA18	Potential Growth (annual % change)		Contributions to Potential Growth*					Determinants of Labour Potential and Capital Accumulation			
Autumn 2014	Ypot per capita (PopWA 15-74)	PF Potential Growth	Total Labour (Hours) Contrib.	*Labour (persons) Contrib.*	*Changes in Hours (per Empl) Contrib.*	Capital Accumulation Contrib.	TFP Contrib.	Growth of Working Age Population (annual % change)	Trend Participation Rate (% of Working Age Population)	NAWRU (% of Labour Force)	Investment Ratio (% of Potential Output)
1999	2.0	2.3	0.4	*(0.7)*	*(-0.3)*	0.9	1.0	0.3	62.5	9.4	22.2
2000	2.0	2.4	0.5	*(0.8)*	*(-0.3)*	0.9	1.0	0.3	63.0	9.2	22.7
2001	1.9	2.3	0.5	*(0.8)*	*(-0.3)*	0.8	1.0	0.4	63.4	9.1	22.5
2002	1.5	2.0	0.4	*(0.7)*	*(-0.3)*	0.7	0.9	0.5	63.8	9.0	21.8
2003	1.4	1.9	0.5	*(0.7)*	*(-0.3)*	0.7	0.8	0.5	64.1	9.0	21.7
2004	1.4	1.9	0.5	*(0.7)*	*(-0.2)*	0.7	0.7	0.5	64.4	9.0	21.9
2005	1.3	1.8	0.4	*(0.6)*	*(-0.2)*	0.7	0.6	0.5	64.7	9.0	22.0
2006	1.4	1.8	0.4	*(0.6)*	*(-0.2)*	0.8	0.6	0.4	65.0	8.9	22.8
2007	1.3	1.8	0.4	*(0.6)*	*(-0.2)*	0.8	0.5	*0.4*	65.3	8.9	23.5
2008	1.0	1.4	0.2	*(0.4)*	*(-0.2)*	0.8	0.5	*0.4*	65.5	9.0	23.1
2009	0.4	0.6	-0.2	*(0.0)*	*(-0.2)*	0.4	0.4	*0.1*	65.7	9.3	20.4
2010	0.6	0.6	-0.1	*(0.1)*	*(-0.2)*	0.4	0.4	*0.0*	65.9	9.4	20.2
2011	0.6	0.7	-0.1	*(0.1)*	*(-0.2)*	0.4	0.4	*0.0*	66.0	9.4	20.4
2012	0.3	0.3	-0.3	*(-0.1)*	*(-0.2)*	0.2	0.4	*0.0*	66.1	9.6	19.6
2013	0.2	0.4	-0.1	*(0.0)*	*(-0.2)*	0.2	0.3	*0.2*	66.2	9.8	19.1
2014	0.4	0.6	0.1	*(0.2)*	*(-0.1)*	0.2	0.3	*0.2*	66.3	9.9	19.1
2015	0.5	0.6	0.0	*(0.1)*	*(-0.1)*	0.2	0.4	*0.0*	66.4	10.0	19.3
2016	0.7	0.7	0.0	*(0.1)*	*(-0.0)*	0.3	0.4	*0.0*	66.5	10.0	19.9
2017	0.8	0.9	0.1	*(0.1)*	*(-0.1)*	0.3	0.5	*0.1*	66.6	10.1	20.4
2018	0.9	0.9	0.1	*(0.2)*	*(-0.1)*	0.4	0.5	*0.1*	66.7	10.1	20.7
2019	0.9	1.0	0.1	*(0.2)*	*(-0.1)*	0.4	0.5	*0.0*	66.9	10.1	20.9
2020	1.0	1.0	0.2	*(0.2)*	*(-0.0)*	0.4	0.5	*0.1*	66.9	9.9	21.0
2021	1.1	1.1	0.2	*(0.2)*	*(0.0)*	0.4	0.5	*0.0*	66.9	9.7	21.1
2022	1.2	1.2	0.2	*(0.2)*	*(0.0)*	0.4	0.5	*-0.1*	66.9	9.5	21.1
2023	1.3	1.2	0.2	*(0.2)*	*(0.0)*	0.4	0.5	*-0.1*	67.0	9.2	21.2
2024	1.3	1.2	0.2	*(0.2)*	*(0.0)*	0.4	0.6	*-0.1*	67.0	8.9	21.2
Periods											
1999-2008	1.5	2.0	0.4	0.7	-0.2	0.8	0.8	0.4	64.2	9.0	22.4
2009-2014	0.4	0.5	-0.1	0.1	-0.2	0.3	0.4	0.1	66.0	9.6	19.8
2015-2024	1.0	1.0	0.1	0.2	0.0	0.4	0.5	0.0	66.8	9.7	20.7

Source: DG ECFIN

in capacity utilisation rates. As can be seen from Table II.1.1, in our medium-term projection the secular decline of the TFP trend does not continue, but a modest increase in TFP trend growth from 0.3% in 2014 to 0.5% is projected for the 2015-24 period. This trend reversal must be seen as uncertain and possibly optimistic, however. Even in the United States there is debate about a secular decline in technology; Gordon (2012) in particular argues that recent innovations which mostly emanate from the IT sector have weaker macroeconomic productivity effects than innovations of the industrial revolution, which were associated with an expansion of the manufacturing sector. ([47]) This argument is even stronger in the case of Europe, where most countries lack a sizeable IT sector and therefore an important driver of innovation. A second argument for a secular slowdown in TFP growth is declining growth rates of skill acquisition and evidence of skill mismatches in the labour force. A further reason why we may be too optimistic about trend TFP is that actual TFP growth has been persistently weak since the crisis. As capacity utilisation rates return to normal levels, we may have to revise the TFP trend downwards.

([47]) Gordon, R. (2012): 'Is US economic growth over? Faltering innovation confronts the six headwinds'. *NBER Working Papers No 18315*.

Graph II.1.3: **Actual TFP, trend TFP and capacity utilisation in the euro area (2000-2014)**

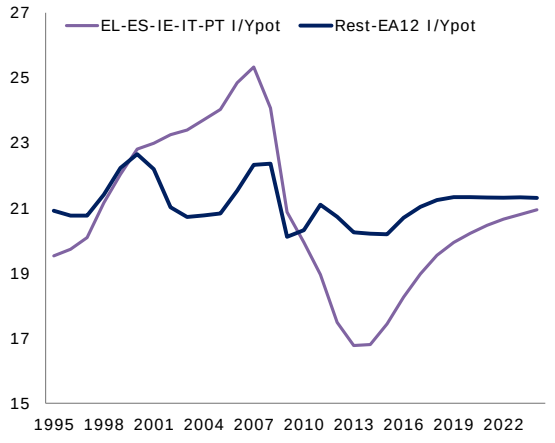


(1) Index of log (TFP) (base year 1997) =log TFP(1997)=0
(2) Index of log (TFP trend) (index is chosen such as to respect the % deviation between actual TFP and trend TFP)
Source: DG ECFIN

Low investment reduced potential growth by 0.5 pps. p.a. over the 2009–14 period on average when compared to the 1999-2008 period, and was the biggest driver of the growth slowdown. A number of factors contributed to the weakness of

investment. ([48]) Firstly, investment responds to both lower trend growth and lower demand (via the accelerator mechanism). Secondly, capital costs are likely to be too high, because the zero lower bound has prevented a further decline in policy rates and because there has been a divergence between lending rates and the policy rate in several Member States. The main reasons for this divergence are either an increased investment risk or a higher degree of risk aversion in financial markets. The divergence in borrowing rates between periphery and core countries suggests there is a correlation between risk premia and the leverage of the private and public sector. It therefore appears likely that more fundamental risk perceptions in financial markets are playing a role. Risk premia point, among other things, to deleveraging pressures from lenders, but also to higher bank capital costs and higher risks of debtor default in some Member States. High and risky private sector leverage has its counterpart in excess capital formation during the pre-crisis boom. This is illustrated by the pattern of gross fixed capital formation (relative to potential output) between peripheral countries (Ireland, Greece, Spain, Italy and Portugal) and core countries. As Graph II.1.4 shows, peripheral countries have been affected most by declining investment rates since 2008, while the fall in investment in the core countries has been moderate.

Graph II.1.4: **Investment to potential output ratio**
(1995-2024, %)



Source: DG ECFIN

([48]) European Commission, 2014: 'Drivers and implications of the weakness of investment in the EU', *Autumn Forecast*, Box I.1.

DG ECFIN's projections show that the investment rate has now reached a trough at 19.1% and will increase to 19.9% at the end of the short-term forecast horizon in 2016. In the medium term, a further increase is expected. This projection is, however, conditional on a decline in NAWRU and a slight recovery in trend TFP growth, as discussed above. Furthermore, investment rates will remain significantly below their pre-crisis averages in the medium term.

How realistic is this medium-term growth scenario?

The medium-term projections provide a scenario in which the euro area economy would eventually move partially back towards its pre-crisis growth rate, corrected for capital growth, which appears to have been too high in the pre-crisis boom. This baseline scenario does not include any further growth impetus from structural reforms ([49]) but is largely based on three assumptions. First, currently high levels of unemployment would not lead to long-lasting hysteresis effects. Second, about 50% of the TFP growth decline since the crisis could be recovered in the medium term. And third, firms and households make use of investment opportunities offered by favourable reversals in supply side trends, but will not benefit from further reductions in capital cost. Under these conditions secular stagnation would be avoided and average growth rates over the next 10 years could be around 1.4% p.a. This baseline scenario also assumes that the output gap would be closed.

Looking at the supply-side factors, there are two downside risks. First, hysteresis effects could last longer than assumed in this projection. Apart from the standard arguments for hysteresis effects which are related to skills degradation among the long-term unemployed, an additional hysteresis risk appears: delayed wage adjustments in a low-inflation environment. However, looking at the evidence for negative growth rates in both nominal and real unit labour costs in euro area economies with high unemployment, this risk appears small. A stronger downside risk is

([49]) For an in-depth analysis of the potential impact of structural reforms see Varga, J. and J. in't Veld (2013), 'The growth impact of structural reforms', *Quarterly Report on the Euro Area*, Vol. 12, Issue 4, pp. 17-27. The analysis shows that if Member States could manage to close half of the gap with the three best performing euro area Member States, euro area GDP growth rates could be boosted by ½ pps. each year over a 10-year period.

associated with the assumed recovery of trend TFP growth to 0.6% at the end of the medium-term projection. This implies a reversal of a long-lasting downward TFP trend and can thus be seen as an optimistic assumption. If this trend reversal does not occur but TFP growth remains at 0.4% (or even declines further to 0.3% if the downward trend persists), this could shave 0.2–0.3 pps. p.a. off the average trend growth projection in the 2015-24 period.

Probably a more fundamental challenge to this projection comes from concerns about demand-side factors related to the debt overhang and deleveraging needs in some euro area countries. As pointed out by Rogoff (2014), ([50]) private-sector deleveraging has not brought down debt levels significantly as a share of GDP in recent years. Based on these observations, Rogoff speculates that demand pressures resulting from deleveraging will exert further downward pressure on growth. Eggertson *et al.* (2014) develop a model where deleveraging leads to a permanent increase in the savings rate. ([51]) In addition, a recent paper by Buttiglione *et al.* (2014) points to a potential vicious circle whereby debt overhang reduces growth which makes deleveraging more difficult and slows down demand and growth further. ([52])

DG ECFIN regularly considers deleveraging pressures in its short-term forecasts. In various scenarios (see for example Cuerpo *et al.* (2013), Raciborski (2014)) the vicious circle hypothesis has been analysed with the European Commission's QUEST model. In the baseline scenario, deleveraging in the household and (non-financial) corporate sectors is considered. Deleveraging in the household sector is captured by a combination of:

- a drop in credit availability due to a reduction in the loan-to-value (LTV) ratio required by banks, and
- a fall in house prices simulated as a shock to housing demand through an increase in the risk premium on housing investment.

The combined effect of the shocks is calibrated to reduce the household debt-to-GDP ratio by about 30 pps. after 10 years and decrease house prices by around 24%, which is similar to the assumptions made in Cuerpo *et al.* (2013). ([53]) The deleveraging in the corporate sector is captured by a negative LTV shock leading to a drop in the corporate debt-to-GDP ratio of about 16 pps. after 10 years. The size of this shock roughly corresponds to the difference between the actual level of the corporate debt-to-GDP ratio in 2011 in Spain and the sustainable level of the ratio, calculated according to the methodology elaborated upon in Cuerpo *et al.* (2013). ([54])

The basic prediction made by these deleveraging scenarios is that the deleveraging process indeed leads to a prolonged slowdown in growth for three to four years — driven by a strong reduction in residential and corporate investment — but this process stabilises and the slowdown is not permanent. During this period private sector debt remains high and falls only slowly because of denominator effects (see Graph II.1.1). An important reason for debt remaining high initially is the fall in inflation, which raises the real interest rate. This leads to a decline in private consumption and investment demand and aggravates the negative demand effect. In that sense there is an element of a vicious circle. However, since price and wage adjustment slows down as the economy becomes more competitive, the real interest rate declines and domestic demand stabilises and the deleveraging process gains momentum. Thus, in contrast to Buttiglione *et al.*, this analysis suggests that a vicious circle will be only temporary and both competitiveness and interest rate effects will stabilise the economy in the medium term. The adjustment path generated by these deleveraging scenarios is qualitatively similar to that observed

([50]) S. Lo and K. Rogoff (2014): *Secular Stagnation, debt overhang and other rationales for sluggish growth, Six Years On,* 13th Annual BIS Conference, 27 June 2014, Lucerne, Switzerland.

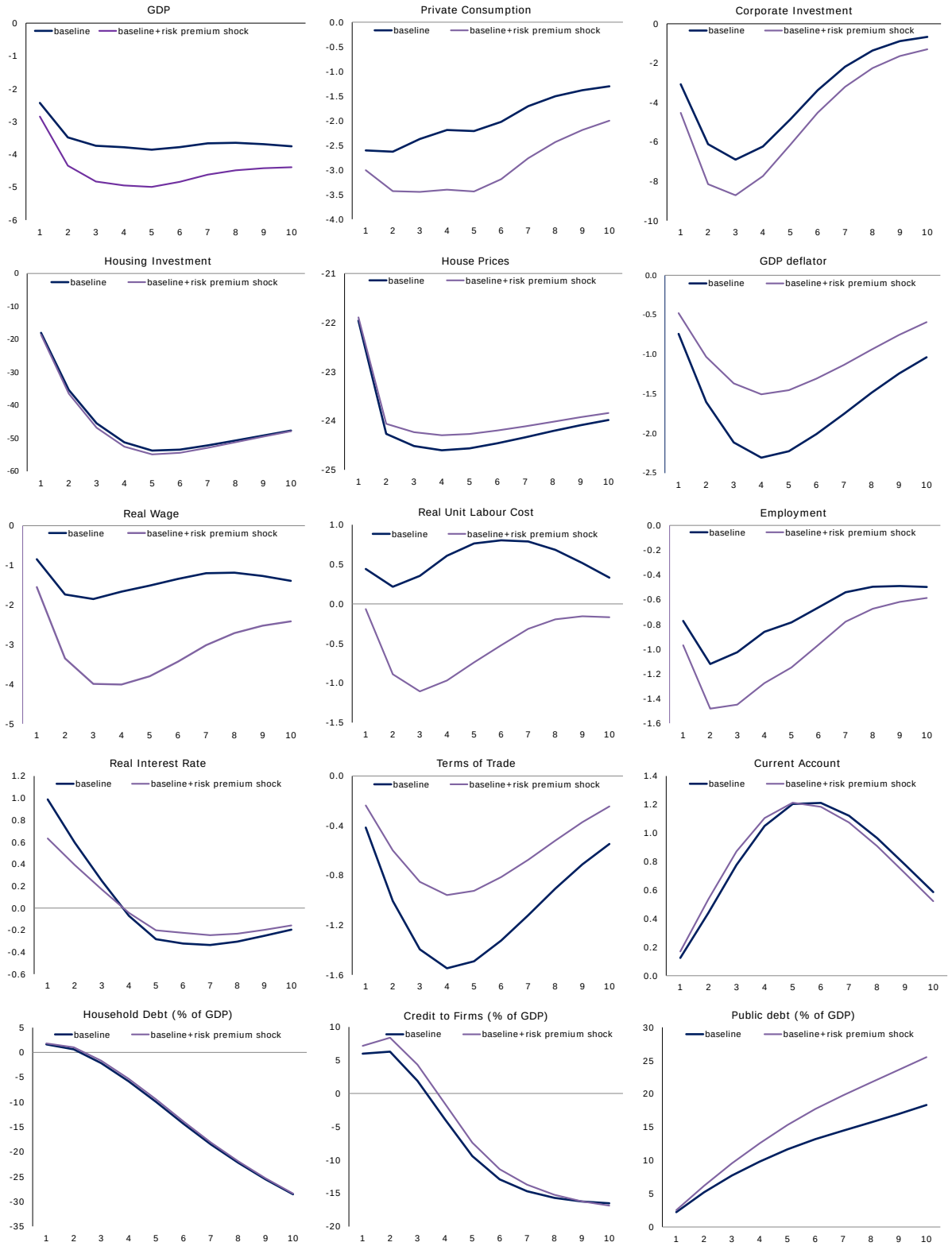
([51]) Gauti B. Eggertsson, G. B. and N. R. Mehrotra (2014): 'A model of secular stagnation', *NBER Working Papers No 20574.*

([52]) Luigi Buttiglione, Philip Lane, Lucrezia Reichlin and Vincent Reinhart (2014): *Deleveraging, what Deleveraging?*, 16th Geneva Conference on Managing the World Economy, May 9, ICMB, CIMB and CEPR, Geneva.

([53]) It is worth putting the size of these shocks into context. Cuerpo *et al.* (2013) calculate that the Spanish household debt-to-GDP ratio rose from around 40% in 2000 to above 85% in 2008, with its value in 2011 only slightly below this number. According to the OECD (see http://s-ecfin-web/directorates/db/u1/data/housing/hp.html), real house prices increased by about 65% between 2000Q1 and their peak in 2007Q3. They have since fallen by about 45%. Between 2011Q1 and 2013Q2 they fell by about 26%.

([54]) The exact value of this gap has been kindly calculated by Carlos Cuerpo Caballero, unit ECFIN.B1 and is equal to 12.4 pps.

Graph II.1.5: **QUEST deleveraging scenarios (1)**



(1) The figures show% deviation from baseline levels.
Source: DG ECFIN.

However, one important reason why the adjustment in the euro area has been more protracted is missing in this analysis. In the euro area the financial crisis was followed by a sovereign debt crisis, thus highlighting shortcomings in the financial architecture of the economic and monetary union. As a vicious circle between rising government debt and bank vulnerabilities developed in the euro area periphery — leading to a second recession in 2012 — the need to provide temporary financial assistance to some sovereigns and to counter financial fragmentation forces became obvious. As a response, the European Stability Mechanism was created and the European banking union was launched. ([55])

Conclusion

There are two dimensions to the classical secular stagnation hypothesis in advanced economies: low supply growth (population growth, rates of technical progress) and/or low demand (expected ageing, rising income inequalities). Both factors can contribute to a slowdown in investment and consumption and may require low real interest rates in order to generate sufficient demand.

This section has argued that the euro area is mostly facing a secular decline in productivity growth and ageing, which started before the great recession and continues today. The negative effect of these forces has been aggravated by downside demand pressures due to the correction of macroeconomic imbalances accumulated the years before the crisis.

The pre-crisis boom can best be characterised by increased household and corporate demand which was fuelled by rising debt levels. This was associated with investment rates (particularly residential investment) which were too high and based on unsustainable income/productivity growth expectations. By contrast, consumption rates remained more in line with historical patterns. This section has argued that deleveraging pressures (mainly in the periphery) are likely to provide a good explanation for the persistence of the adjustment in the euro area, which has registered negative output gaps since 2009. Nevertheless, the length of this process as compared with the adjustment in countries outside the euro area shows that the euro area was suffering from problems with its financial architecture. This essentially led to a second recession in 2012. However, in response to the sovereign debt and banking problems important measures were taken, with the creation of the ESM, to provide supranational financial assistance. The European banking union is a further step towards improving cross-border adjustment and a more efficient allocation of risks across the euro area. The recently announced Investment Plan for Europe and a renewed commitment to structural reforms are also essential to counter risks of secular stagnation in the euro area.

([55]) F. Breuss, W. Roeger and J. in'tVeld (2014). 'The stabilising properties of a European Banking Union in case of financial shocks in the Euro Area', *DG ECFIN Economic Papers* (forthcoming) show how the Single Resolution Mechanism, the Single Deposit Guarantee Mechanism and, over a transition period, the ESM help to stabilise countries affected by adverse financial shocks.

II.2. External rebalancing in the euro area: progress made and what remains to be ([56])

Euro area countries with high current account deficits before the start of the crisis have now achieved balanced positions or even surpluses. This reflects substantial external rebalancing. The question is whether this is sufficient and the answer depends on whether levels of external indebtedness are sound. The analysis in this section shows that countries such as Estonia, Latvia and Slovakia corrected their current account positions early on in the crisis. At the same time, they have a level of indebtedness that does not pose sustainability risks for their economies and/or is slowly declining. Countries such as Spain and Portugal have stabilised their external positions and have current account surpluses that are helping to reduce their external indebtedness at a moderate pace. Nevertheless, their levels of indebtedness are high and require current account surpluses to continue. More efforts are required of Cyprus and, in particular, Greece if they are to improve their current account positions and reduce their indebtedness. In general, the process of external rebalancing is not finished, as there is still a need to address high stocks of debt. Moreover, the ability to achieve that is surrounded by significant risks that relate predominantly to persistently lower-than-expected inflation and growth.

External rebalancing — how far have we got?

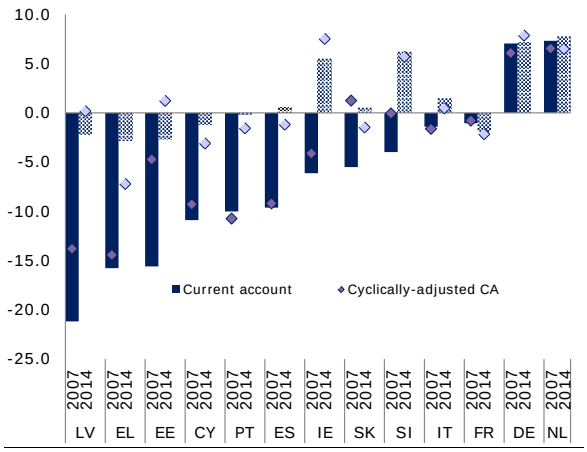
An earlier contribution to the *Quarterly Report on the Euro Area* ([57]) concluded that a number of countries in the euro area needed to do more to improve their external positions. Substantial progress has since been made in most euro area countries in this respect, but the adjustment remains asymmetric, with surplus countries further increasing their surpluses.

In this section, we revisit and update the assessment of external sustainability. We focus mostly on a small number of countries in the euro area, namely those that have been characterised as vulnerable in recent years (Cyprus, Greece, Spain, Ireland, Portugal and Slovenia). These countries have managed to improve their current account positions substantially. At the same time, their levels of external indebtedness remain high (except for Slovenia) and in any case, mostly composed of debt liabilities. Both the level of debt and its composition can pose considerable risks in terms of sustainability. ([58])

For comparison purposes, the analysis also occasionally includes those euro area Member States that accumulated large current account deficits in the pre-crisis years but closed these deficits earlier in the crisis, i.e. by 2010 (Estonia, Latvia and Slovakia). The external indebtedness of these countries has stabilised at levels of no more than 60% of GDP and, importantly, this debt is in its most part foreign direct investment (FDI) rather than debt liabilities. As a result, the underlying risk is shared between the countries concerned and their creditors.

For reference, the section also includes some data for the euro area's two main creditor ([59]) countries (the Netherlands and Germany) and the two remaining large Member States (Italy and France).

Graph II.2.1: **Actual and cyclically-adjusted current account levels**
(2007 and 2014, % of GDP)



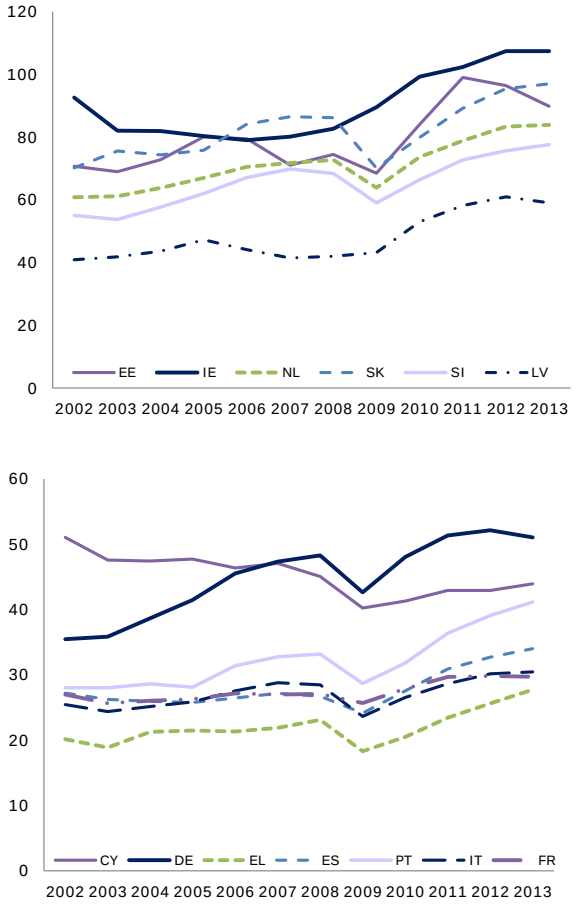
Source: European Commission calculations

Current account balances in the countries that faced large current account deficits prior to the crisis have now improved substantially (see Graph II.2.1). By 2014, all countries recorded

([56]) Section prepared by Alexander Hobza and Maria Demertzis.
([57]) D'Auria, F., J. in't Veld, R. Kuenzel, (2012): 'The dynamics of international investment positions', *Quarterly Report on the Euro Area,* Volume 11, No 3.
([58]) 'Sustainability' will be discussed in the last section in greater detail.
([59]) Creditors in the sense of having a positive net international investment position.

surpluses or very small deficits. ([60]) As to the nature of the adjustment, previous analyses indicate that much of this correction has been non-cyclical. ([61])

Graph II.2.2: **Exports of goods and services**
(2002-2013, % of GDP)



Source: Eurostat

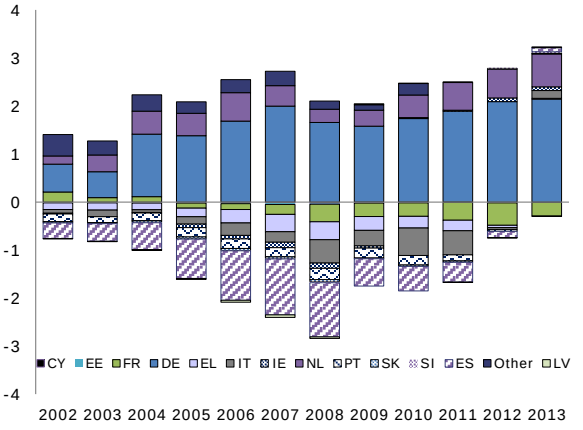
This implies that improvements in the position in the business cycle are unlikely to lead to current account positions similar to those witnessed prior to the crisis. ([62])

The adjustment to the current accounts is the result of both a reduction in imports as well as an increase in exports. Naturally, given the collapse in demand, the resulting reduction in imports has been an important driver. However, expanding exports have also played an important role in some of the countries' efforts to correct current account imbalances, in particular Ireland, Slovenia, Portugal and more recently Spain and Greece (Graph II.2.1).

An important consequence of countries' having achieved positive current account balances is that the euro area as a whole has an increasingly positive current account. In this respect, debtor countries have been mostly responsible for rebalancing at euro area level, with creditor countries not adjusting their surplus positions. In fact, the current accounts in Germany and the Netherlands, the two main creditors with a surplus, have continued to grow since the crisis and now exceed 7% of GDP.

As for the other very large euro area economies, Italy posted a slight surplus in 2013 (with a cyclically corrected current account close to zero), while France's current account has deteriorated in actual terms (-1.9% of GDP in 2013) and even more so in cyclically-adjusted terms (-2.2%) (Graph II.2.3). While France's current account deficit is still relatively contained as a proportion of GDP, it is now the euro area's largest in euro terms.

Graph II.2.3: **Contributions to euro-area current account balance**
(2002-2013, % of euro area GDP)



Source: Eurostat

Overall, the euro area's current account balance increased from 2.0 % of GDP in 2012 to 3.0 % in 2013 and is expected to rise further, to 3.2 % in 2014.

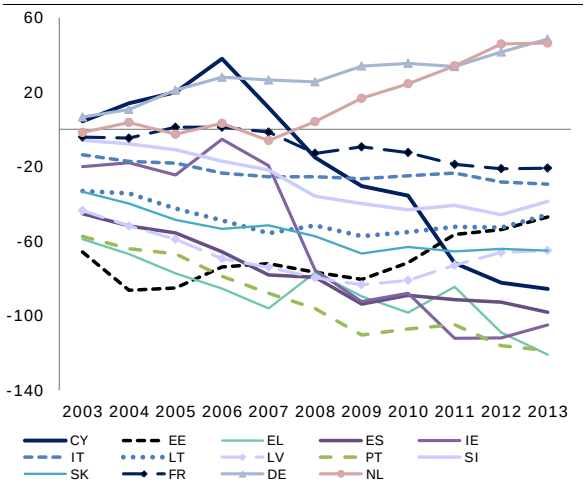
([60]) Preliminary data on the latest positions indicate that Spain has reverted back to deficit, at least temporarily. This is primarily due to changing external market conditions that have adversely affected exports.

([61]) European Commission, 2014: 'The cyclical component of current-account balances', *Winter Forecast*, Box 1.3 (and more recent (autumn 2014) forecast for updated numbers); 'Legacies, Clouds and Uncertainties', *IMF World Economic Outlook*, 2014.

([62]) The reliability of cyclically adjusted current account estimates depends on the accuracy of output gap estimates. However, output gaps would have to be unrealistically large to overturn the conclusion that most of the adjustment is non-cyclical.

However, in evaluating the extent of the adjustment made and how much remains to be done, one needs to assess progress in both flows and stocks. Despite the observed adjustment in flows, there has not been much adjustment in external liability stocks, which remain very high, particularly in vulnerable countries (Graph II.2.4).

Graph II.2.4: **Net international investment positions**
(2003-2013, % of GDP)



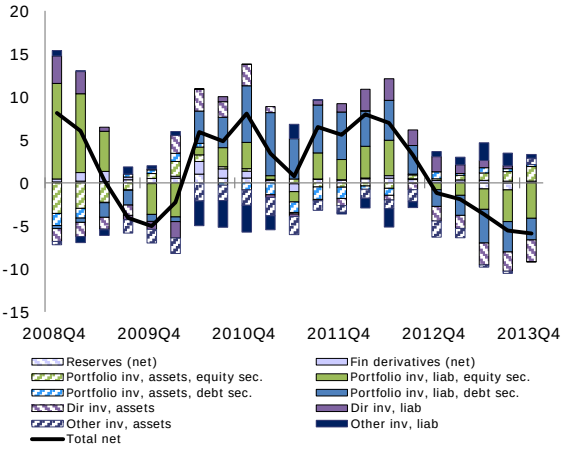
Source: Eurostat

For a number of countries (Greece, Portugal, Ireland and Spain), net foreign liabilities were close to, or above, annual output in 2013. In Italy and Slovenia, the Net International Investment Position (NIIP) is relatively contained (-29% and -37% of GDP respectively).

Even more importantly, of the euro area Member States with negative NIIPs, only Ireland and Slovenia have recorded some recent improvement in their NIIP levels. In the other countries, NIIPs either stagnated (Portugal) or continued to worsen. In this respect, the adjustment process is incomplete.

An additional dimension in assessing flow developments is given by valuation effects, which have been an important factor in recent changes in NIIPs (Graph II.2.5). On average in 2009-12, valuation gains on outstanding stocks of foreign assets and liabilities have tended to reduce external indebtedness in the vulnerable countries. After 2012, however, many of these countries recorded valuation losses, mostly accrued on their portfolio debt and equity liabilities.

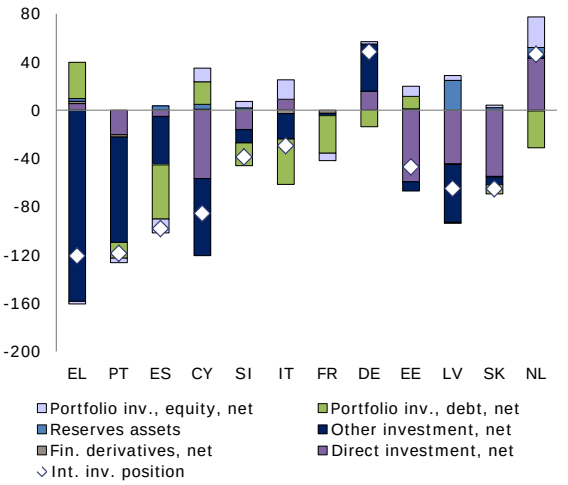
Graph II.2.5: **Breakdown of valuation effects**
(2008Q4–2013Q4, % of GDP)



(1) Chart includes aggregated data for EL, ES, PT, CY and SI. IE excluded due to data issues.
Source: Eurostat.

A dominant share of the vulnerable countries' NIIPs is composed of debt, which further adds to sustainability risks. Graph II.2.6 shows that these countries' net foreign liabilities consist in large part of 'other liabilities', i.e. cross-border loans (Greece and Portugal) and portfolio debt (Spain and Cyprus).

Graph II.2.6: **Breakdown of net international investment positions**
(2013, % of GDP)



Source: Eurostat

Financial instruments that allow for better financial risk-sharing, i.e. FDI or portfolio equity, account for a fairly negligible proportion. (63) By contrast,

(63) In the case of Greece, sustainability concerns are different, because for the most part the NIIP level reflects financial

Estonia, Latvia and Slovakia have very substantial FDI components in their NIIPs, which allows for a better distribution of risk and the burden it imposes.

How much adjustment is still needed?

Determining how much more adjustment is needed depends on what level of external indebtedness countries should aim to achieve. Since there is no consensus as to the ideal level of external indebtedness or how quickly it should be achieved, below we postulate alternative NIIP target levels for countries to reach by different dates ([64]) and show what efforts this would involve. The scenarios vary both in terms of the stringency of requirements and the pace at which they should be met. The resulting current account position is then compared with the cyclically-adjusted current account forecast for 2014.

Table II.2.1: **Average level of current account (% of GDP) needed to reach various benchmarks (1)**

Benchmarks	ES	PT	IE	SI	CY	EL
NIIP in 2014 (expected)	**-95.4**	**-115.0**	**-95.0**	**-31.3**	**-86.0**	**-121.0**
Stabilise at 2014 NIIP level in 10y	-3.3	-3.4	-4.1	-1.1	-2.2	-2.4
Bring NIIP to -35% of GDP by 2024 (in 10 y)	3.6	5.7	3.3	-1.4	3.3	6.7
Bring NIIP to -35% of GDP by 2030 (in 16 y)	1.2	2.5	0.9	-1.3	1.2	3.3
Bring NIIP to -50% of GDP in 10y	1.8	4.0	1.5	-3.1	1.6	5.1
Reduce 2013 NIIP by half in 10y	2.2	3.2	1.8	0.9	2.2	4.0
Reduce 2013 NIIP by half by 2030 (in 16y)	0.2	0.8	-0.1	0.2	0.4	1.4
CA in 2014 (expected)	1.4	1.0	7.4	6.0	0.0	-2.3
Cyc.-adjust. CA in 2014 (expected)	**-0.9**	**0.3**	**8.3**	**5.6**	**-2.2**	**-5.7**

(1) The shaded cells show benchmarks that are more demanding than the cyclically adjusted current account balance estimated for 2014.
Source: DG ECFIN

We start by computing NIIP-stabilising current accounts, i.e. the average current account levels that countries would have to sustain (for a conventional period of 10 years) to keep their NIIP-to-GDP ratio unchanged from the latest value. We complement this basic benchmark with alternative scenarios in which NIIPs must reach various levels within a given period. All simulations assume average growth, inflation and trade balance based on Commission staff projections. ([65]) The simulations also assume that there are no valuation effects, i.e. prices of foreign assets and liabilities remain unchanged. Given the difficulty of predicting valuation effects, this is a standard way of dealing with them in the literature (Gourinchas, 2008). ([66])

Table II.2.1 sets out the scenarios and results and Table II.2.2 shows the main assumptions.

Table II.2.2: **Main assumptions in the baseline scenario**

Benchmarks (2015-2024)	ES	PT	IE	SI	CY	EL
Average real GDP growth rate	2.2	1.5	2.6	1.3	1.6	0.9
Average inflation rate (GDP deflator)	1.6	1.6	1.7	1.8	1.8	1.5

Source: DG ECFIN

The figures show that further, sometimes quite sizeable, improvements are still needed in a number of countries if they are to meet these benchmarks. Efforts to contain the level of indebtedness vary significantly according to country and target level: ([67])

- All countries except France and Greece are estimated to achieve current account positions in 2014 that stabilise their NIIP position at their current level. However, for a number of them (Ireland, Spain, Portugal and Greece), the current level of external indebtedness is a potential risk. Running current accounts that simply stabilise the level of indebtedness may therefore not be sufficient.

- As estimated for 2014, Greece's cyclically-adjusted current account position is not compatible with any of the benchmarks. It will have to increase by more than 3 pps. to reach

assistance received under the programme (and central bank liabilities). For Cyprus, financial programme assistance represents about 30% of GDP. In the case of Ireland (not shown in the graph), the composition of the NIIP is more favourable, thanks to FDI and the fact that multinationals' debts are not intermediated by the domestic banking system.

([64]) We examine here only the countries with high levels of indebtedness (very negative NIIP). We include SI for completeness, even though its NIIP is not very negative (by comparison).

([65]) Short-term projections (AMECO) and Medium-term projections from medium term forecasting framework (AMECO) and long-term projections are published in the Fiscal Sustainability Report (2012), European Commission.

([66]) Gourinchas, P.O. (2008), 'Valuation Effects and External Adjustment: a Review', *Central Banking, Analysis, and Economic Policies Book Series*, Central Bank of Chile.

([67]) These simulations do not take account of second-round effects, i.e. further increases in current account surpluses in these countries dampening growth and inflation, in turn increasing the surplus required to reach a given benchmark.

the least demanding benchmark (stabilising the NIIP at the 2014 level). However, a mitigating factor is the fact that programme assistance constitutes a substantial component of external liabilities (see footnote 8).

- Cyprus' cyclically-adjusted current account position in 2014 stabilises the NIIP at the 2014 level, but falls short of other benchmarks.

- Spain and Portugal both require greater improvement in their current account balances to achieve any benchmark.

- The high surpluses in Ireland and Slovenia are currently compatible with fast NIIP reductions that achieve all the benchmarks. Irrespective of countries' efforts to reduce their indebtedness, NIIP developments depend crucially on growth and inflation assumptions.

- All our simulations assume a constant path for growth and inflation. The risks surrounding the baseline scenario stem from persistently low inflation coupled with weaker-than-expected growth. Such adverse shocks could be generated by developments, e.g. deleveraging pressures, but could also be related to the asymmetric nature of adjustment in the euro area. As domestic demand in creditor countries has not increased (reflected in higher current account balances), demand at the euro area level remains depressed. This puts downward pressure on prices and growth, which could negate some of the vulnerable countries' efforts to become more competitive.

Conclusions

In conclusion, current account positions in most countries meet the NIIP sustainability conditions, but the attendant risks are high. In Greece, where the adjustment observed so far appears mostly cyclical and the cyclically-adjusted current account position does not ensure that external debt will not increase, greater efforts will be needed to reduce external indebtedness. Also, the position of Cyprus appears rather vulnerable, partly because its external position has fluctuated widely of late due to a mix of other (real, financial and accounting) factors. Spain and Portugal have stabilised their external positions and their current account surpluses are helping to reduce net external indebtedness at a moderate pace. More ambitious targets do not seem feasible within the ten-year timeframe. There are also significant risks involved: any adverse shocks to inflation and/or growth would cause their external positions to deteriorate significantly. For Ireland and Slovenia, this problem is less acute. Italy and France, the two large countries with negative NIIPs, have relatively low external debts, although in the case of France these are growing gradually as a result of current account deficits.

Lastly, the creditor countries also have an important role to play as contributors to the macroeconomic environment in which vulnerable countries are asked to adjust. Low domestic demand suppresses inflation and relative prices do not necessarily adjust as required if vulnerable countries are to regain competitiveness. In this respect, greater symmetry in adjustment, creating the conditions for growth to pick up, would relieve some of the risks contributing to the current unfavourable macroeconomic climate.

III. Recent DG ECFIN publications

1. Occasional Papers

European Economy. Occasional Papers. 206. December 2014
Spain - Post Programme Surveillance - Autumn 2014 Report
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European Economy. Occasional Papers. 205. December 2014
Progress towards meeting the economic criteria for EU accession: the EU Commission's 2014 assessments
http://ec.europa.eu/economy_finance/publications/occasional_paper/2014/pdf/ocp205_en.pdf

European Economy. Occasional Papers. 204. December 2014
Market Functioning in Network Industries - Electronic Communications, Energy and Transport
http://ec.europa.eu/economy_finance/publications/occasional_paper/2014/pdf/ocp204_en.pdf

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Infrastructure in the EU: Developments and Impact on Growth
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European Economy. Occasional Papers. 202. December 2014
The Economic Adjustment Programme for Portugal. 2011-2014
http://ec.europa.eu/economy_finance/publications/occasional_paper/2014/pdf/ocp202_en.pdf

European Economy. Occasional Papers. 201. October 2014
Identifying fiscal sustainability challenges in the areas of pension, health care and long-term care policies
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Assessing Public Debt Sustainability in EU Member States: A Guide
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European Economy. Occasional Papers. 199. July 2014
The 2014 Stability and Convergence Programmes: An Overview
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European Economy. Occasional Papers. 198. July 2014
2014 Economic and Fiscal Programmes of Albania and Bosnia and Herzegovina: The Commission's country assessments
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2. Economic papers

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Alfonso Arpaia, Aron Kiss, Balazs Palvolgyi, Alessandro Turrini
Labour mobility and labour market adjustment in the EU
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The role of survey data in nowcasting euro area GDP growth
http://ec.europa.eu/economy_finance/publications/economic_paper/2014/pdf/ecp538_en.pdf

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Lukas Vogel
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