Quarterly Report on the Euro Area

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The **Quarterly Report on the Euro Area** is written by staff of the Directorate-General for Economic and Financial Affairs. It is intended to contribute to a better understanding of economic developments in the euro area and to improve the quality of the public debate surrounding the area's economic policy.

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Euro area economies have performed well in the first half of 2017. As shown in the Autumn 2017 macroeconomic forecasts released by the Commission, the pace of economic growth has picked up (2.2% in 2017, 0.5 p.p. higher than forecast in spring) and the expansion has become broad-based across countries. Labour market conditions have improved. Investment has picked up and private consumption remains robust, while stronger global demand is also providing continued momentum for growth.

Legacies from the economic and financial crisis nonetheless remain, especially in terms of high private and public debt levels in some euro area members. Investment, especially public investment, remains relatively low as a share of GDP. The outlook for inflation is still subdued amid sluggish wage growth, despite robust job creation. And while unemployment is expected to go below 8% by 2019, it is still very high, especially if broader measures of unemployment are considered.

Against this background, this Quarterly Report on the Euro Area examines a series of topical issues, with an eye to policy lessons that can be learnt from the experience of the crisis and to developments to be monitored going forward. Strengthening economic resilience (in its three dimensions of reducing the economies' vulnerability to shocks, their shock absorption capacity and their ability to swiftly recover from shocks) emerges as key from the analysis presented in the report. As explained in Section 1, the recent crisis has indeed shown that several euro area members lacked the appropriate economic structures to prevent and respond to the build-up of imbalances and the economic recession that followed. This has contributed to sizeable output losses and persistently high unemployment rates. Convergence towards more resilient economic structures would therefore provide an important contribution to improve the capacity of EMU and its member states to withstand shocks in the absence of intra-area exchange rates and with monetary policy that cannot be tailored to country-specific needs. By limiting the impact and persistence of shocks and strengthening the effectiveness of the

common monetary policy, stronger economic resilience can also be expected to have positive effects on other dimensions of convergence, especially cyclical, real and social convergence. "Sustainable convergence", i.e. a convergence process that is durable and sustainable over time, would be supported as a result, contributing to the longer-term socio-economic and political sustainability of EMU.

The analysis of uncertainty shocks in the euro area (in Section 2) suggests that individual structural characteristics of the economies do determine their responses to such shocks, as much as the origin of the shocks themselves (idiosyncratic versus common). Indeed, unexpected spikes in uncertainty (like the ones experienced in the recent crisis) tend to have a negative impact on the real economy (notably investment) and this differs across euro area members. Those Member States with more efficient labour, product markets and financial systems are in a better position to weather uncertainty shocks, displaying stronger economic resilience, thereby supporting the adjustment in EMU.

Section 3 of the report on long-term labour market effects of the Great Recession looks at the experience of the crisis and shows that wage adjustments primarily happened in reaction to changes in short-term unemployment (while being less responsive to long-term unemployment). At the same time, labour reallocation took place only sluggishly from sectors that were booming before the crisis to sectors with stronger growth potential, due to skills mismatches. Policies that limit skill erosion and support skill formation during downturns and measures that improve the working of product markets are therefore particularly important to ease sectoral reallocation (another key dimension of stronger economic resilience) and limit negative long-term labour market effects. Well-designed short-term working arrangements (as the ones used or developed by several euro area countries during the recent crisis) can also be particularly valuable policy tools during severe economic downturns.

Section 4 of the report turns the attention to house price dynamics, highlighting possible developments of particular relevance to the euro area. Before the global financial crisis, many Member States experienced a housing boom which brought house prices to record levels, followed often by a slump during the crisis. Despite the general correction, house prices in most Member States appear broadly close to the pre-crisis peak. In a number of countries, house prices have recently increased and a risk of overheating has been recorded. In other countries, house price increases have been more localised and hence less worrying from a financial stability standpoint. As also highlighted in the recently published Alert Mechanism Report 2018, continued monitoring is required to avoid the possible accumulation of pockets of macro-financial risks in countries characterised by buoyant house price growth. The discrepancy between the situations in the housing cycle in the euro area clearly calls for differentiated policy responses across Member States.

Finally, the last section of the report (Section 5) takes a look at the ECB's expanded asset purchase programme and related changes in international investment positions of euro area countries over 2014-16. Increases in central bank reserves related to asset purchases and other liquidity providing operations by the Eurosystem were accompanied by different types of cross-border financial flows.

This affected foreign assets and liabilities of the main domestic sectors. In particular, portfolio rebalancing toward foreign financial assets by the private non-banking sector in the main TARGET2 debtor countries has likely contributed to the recent divergence in TARGET2 balances. This divergence might have also reflected repayments of gross foreign liabilities by these countries' banking sector (excluding national central banks). In other words, the private sector in the main TARGET2 debtor countries seems to have taken the opportunity offered by the increased provision of liquidity by the Eurosystem to improve its net international investment position. This should increase resilience to a possible future tightening of global financing conditions.

Overall, going forward, policy measures that strengthen the economic resilience of the euro area as a whole and its individual members are key to ensure a well-functioning EMU and should be implemented as a matter of priority. Product market institutions that foster competition and provide a business-friendly environment and labour market institutions that are responsive to cyclical conditions and support transitions should receive particular attention in policy design and implementation. At the same time, well-functioning financial markets provide a crucial contribution to resilience by directing funding to the most productive and financially viable firms, while ensuring an appropriate differentiation of funding sources, thereby also reducing risks and increasing shock-absorption capacity in the euro area. Progress on the Capital Markets Union would therefore provide an important contribution to strengthening resilience in EMU.

I. Sustainable convergence in the euro area: A multi-dimensional process

Economic and social divergences between euro area Member States that emerged with the recent crisis have brought to the forefront of the policy debate the issue of convergence, and in particular what could be called "sustainable convergence" (i.e. a convergence process that is durable and sustainable over time). In this section the point is made that to achieve sustainable convergence among EMU members, different relevant dimensions of convergence need to be fostered. Convergence should indeed be looked at as a multi-dimensional process, whereby nominal, real, social, cyclical convergence (as affected by both business and financial cycles) and convergence towards resilient economic structures are different but relevant and interrelated dimensions. Together they concur to determining the longer-term socio-economic and political sustainability of EMU.

The empirical analysis shows, for instance, that real convergence (measured as real GDP per capita), weakened with the crisis, especially among the older euro area Member States. Differences among these countries in income distribution and in poverty rates were widened by the crisis too. Moreover, business cycles appear to have differed significantly in terms of amplitude across euro area Member States since the late '90s and remarkable differences have been observed in the amplitudes of the financial cycles.

As shown by the experience of the recent crisis, convergence towards resilient economic structures is pivotal for a well-functioning EMU. This section argues that measures aimed at further deepening of the Single Market, labour market reforms that protect workers more than jobs, effective education and training systems and well-functioning financial markets are particularly relevant under this dimension. It is also argued that avoiding very large asymmetries in financial cycles is important to promote macro-financial stability in the institutional set up of EMU. Completing the Banking Union, making significant progress on the Capital Markets Union and strengthening macro-prudential policies in EMU would all contribute to preventing the building up of unsustainable asymmetries in financial cycles. ([1])

I.1. Introduction

"Sustainable convergence" (defined here as a convergence process that is durable and sustainable over time) is key in the context of economic and monetary integration in the euro area. It importantly contributes to the well-functioning of EMU in terms of economic performance, as well as to its socio-economic and political sustainability in the longer run. In turn, a well-functioning EMU supports sustainable convergence as it strengthens the incentives for, inter alia, cross-border trade and capital flows, technology and knowledge transfers, labour mobility and price arbitrage, all drivers of convergence. Discussions on how to strengthen sustainable convergence have recently occupied the centre stage in the debate on the completion of EMU. ([2])

In this section the point is made that sustainable convergence should be looked at as a multi-dimensional process, covering different relevant dimensions (nominal, real, social and cyclical convergence, as well as convergence towards resilient economic structures). All these dimensions together concur in ensuring the long-term economic, social and political sustainability of the EMU. At the same time, some of these dimensions are relatively more important for the well-functioning of EMU and should therefore be achieved as a matter of priority. Measures to strengthen convergence towards resilient economic structures, as well as reforms (of institutional nature too) that help preventing unsustainable financial cycles are key in this respect. Conceiving convergence as a multi-dimensional process implies

medium term. To the same aim, the European Commission's Reflection Paper on the deepening of the Economic and Monetary Union of May 2017 pointed to the possibility of: i) strengthening the EU-level framework for convergence (the single market, the banking and capital markets union); ii) strengthening economic policy coordination under the European Semester (and here reference is made also to the possibility of a more binding convergence process based on agreed standards, as envisaged in the Five Presidents' Report); and iii) reinforcing the link between national reforms and EU funding.

that policy design needs to consider the interactions between the different dimensions, with particular focus on possible self-reinforcing mechanisms to be exploited and trade-offs to be accounted for.

In economic terms, the concept of convergence can take different connotations depending on the precise definition that is adopted in terms of: i) factors that are looked at to establish the case for convergence or divergence; [3] ii) criteria used to assess convergence; [4] and iii) the geographical dimension at which convergence is analysed (typically countries or regions within countries – the focus in this section will be on the former). [5]

This section of the report analyses, from a conceptual and empirical point of view, convergence in the euro area across the aforementioned dimensions. Sub-section 2 focusses on the different dimensions of convergence from a conceptual point of view, discussing briefly their functional relevance for EMU. Sub-section 3 describes convergence patterns in the euro area with respect to nominal, real, social and cyclical convergence, taking into account both business and financial cycles. The interactions between the different dimensions of convergence and business/financial cycle synchronisation are then examined in sub-section 4. Conclusions and policy implications are drawn in sub-section 5.

I.2. Sustainable convergence as a multi-dimensional concept: definitions and economic rationale for EMU

This section briefly explores the concept of sustainable convergence in its various dimensions and elaborates on its rationale in the context of EMU.

Sustainable convergence is most appropriately defined as a multidimensional process. Five different dimensions of convergence can usefully be distinguished in this respect: i) nominal, ii) real, iii) social, iv) cyclical (impacted by both business and financial cycles) and v) convergence towards resilient economic structures. Some of these dimensions (like convergence in living standards and social outcomes) can be thought of as having a direct impact on citizens' welfare across Member States, while others (nominal convergence, for instance) are instrumental in raising welfare. As will be explained in what follows, some of the aforementioned dimensions are needed for a smooth functioning of the EMU. They refer, for instance, to important features of the economy that would strengthen the euro area capacity to respond to shocks (convergence toward resilient economic structures), or importantly ensure macro-financial stability and the smooth conduct of the common monetary policy in the currency union (avoidance of unsustainable differences in financial cycles). Other dimensions of convergence are instead needed to ensure the economic and political sustainability of EMU in the longer run (convergence in living standards and in social outcomes, for instance). Each of these dimensions is analysed in more detail below.

Nominal convergence refers to convergence in nominal variables like interest rates, inflation and exchange rates. A focus on nominal convergence has informed the Maastricht criteria to be fulfilled for entering EMU. Nominal convergence, prior to joining, in long-term interest rates and inflation improves the capability of copying with a single monetary policy rate and the absence of the exchange rate within the currency union. [6]

Real convergence instead refers to convergence in living standards, typically (but not exclusively) measured by real GDP per capita. While real convergence is not necessarily a pre-condition for a well-functioning monetary union, [7] the euro was introduced as a means to achieve the Union's objectives. These explicitly include economic, social and territorial cohesion, and the Treaty

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[3] Based on this it is possible to distinguish between nominal, social and cyclical convergence and convergence towards resilient economic structures.

[4] This involves, for instance, a distinction between sigma-convergence, absolute and conditional beta-convergence under the dimension of real convergence, as well as between cycle synchronisation and differences in cycle amplitudes under cyclical convergence. See Subsection I.3 below for more details.

[5] It is beyond the scope of this section to cover the regional dimension of convergence. Convergence will be meant here as convergence between countries, rather than between regions within a country. On the latter, see, for instance, Goecke, H. and M. Hüther (2016), 'Regional Convergence in Europe', *Intereconomics*, Vol. 51, No. 3, pp. 165-171.

[6] The Maastricht criteria additionally impose requirements (in the form of upper limits) related to public finances (government budget deficit and debt-to-GDP ratio).

[7] For instance, Young, A., Higgins, M. and D. Levy (2013), 'Heterogeneous convergence', *Economics Letters*, Vol. 120, pp. 238–241, report a significant heterogeneity in the state-level convergence rates across 22 US states.

mentions convergence as a means to promote the latter. [8] Over the longer run, real convergence in the euro area supports economic and political sustainability of the integration process, and eases the identification of common economic policy priorities and common/coordinated policy-making in the area. For these reasons, economic policy coordination in the context of the European Semester covers policies that contribute to real convergence and European Structural and Investment (ESI) Funds have been actively used to the purpose. Completing the institutional architecture of EMU is also key to support real convergence in the euro area, through strengthening the incentives for reforms that improve economic performance.

Social convergence is defined, to the purpose of the analysis presented in this section, as (upward) convergence across Member States in social outcomes, such as income inequality and poverty rates (which can of course be achieved with different economic and social structures and institutions). [9] As for real convergence, the social dimension is highlighted in the Treaty as one of the Union's objectives ('social cohesion'), and has been taken up explicitly in the European Commission's Europe 2020 strategy for growth and jobs. [10] Reforms and policies that are essential to foster social convergence are guided by the European Pillar of Social Rights. [11]

A concept that is attracting renewed attention recently is the one of **cyclical convergence** (under which business [12] and financial cycles are to be distinguished). This involves two distinct dimensions: i) the cycle synchronisation (i.e. the correlation of business/financial cyclical fluctuations across euro area countries) and ii) the alignment in (business/financial) cycle amplitudes. [13] Business cycle convergence is particularly important in the euro area as the conduct of the common monetary policy is more effective if Member States are in the same stage of the business cycle, and experience no major differences in the monetary policy stance that would be optimal for each of them. At the same time, developments in financial cycles are important too, as shown by the way the last crisis unravelled in the euro area. Differences in financial cycles can become excessive and get to the point of amplifying economic fluctuations through inefficient and unsustainable credit allocation. Financial cycle de-synchronisation and large misalignments in financial cycle amplitudes can endanger macro-financial stability in the currency union. This is especially the case when financial integration is not "resilient", i.e. it can unravel and become itself a source of instability in the face of large shocks (with debt finance being more subject to sudden reversals than equity and FDI, for instance). [14] When both the business and financial cycles are not synchronised, the single monetary policy might not be able alone to stabilise the economy. [15] Completing the institutional architecture of EMU (in particular through the completion of the Financial Union and continued

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[8] In the Treaty on the Functioning of the European Union (TFEU), convergence (in the sense of "overall harmonious development" of the Union and "reducing disparities between the levels of development of the various regions and the backwardness of the least favoured regions") is a means to promote economic, social and territorial cohesion. Cohesion is to be achieved via the coordination of economic policies and budgetary instruments. At the same time, the objective of convergence is repeated in the TFEU, in the legal basis for economic policy coordination in the Union. See Andor L. (2014), "Cohesion and convergence in Europe", lecture delivered at the Warsaw School of Economics, 24 October 2014.

[9] As such, social convergence is to be kept separate from real convergence, though there is a strong inter-relation between the two dimensions. While real convergence is based on the comparison across Member States of real GDP per capita as the average national aggregate, social convergence relies on the comparison across Member States of a distribution (income distribution) within the country.

[10] For instance, one of the targets of the Europe 2020 Strategy is to have at least 20 million fewer people in or at risk of poverty/social exclusion for the EU as a whole in 2020 compared to 2008.

[11] The principles set out in the Pillar fall into three broad chapters: i) equal opportunities and access to the labour market, ii) fair working conditions, and iii) social protection and inclusion. The Pillar is accompanied by a social scoreboard to monitor performances and track trends across the Member States. The

scoreboard provides a number of headline indicators to screen the employment and social performance of Member States along the three dimensions of the Pillar (see the Joint Employment Report 2018).

[12] The literature on business cycle convergence includes: Belo, F. (2001), 'Some Facts about the Cyclical Convergence in the Euro Zone', Banco de Portugal, *Economic Bulletin December 2001*, pp. 37-44; Gayer, C. (2007), 'A fresh look at business cycle synchronisation in the euro area', European Economy, *Economic Papers* No. 287; and Balta, N. (2015), 'Business cycle synchronisation in the euro area, Quarterly Report on the Euro Area', *Quarterly Review of the Euro Area*, Vol.14, No.2.

[13] A distinction is made here between cyclical convergence and cyclical synchronisation, as in Belo (2001), *op. cit.,* that proposes to define cyclical convergence in terms of a combination of association and synchronization concepts. The former can be measured by the concordance coefficient (as done in this section) and the latter by correlating amplitudes.

[14] ECB (2016), Financial Integration in Europe 2016..

[15] In such cases traditional monetary policies should be complemented by macro-prudential policies. See, for example, Jorda, O. et al. (2014), 'The Great Mortgaging: Housing Finance, Crises, and Business Cycles', *NBER Working Paper* No. 20501.

progress on key areas of the Single Market) would provide support under this dimension too.

Last but not the least, among the different dimensions of convergence is the concept of **convergence towards resilient economic structures.** This was used in the Five Presidents' Report, and more recently in the Commission Reflection Paper on the deepening of EMU, to refer to strengthening EMU countries' ability to withstand shocks and swiftly return to potential. [16] Strengthening resilience entails acting on three elements: i) reducing the economies' vulnerability to shocks; ii) increasing their shock-absorption capacity; and iii) increasing their ability to reallocate resources and recover from the shocks. The recent economic and financial crisis has indeed shown that several euro area Member States lacked appropriate economic structures to prevent and respond to the build-up of imbalances and the economic recession that followed. This has caused sizeable adjustment costs in terms of output losses and persistence of high unemployment rates, which have underlined the importance of strengthening convergence towards more resilient economic structures. Economic resilience is particularly relevant for a well-functioning EMU, where intra-area exchange rates are not available any longer as an adjustment tool against asymmetric shocks, monetary policy cannot be tailored to country-specific needs and inflation differentials can exacerbate real interest rate differentials that can magnify shocks.

All in all, convergence towards resilient economic structures is a particularly important dimension for the well-functioning of EMU, while other dimensions, like real convergence, are rather key for its longer-term sustainability. Differences between the two dimensions of convergence are shown in Graphs I.1 and I.2. Graph I.1 additionally illustrates the difference between absolute and conditional convergence. Absolute real convergence is given by convergence to the same level of GDP per capita and growth rate for the two (leading and lagging) economies over the

longer term. Conditional real convergence, on the contrary, implies convergence to a certain long-run level of GDP per capita depending on structural characteristics of the economy (under this concept, for the lagging economy to move to the path of GDP per capita of the leading economy – with different structural characteristics assumed between leading and lagging - reforms to improve the structural characteristics of the former would be needed).

Graph I.1: **Real (absolute and conditional) convergence**
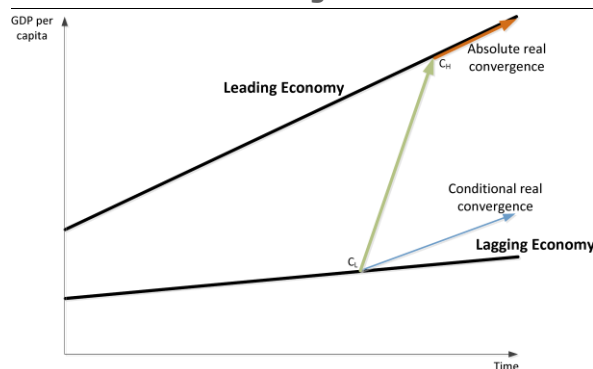
Source: Commission Services.

Graph I.2: **Economic resilience**
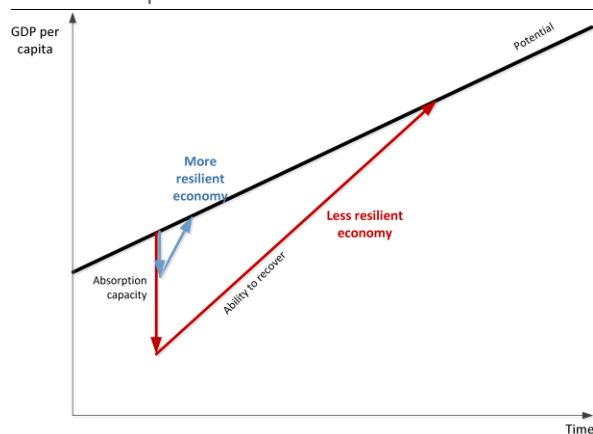
(1) Both economies are affected by the same shock (and here we assume that both economies are equally vulnerable to it), but the "absorption capacity" and the "ability to recover" in the more resilient economy are stronger than in the less resilient economy.
Source: Commission Services.

Graph I.2 provides a representation of the concept of economic resilience. For a given shock, the more resilient economy experiences on impact a smaller deviation from potential relative to the less resilient economy and it also recovers faster to potential. Convergence to resilient economic structures would require convergence between the two economies in terms of vulnerability to shocks

(16) See, for instance, European Commission (2017), 'Economic resilience in EMU. Thematic discussions on growth and jobs. Note for the Eurogroup', September 2017, as well as OECD (2016), 'G20 Policy Paper on Economic Resilience and Structural Policies'; IMF (2016), 'A Macroeconomic Perspective on Resilience'; ECB (2016), 'Increasing resilience and long-term growth: the importance of sound institutions and economic structures for euro area countries and EMU' Economic Bulletin Issue 5.

and ability to respond to them, independently of differences in economic structures between the two. ([17]) It is indeed important to stress that convergence towards resilient economic structures does not imply harmonisation. In areas where policy measures to foster convergence to resilient economic structures can be taken, such as labour markets and competitive goods and services markets, different policies can lead to similarly good performance and country-specific solutions can be called for. ([18])

I.3. Convergence patterns in the euro area

This section provides a synthetic overview of main developments under the various dimensions of convergence for euro area Member States. Aim is to provide a snapshot of where we stand in terms of convergence, from a multi-dimensional point of view, after the first 15 years of EMU.

Results presented below show that while, in terms of nominal convergence, interest rate differentials across euro area members have narrowed again over the last few years (with benefits for lending to the real economy in the periphery), real and social convergence have both been weakened by the crisis, especially in the EA12, with no re-convergence evident in the data yet. As far as cyclical convergence is concerned, the analysis mostly hints at large cross-country differences, for both business and financial cycles, in terms of cycles' amplitude, over the last 15 and 13 years of EMU respectively. Financial cycle concordance indicators provide clear indications of the unsustainable asymmetries that built up in the run up to the crisis.

I.3.1. Strengthening nominal convergence

As explained in the previous section, nominal convergence refers to a whole set of nominal variables, including interest rates and inflation. During the first 10 years of EMU, differences in interest rates between participating Member States narrowed. But the initial years after the crisis led to sizeable nominal divergences in interest rates, when

financial fragmentation took hold. These were reflected in marked differences in lending rates to the real economy (businesses and households) between core and peripheral euro area countries. Interest rate differentials have narrowed again over the past few years, also helped by monetary policy (Graph I.3). ([19])

Graph I.3: **Interest rates on loans to non-financial corporations (%), EA and selected EA MSs**
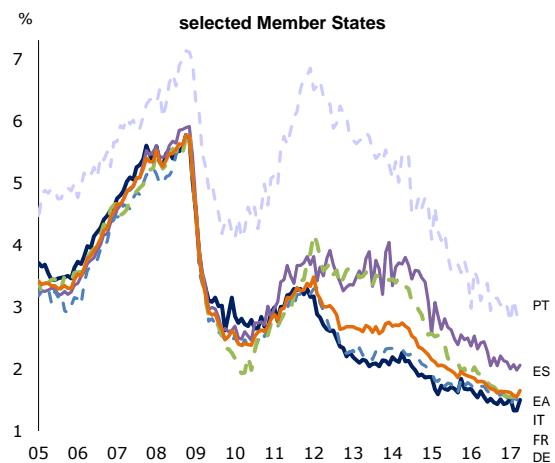
Source: European Central Bank.

I.3.2. Real convergence weakened in EA12

In terms of potential GDP per capita (at purchasing power parity) the data show that several euro area Member States with low potential GDP per capita in 1998 recorded on average fairly strong growth (Graph I.4 – see also Box I.1 which examines beta-convergence empirically ([20])). ([21]) Important differences between Member States

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([17]) For a comprehensive discussion on the strengthening of economic resilience, see, for instance, Canton, E., P. Mohl, , A. Reut and M. Ward-Warmedinger (2016), 'How to make the Economic and Monetary Union more resilient?', *Quarterly Report on the Euro Area*, Vol. 15, No. 3, pp. 7-18.

([18]) European Commission (2017), 'Reflection Paper on the Deepening of the Economic and Monetary Union', COM(2017) 291 of 31 May 2017.

([19]) Interest rate risk premia decreased notably in periphery euro area Member States in the wake of the speech by ECB President Mario Draghi on 26 July 2012, with the by now famous statement that that "the ECB is ready to do whatever it takes to preserve the euro".

([20]) While sigma-convergence is defined as a decrease in the overall dispersion across countries, beta-convergence is defined as occurring when lagging economies grow faster than leading ones (thus catching up takes place). Absolute beta-convergence is given by convergence to the same level of GDP per capita, while conditional beta-convergence implies convergence to a certain long-run level of GDP per capita depending on structural characteristics of the economy. Sigma and beta convergence are closely related to each other in the sense that beta convergence is a necessary but not sufficient condition for sigma convergence, while beta-convergence may arise without sigma-convergence. See Young, A., Higgins, M. and D. Levy (2008), 'Sigma Convergence versus Beta Convergence: Evidence from U.S. County-Level Data', *Journal of Money, Credit and Banking*, Vol. 40, No. 5, pp. 1083–1093.

([21]) See also IMF (2017), Euro Area Policies, Selected Issues, 'Real Income Convergence in the Euro Area', pp. 4-14

nonetheless persist, as potential GDP per capita in the Baltic Member States is still less than two-thirds that of the euro area as a whole.

The dispersion of real GDP per capita was overall on a decreasing trend between 1999 and 2007 in the euro area, [22] but the decrease stopped when the crisis hit in 2008 and resumed only at a much lower pace since 2010 (Graph I.5). Most notable is the downward divergence of real GDP in Greece since the onset of the crisis, the steady (albeit weak) upward divergence in Germany as of 2011 and the strong catching-up of the Baltic States, albeit abruptly interrupted between 2008 and 2010.

Graph I.4: **Potential output per capita: initial level and growth (β-convergence)** *(PPP), 1998-2016*
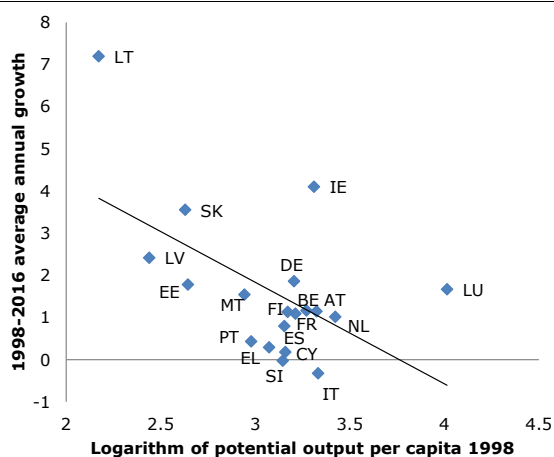
(1) 1998 is first year for which comparable data for all EA Member States are available.
Source: Authors' estimates based on AMECO data.

Graph I.5: **Real GDP per capita** *(as percentage of EA17 average real GDP per capita at purchasing power parity)*
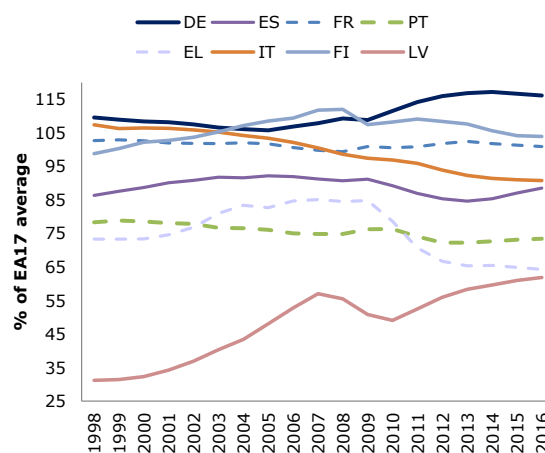
(1) A value equal to 100 implies a national real GDP per capita equal to the EA17 average real GDP per capita, both in 2010 purchasing power parity. EA17 is EA19 aggregate without LU and IE. LU excluded as GDP per capita strongly affected by high share of cross-border workers. IE excluded as it shows strong spike in 2015-16 GDP reflecting a substantial revision in the treatment of investment. For illustrative purposes only a limited set of EA Member States is shown.
Source: Authors' estimates based on AMECO data.

Looking at unemployment rates across euro area members (that are relevant for real convergence too as they impact on real GDP per capita) confirms the picture of widened divergences brought about by the crisis. In the group of countries that were already in the euro before 2007, divergences in unemployment have increased steeply from 2007 till 2012. They have decreased since 2013 but are still much higher than before the crisis. These developments reflect, among other things, significant differences in economic resilience across the EA12 Member States.

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[22] Formally speaking, the coefficient of variation of the unweighted real GDP per capita, measured in purchasing power standards, decreased.

Graph I.6: **Dispersion of unemployment rates**
(coefficient of variation), 2000-2016
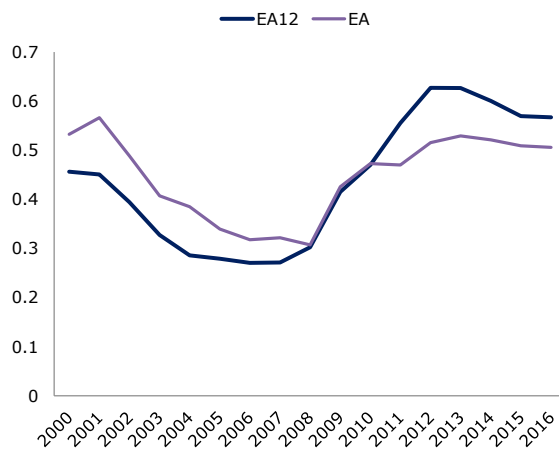
(1) EA10 is EA12 without IE and LU.
Source: Authors' estimates based on AMECO data.

I.3.3.   Social convergence weakened especially in EA12

Social convergence among euro area Member States is analysed here, in a simple aggregate way, by looking at trends in social outcomes (income inequality and poverty rates), to see how large cross-country differences appear to be within the euro area and whether they have increased or decreased over time.

Based on the ratio of total income received by the 20% of the population with the highest incomes to that received by the 20% of the population with the lowest incomes (so called "S80/S20 income quintile ratio"), (23) differences in income distribution appear to have increased in the EA12 since 2008, levelling off at higher level as of 2014 (Graph I.7). Older EA Member States have therefore diverged under this dimension compared to the level that had been reached pre-crisis. Graph I.8 shows it was primarily some EA12 Member States that recorded a rise in the income quintile ratio between 2005 and 2015.

Turning to poverty rates, the data show that cross-country differences in the share of the population at risk of poverty or social exclusion increased in the euro area as a whole between 2008 and 2013 (Graph I.7). And again the dispersion increased with the crisis in an even more abrupt way across the older EA12 Member States, where it has then broadly stabilised at higher level.

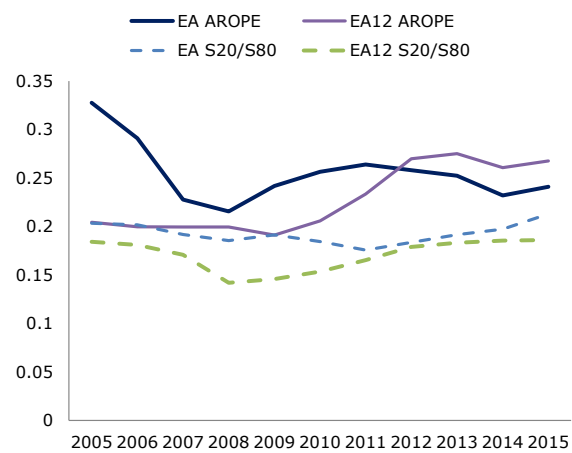Graph I.7: **Dispersion of at risk of poverty or social exclusion rate (AROPE) and S80/S20 income quintile ratio**
(coefficient of variation)

(1) The at risk-of-poverty (AROP) indicator corresponds to the sum of persons who are at least in one of the situations: at risk of poverty or severely materially deprived or living in households with very low work intensity. The S80/S20 income quintile ratio measures the ratio of total income received by the 20 % of the population with the highest income to that received by the 20 % of the population with the lowest income.
Source: Authors' estimates based on Eurostat data.

I.3.4.   Cyclical convergence

Business cycles: large differences in amplitude

As explained in the previous section, business cycle convergence is another important dimension of convergence for the euro area. It is relevant for the well-functioning of EMU, in that it makes the conduct of the common monetary policy smooth. (24) Both the cycle synchronisation and its amplitude are relevant in this respect.

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(23) Several indicators are available to measure income inequality. The income quintile ratio is widely used in economic analysis and has a straightforward interpretation: a S80/S20 income quintile ratio equal to 5, for instance, indicates that the income of the upper quintile is 5 times the income of the lowest quintile. The Gini coefficient is an alternative indicator of income inequality that ranges between 0 (in case of perfect equality) and 1 (in case of maximum inequality). Here the S80/S20 income quintile ratio is chosen as more straightforward to interpret.

(24) Here the business cycle is measured by the output gap, i.e. the deviation of GDP from its potential. Estimates of potential output at national frequency are taken from the AMECO database. At quarterly frequency they have been estimated applying a Hodrick-Prescott filter to the seasonally adjusted GDP at constant prices.

Graph I.8: **S80/S20 income quintile ratio: 2005 ratio and change**

Source: Authors' estimates based on Eurostat data.

Graph I.9: **Dispersion of output gaps in the EA (standard deviation), 1999-2016**

(1) Output gap measures the gap between actual and potential gross domestic product at 2010 reference levels; standard deviation of output gap based on un-weighted average.
Source: Authors' estimation based on AMECO.

Graph I.10: **Concordance between national and EA output gap, 1998-2016**
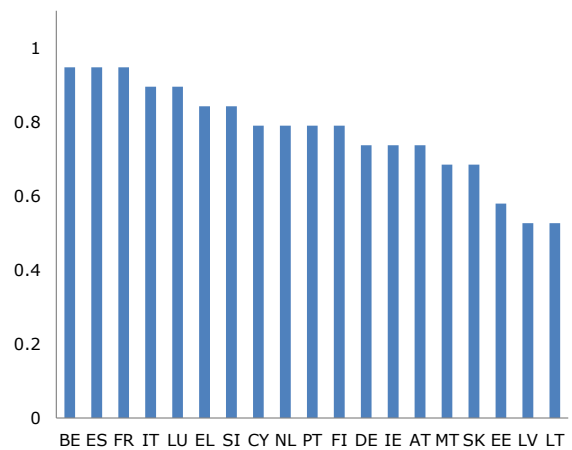
(1) Concordance indicator measures the proportion of time the cycle of a MS is in the same phase as the cycle of the EA. Indicator values range from 0 (always in opposite phase) to 1 (always in same phase).
Source: Authors' estimation based on AMECO data.

The data show that the dispersion of output gaps across euro area Member States was smaller over the period 1999-2005 than over 2006-13 when it was on a rising trend, while it started decreasing again as of 2014 (Graph I.9). The standard deviation of the output gap has nonetheless drawbacks as a measure of the business cycle as it decreases when business cycles are more in line with each other but also when their amplitude decreases. Results for this metric should therefore be interpreted with caution. [25]

In terms of concordance (the proportion of time the cycles of two countries are in the same phase, below or above potential), the business cycles in Belgium, Spain and France showed the strongest concordance (i.e. highest synchronization) with the euro area business cycle (with about 95% of the time spent in the same phase of the cycle as the euro area over the entire period considered). [26] On the opposite side, the business cycle in the Baltic States showed the weakest concordance (with only about 55% of the time in the same phase) (Graph I.10). Overall, the indicator shows that synchronization is high for the majority of euro area countries, with as many as 11 Member States at values close or above 80%.

Where business cycles appear to have differed significantly, since the late 90s, is instead in terms of amplitude. Very strong differences have been recorded in business cycle amplitudes between Member States[27] with Greece experiencing by far

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[25] See European Commission (2006), 'Cyclical synchronisation within the euro area: what do recent data tell us?', *Quarterly Report on the Euro Area*, Vol. 5, No 2, pp.19-24.

[26] The value of the indicator varies between 0 (i.e. the case where the cycles are always in the opposite phase) to 1 (i.e. the case where the cycles are always in the same phase). See McDermot and Scott (1999), 'Concordance in business cycles', Reserve Bank of New Zealand.

[27] The degree of alignment in cycle amplitudes is estimated by regressing the national output gap on the EA output gap (and a constant), following a similar method applied in De Grauwe and Ji (2016), 'International Correlation of Business Cycles in a Behavioural Macroeconomic Model'", *CEPR Discussion Paper* No. 11257.

the strongest relative to the business cycle of the euro area as a whole, followed by Spain and Latvia (Graph I.11). Malta, Austria, Germany and Belgium recorded much smaller relative amplitudes.

Graph I.11: **Business cycle amplitude, MS vis-à-vis EA output gap, 1998-2016**
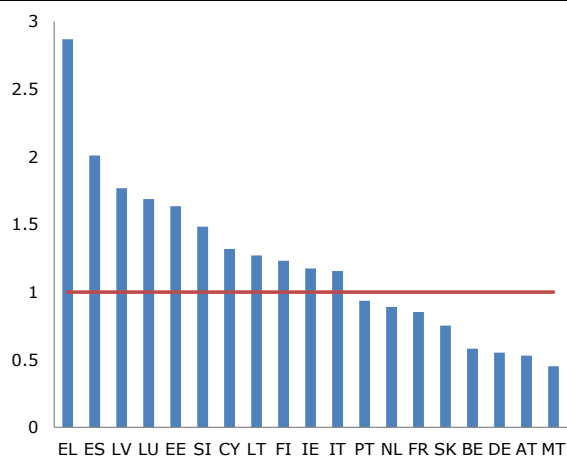
(1) Amplitude estimated by regressing the MS output gap on the EA output gap and a constant. A slope coefficient larger (smaller) than 1 indicates greater (smaller) amplitude in national cycle than the EA average.
Source: Authors' estimation based on AMECO data.

Financial cycles: large differences in amplitude

Financial cycles are more difficult to measure, partly because of the concept being relatively new and also due to data availability. [28] In this section the financial cycle is measured as the percentage deviation of a key financial variable (private sector credit flow) from its trend. [29]

The available (price and quantity) indicators suggest significant cross-country heterogeneity in the duration and amplitude of financial cycles across euro area Member States. While some differences in financial cycles also reflect the high degree of financial integration within the currency union, with its beneficial effects in terms of

efficient capital allocation and private risk-sharing, financial cycle de-synchronisation and large misalignments in financial cycle amplitudes can endanger macro-financial stability in EMU. This is because excessive asymmetries in financial cycles can amplify economic fluctuations through unsustainable credit allocation. This is particularly the case in a context of asymmetric financial integration, with significantly more integrated inter-bank credit market compared to equity markets and retail banking, for instance. [30]

The data show that, as expected, the dispersion across euro area countries in the credit-to-GDP gap (i.e. the difference between the credit-to-GDP ratio and its long-run trend), [31] as measured by the standard deviation, increased in the run up to the crisis and then started a gradual decreasing trend as of 2008, with a mild reversal since 2014 (Graph I.12).

Graph I.12: **Dispersion in credit-to-GDP gap in the EA (standard deviation), 2004q1-2017q1**
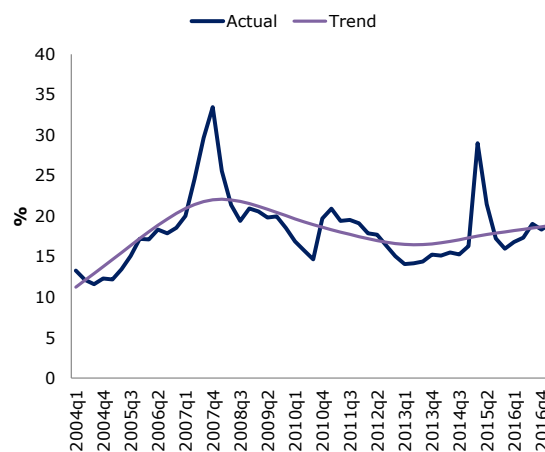
(1) The credit-to-GDP gap measures the difference between the credit-to-GDP ratio and its long-run trend.
Source: Authors' estimates based on ECB Statistical Warehouse.

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(28) See Borio, C. (2012), 'The financial cycle and macroeconomics: What have we learnt?', *BIS Working Papers* No 395; Claessens et al. (2011), 'How Do Business and Financial Cycles Interact?', *IMF Working Paper* WP/11/88; Stremmel (2015), 'Capturing the financial cycle in Europe', *ECB Working Paper Series* No 1811and Schüler et al. (2017), 'Coherent financial cycles for G-7 countries: Why extending credit can be an asset', *ESRB Working Paper Series* No 43; Franks, J., B. Barkbu, R. Blavy, W. Oman, and H. Schoelermann (2018), 'Economic Convergence in the Euro Area: Coming Together or Drifting Apart?', *IMF Working Paper*, No. WP/18/10.

(29) Real house prices can be used as an alternative measure of the financial cycle.

(30) European Central Bank (2017), 'Financial cycles and the macroeconomy', ECB Economic Bulletin, Issue 1 / 2017.

(31) For a discussion of limitations of such an indicator, see, for instance, Lang, J. and P. Welz (2017), 'Measuring credit gaps for macroprudential policy', *ECB Financial Stability Review,* May 2017 – Special features, pp. 144-157.

Graph I.13: **Credit-to-GDP gap concordance, MS vis-à-vis EA average, 2003q4 -2017q1**
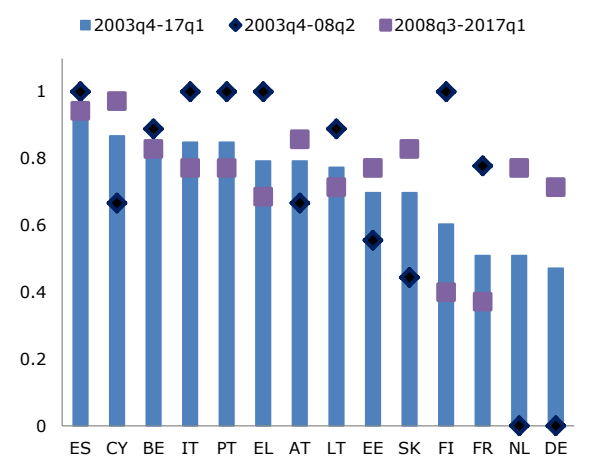
(1) The credit-to-GDP gap measures the difference between the credit-to-GDP ratio and its long-run trend.
(2) No data for EA aggregate available in ECB Statistical Warehouse. Concordance measured vis-à-vis unweighted average of credit-to-GDP gap of EA Member States.
Source: Authors' estimates based on ECB Statistical Warehouse.

The majority of euro area Member States for which data are available display a relatively strong concordance (i.e. synchronisation) of their credit-to-GDP gap with the euro area between the fourth quarter of 2003 and the first quarter of 2017, ([32]) with 8 Member States out of 14 reporting values close or above 80% (Graph I.13). The strongest concordance was recorded for Spain, Cyprus, Belgium, Italy and Portugal (all at or above 85% of the time spent in the same phase as the euro area financial cycle over the entire sample period). For these Member States (except Cyprus), concordance was somewhat stronger before the crisis than after the crisis. The lowest concordance was reported for Germany, Netherlands and France (all at or just below 50% over the entire sample period). Most notably, before the onset of the crisis, the Netherlands and Germany recorded a credit-to-GDP gap that was always in the opposite phase to the euro area gap. Since 2008 this pattern has changed notably and the gap in these Member States has got closer to the pattern displayed by the euro area average.

At the same time, the variability in the amplitude of the financial cycle across euro area countries was remarkable. Very strong financial cycle amplitude relative to the euro area is reported in terms of

credit-to-GDP gap for Spain, Luxembourg and Ireland, while there is practically no relative cyclicality for Germany (Graph I.14). All these results are broadly confirmed when using real house prices as an alternative measure of the financial cycle.

Graph I.14: **Credit-to-GDP gap amplitude, MS vis-à-vis EA average, 2004q1-2017q1**
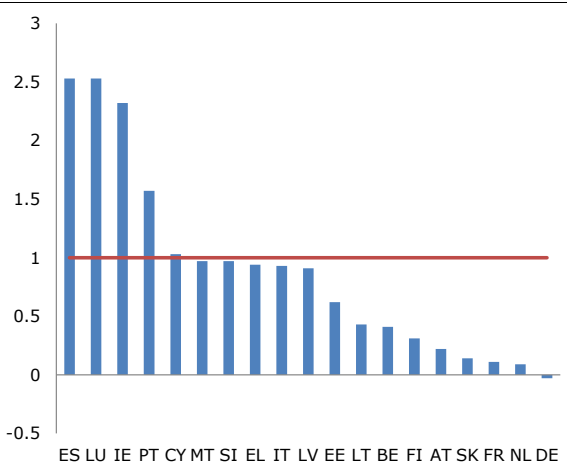
(1) The credit-to-GDP gap measures the difference between the credit-to-GDP ratio and its long-run trend.
(2) No data for EA aggregate available in ECB Statistical Warehouse. Amplitude measured relative to average credit-to-GDP gap of EA Member States.
Source: Authors' estimates based on ECB Statistical Warehouse.

I.4. Multi-dimensional convergence: complementarities and trade-offs

After having provided a conceptual review of the different dimensions of convergence and taken a snapshot of their evolution over time in the euro area, it appears important to underline that possible complementarities and trade-offs exist between the various dimensions. Some dimensions of convergence are more urgent to achieve than others given their central role for the smooth functioning of EMU, as discussed in previous sub-sections. Convergence towards resilient economic structures, for instance, is key, as is the avoidance of unsustainable divergences in financial cycles. But ultimately, in the longer term, the goal should be for the euro area to achieve greater convergence under all of its dimensions (including real and social) to support economic and political sustainability of the integration process. Understanding possible trade-offs and complementarities between the different dimensions is therefore important. Some of these inter-relations are discussed in what follows.

([32]) EA credit-to-GDP gap is measured as the average of Member States' credit–to-GDP gaps. 2003q3-2017q1 was the timespan for which data were available at the time of writing.

I.4.1. Nominal versus real convergence

Nominal and real convergence are related to each other. Nominal convergence in terms of inflation rates, for instance, has a direct impact on real convergence as it affects, inter alia, Member States' competitiveness via its impact on the real effective exchange rate. The latter affects net external demand, which is an important driver of real GDP in the short to medium run, thus having an impact on real convergence too. [33]

Nominal convergence in terms of interest rates has also a clear connection with real convergence through financing conditions for business and households that impact on economic activity and employment, thus ultimately on real GDP per capita. The financial fragmentation experienced during the economic and financial crisis has shown in full strength how differences in lending rates can reinforce differences in economic performance, thus fuelling real divergence. [34]

I.4.2. Nominal and real versus social convergence

Nominal convergence can be expected to support social convergence. In terms of inflation rates, for instance, as people in the lower income deciles tend to have a higher propensity to hold cash, their financial wealth would be disproportionately affected by excessive inflation. [35] As such, excessive and persistent cross-country differences in inflation rates may weaken social convergence across Member States.

At the same time, social convergence can promote nominal convergence. Relatively high inequality in some Member States, for instance, could trigger strong pressure to increase nominal wages at the bottom of the income distribution, not supported by productivity increases. [36] As a result, excessive inflationary pressure may arise in the countries concerned (with social divergence fuelling nominal divergence).

Real and social convergence have clearly strong interconnections. Several mechanisms underpin the co-movement. In particular, social divergence can create a downward spiral that may hinder real convergence in the longer term. For example, Member States with relatively high inequality are more likely to have more people in poverty with relatively more limited access to skill formation. This in turn hinders the efficient allocation of resources and productivity growth.

I.4.3. Interactions between business and financial cycle convergence

Business cycle synchronisation is driven by the degree of trade and financial integration, [37] among a series of other important factors, including the nature of the shocks (common or idiosyncratic), [38] and the extent to which the economy is resilient to them. Interconnections clearly exist between business and financial cycles, pointing to a likely positive interaction between the two.

Financial cycles that are not synchronized may affect business cycle synchronisation via several channels, including funding costs, wealth, balance-sheet and confidence effects. First, to the extent that financial cycle divergence leads to differences in funding costs, investment would be affected differently across Member States. This would have a differentiated impact on domestic demand, thus on national business cycles.

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[33] A distinction has to be made between price level and inflation convergence. A temporary inflation divergence may be necessary to correct price level divergences accumulated in the past.

[34] The empirical analysis in Al-Eyd, A. and P. Berkmen (2013), 'Fragmentation and Monetary Policy in the Euro Area', *IMF Working Paper* WP/13/208, suggests that the credit channel of monetary policy has broken down during the crisis, particularly in stressed markets, and that SMEs in these economies appear to have been most affected by elevated lending rates.

[35] Although in case of excessive disinflation the risk of loss of purchasing power for people holding cash balances reverses, the higher income quintiles may have a wider range of deflation hedges at their disposal (e.g. gold, commodity funds, …). In any case, in case of (unexpected) disinflation the real value of nominal debt increases, which may also have important distributional consequences.

[36] For instance, as income concentration is often associated with concentration of political power, it may hinder the implementation of structural reforms that reduce rents (such as monopoly rents). See Stiglitz, J. (2012), The Price of Inequality: How Today's Divided Society Endangers Our Future, W.W. Norton & Company.

[37] When the euro area was created, it was expected that business cycles would become more synchronised as cross-border trade and financial flows would intensify and a stronger intra-industry specialisation across Member States would emerge. See Frankel and Rose (1999), 'The Endogeneity of the Optimum Currency Area Criteria', *The Economic Journal*, Vol. 108, pp. 1009-1025.

[38] The effect of the shock is to a large extent driven by the economic specialisation of the countries, i.e. inter-industry or intra-industry specialisation. In the former case countries are more likely to be hit by idiosyncratic shocks, while they are more likely to be hit to the same extent in the latter case. Of course, apart from the vulnerability to shocks, convergence is also affected by the Member States' capacity to absorb and recover from the shock - which in turn depends on structural factors such as the well-functioning of labour and product markets.

Second, large divergence in financial cycles may trigger differences in asset prices developments (such as house prices and equities) across Member States. This may generate differences in business cycle fluctuations to the extent that changes in asset prices affect households' wealth, which in turn affects households' consumption decisions. ([39])

Third, to the extent that large financial cycle divergences affect firms' balance sheets differently, it may also weaken business cycle synchronisation. This would be the case, for instance, if borrowers cleaned up their balance sheets by reducing debt and cutting down on expenditure, or if lenders were reluctant to provide funding to borrowers as the value of their collateral decreased, with responses differentiated across Member States. ([40])

Fourth, in its most extreme case, very strong and unsustainable financial cycles divergence, driven in part by cross-border financial speculation, may involve a sudden change in market confidence that triggers a withdrawal of foreign funds. Such 'sudden stop' may affect domestic credit with an adverse impact on investment and consumption, thus on the national business cycle.

All in all, available empirical evidence suggests that business cycle recessions are indeed much deeper when coinciding with the contraction phase of the financial cycle. ([41]) Business cycles are more synchronised (in the face of country-specific shocks) between countries that are more financially integrated. ([42]) Furthermore, to the extent that financial markets are affected by common 'animal spirits', ([43]) business cycles among integrated economies tend to become more similar. ([44]) Quantitatively, recent data show a relatively high concordance between the business cycle (as measured by the output gap) and the financial cycle (as measured by the credit–to-GDP gap), with

values between 45% and 60% over 2004-17 for all euro area Member States (for which data available) and above 50% for almost all of them (See Graph I.15). ([45]) As expected, prior to the crisis, business and financial cycles showed a stronger concordance in most Member States than after the crisis (notable exceptions are Cyprus and Portugal).

Graph I.15: **Concordance between national business cycle and credit-to-GDP gap, 2003q4-2017q1**

(1) Note: For more details on concordance see Graph I.7. (2) National business cycle at quarterly frequency estimated applying a Hodrick-Prescott filter to the seasonally adjusted GDP at constant prices.
Source: Author's estimates based on Eurostat, National Accounts and ECB Statistical Warehouse.

I.4.4. Convergence towards resilient economic structures versus other dimensions of convergence

Convergence towards resilient economic structures can be expected to have important positive effects also in terms of the aforementioned notions of convergence. Resilience fosters cyclical convergence. At the same time resilient economies are better able to resume long-term growth and prevent negative social consequences of downturns, thus fostering real and social convergence in the longer run.

More resilient economies limit the risk of hysteresis in labour markets, as well as in investment. Persistent unemployment spells may trigger a deterioration in employability (e.g. skills erosion) and exits from the labour market (e.g. early retirement), with a negative impact on the size and quality of the labour force. At the same time, a lack

([39]) See Antony, J. and P. Broer (2010), 'Linkages between the Financial and the Real Sector of the Economy. A Literature Survey', *CPB Document* No 216.
([40]) On balance sheet recessions, see also Koo, R. (2014), The Escape from Balance Sheet Recession and the QE Trap, Wiley.
([41]) See Drehmann, M., et al. (2012), 'Characterising the financial cycle: don't lose sight of the medium term!', *BIS Working Papers* No 380, Bank for International Settlements.
([42]) See Cesa-Bianchi et al. (2016), 'International business cycle synchronisation: The role of financial linkages', *VoxEU.org*.
([43]) See Akerlof, G. and R. Shiller (2010), Animal Spirits, Princeton.
([44]) See Calvo and Mendoza (2001), ' Rational Contagion and the Globalization in Securities Markets', *Journal of International Economics*, Vo. 51, No. 1, pp.79-119.

([45]) When the financial cycle is measured using real property prices, concordance is fairly similar across euro area Member States.

of investment embedding the latest innovations and technological advances and an under-use of existing capital may reduce the size and quality of the capital stock. When hysteresis risks materialize, less resilient economies can be expected to fare relatively worse under other dimensions of convergence, from real to social. In this sense, convergence towards resilient economic structures can foster these other dimensions of convergence.

Less resilient economies also risk recording stronger deviations from the inflation reference value as persistently negative output gaps can trigger stronger deflationary pressures, thereby weakening nominal convergence. [46] At the same time, this lower inflation (or even deflation) in less resilient economies may then trigger a rise in real interest rates, which could have an adverse impact on other dimensions of convergence (real, for instance). [47]

Finally, stronger resilience might promote convergence under other dimensions by strengthening the effectiveness of the common monetary policy.

I.5. Conclusions and policy implications

Divergences across EA Member States generated by the recent economic and financial crisis, particularly in the EA12, have brought the issue of sustainable convergence to the forefront of the policy debate, also in relation to the institutional reforms to complete EMU. [48]

As explained in this section, sustainable convergence should be looked at as a multi-dimensional process, whereby nominal, real, social, cyclical convergence and convergence towards resilient economic structures are all different but relevant dimensions. All these dimensions together concur to determining the longer-term sustainability of EMU, in socio-economic, financial and political terms. Some of these dimensions (convergence towards resilient economic structures

and the avoidance of large unsustainable differences in financial cycles) are necessary – though - not sufficient conditions for sustainable real convergence. They therefore require appropriate policy action as a matter of priority. However, at the same time, conceiving convergence as a multi-dimensional process importantly means also internalising in policy design possible trade-offs with other dimensions of convergence where appropriate. [49]

The analysis presented here of the possible interactions between the different dimensions of convergence hints at the complexity of the matter. It is generally not possible to expect an unambiguous relationship between the various dimensions of convergence. Focussing exclusively on one or some specific dimensions to achieve sustainable convergence overall would therefore be misguided. Possible complementarities and trade-offs should rather be factored in, and eventually the latter corrected for. For example, ensuring that social convergence goes along with other dimensions of convergence that might be more directly pursued by the authorities requires giving due consideration to the social impact of policy measures and reforms on a regular basis.

Interconnections are present also between business and financial cycles, and should be accounted for in policy design. In particular, the amplifying effects on economic fluctuations that large differences in financial cycles can generate have been laid bare by the recent crisis. Avoiding large unsustainable financial cycle divergences appears important to guarantee macro-financial stability in the institutional set up of the EMU. In this sense, strengthening macro-prudential policies in EMU, completing the Banking Union with the European Deposit Insurance Scheme (EDIS) and the common backstop to the Single Resolution Fund (SRF), and making significant progress on the Capital Markets Union would all importantly contribute to preventing the building up of unsustainable asymmetries in financial cycles.

Convergence towards resilient economic structures is also pivotal to support a well-functioning EMU by reducing the economies' exposure to shocks, raising their shock-absorption capacity and strengthening their ability to recover quickly after a shock.

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[46] Depending on where these Member States are in term of inflation rates.
[47] Nevertheless, the domestic deflationary pressures may increase international price competitiveness which may boost external demand. It is an empirical matter to determine which of the two effects will dominate.
[48] See European Commission (2017), 'Reflection paper on the deepening of the economic and monetary union', 31 May 2017; Juncker, J.C., in cooperation with D. Tusk, J. Dijsselbloem, M. Draghi and M. Schulz (2015), 'Completing Europe's Economic and Monetary Union', 22 June 2015.

[49] This might call for appropriate flanking measures.

The economy's capacity to cushion the effects of a shock is influenced by the degree of risk-sharing through financial markets. In this respect a well-capitalised banking sector and measures to create a Capital Markets Union are key to economic resilience. At the same time, both properly functioning labour market institutions that respond to cyclical conditions (including flexible working time arrangements and flexible wage setting mechanisms) and competitive product markets support adjustment in response to shocks. Finally, governments too support shock absorption capacity through automatic adjustments in spending and revenues related to cyclical developments, like automatic changes in tax revenues and spending on unemployment benefits.

The recovery phase of economic resilience is helped by mechanisms that support the swift reallocation of resources following the shock. Product market institutions that foster competition and provide a business-friendly environment are important to foster reallocation during the

recovery. At the same time, an efficient judicial system supports business dynamics by facilitating contract enforcements and via effective insolvency frameworks.

Labour market institutions that support a smooth transition of workers towards new opportunities also support the recovery and reduce the risk of labour market duality. To this aim, flexible employment protection legislation needs to go hand in hand with an adequate social safety net and active labour market policies to support the taking up of new opportunities in more productive activities. Education and training further support such reallocation.

Finally, well-functioning financial markets also support the recovery by ensuring that financing is available for the most productive and financially viable firms in the reallocation process. Developed equity markets and availability of venture capital may, for instance, support the funding and facilitate the growth of dynamic firms.

Box I.1: **Drivers of real convergence: some empirical results**

Roughly speaking, with decreasing returns to capital, countries with a lower real GDP per capita should grow at a stronger pace as capital flows to them, producing what is known as 'beta-convergence'. The latter is estimated using the following equation:

$$\frac{1}{T}\log\left(\frac{Y_{i,t+T}}{Y_{i,t}}\right) = \alpha - \beta \log(Y_{i,t}) + \gamma X_{i,t} + e_{i,t}$$

where Y is real GDP per capita; $X_{i,t}$ captures various factors that condition convergence; T is the timespan over which average growth is measured; and β is the speed of convergence. [1]

Table B.1 shows estimation results for a regression (using IV) of the change in real GDP per capita on: lagged real GDP per capita; lagged number of persons employed in services to those employed in manufacturing; share of persons aged 65 or more in the population: net capital stock per employee (at constant prices); share of low skilled relative to share of high skilled; income ratios of the first to fourth quartile, second to fourth quartile, third to fourth quartile. The first part of the table covers the period 1999-2016 for all EA Member States (except Luxembourg and Ireland in 2015-16 to correct for potential outliers). The second part shows estimates for a pool covering only the Member States that were already member of the euro area before 2007.

Table B.1: Conditional real beta-convergence in the euro area
Dependent variable: Real GDP per capita (in purchasing power parity)

	All EA MS (except LU)					Old EA MS (except LU)			
T=	1	5	10	15		1	5	10	15
Lagged GDP per capita (logarithm)	-0.1462 ***	-0.1174 ***	-0.0831 ***	-0.0287 ***		-0.1199 ***	-0.0867 ***	-0.0849 ***	-0.0287 ***
Employment composition	-0.0048 **	-0.0041 ***	-0.0031 ***	-0.0035 ***		-0.0056 **	-0.0047 ***	-0.0036 ***	-0.0035 ***
Share of older people (65+)	-0.3436 ***	-0.3581 ***	-0.3792 ***	-0.2459 ***		-0.5851 ***	-0.3876 ***	-0.4364 ***	-0.2459 ***
Capital stock per person employed	0.4493 ***	0.3719 ***	0.2567 ***	0.2159 ***		0.2830 **	0.2171 ***	0.3326 ***	0.2159 ***
Low- high skilled ratio	0.0007	-0.0002	-0.0005	-0.0006		-0.0007	-0.0008	-0.0003	-0.0006
First income quartile/fourth	0.2282	-0.0933	-0.2258 *	-0.2182 *		-0.5241	-0.0749	-0.3582 **	-0.2182 *
Second income quartile/fourth	-0.0063	0.2587	0.4301 ***	0.4906 ***		1.1185	0.3258	0.6661 ***	0.4906 ***
Third income quartile/fourth	-0.0926	-0.1169	-0.2209 **	-0.3645 ***		-0.5314	-0.1688	-0.3823 ***	-0.3645 ***
Constant	0.4824 ***	0.3815 ***	0.3109 ***	0.1748 ***		0.4477 ***	0.3165 ***	0.3416 ***	0.1748 ***
Adj. R-squared	0.09	0.46	0.66	0.45		0.09	0.42	0.55	0.45
Observations	257	197	107	56		185	147	92	56

Source: Authors' (instrumental variables) estimates using AMECO and Eurostat, LFS data.
Note: Employment composition is employment service sector to employment manufacturing ratio. Pooled regression (EA MS except LU and IE (2015-16)). Point estimates with their significance level: *** for p < 0.01, ** for p < 0.05, * for p < 0.1.

Lagged real GDP per capita shows the expected negative sign, indicating that the lower the initial real GDP per capita, the stronger the growth rate. The estimate attached to the variable on the employment composition has a negative sign, indicating that the higher the initial share of the workforce employed in services, the more growth will be tempered. This may reflect a generally lower productivity of the services sector relative to manufacturing. As expected, a higher initial share of older people in the population puts downward pressure on growth, while a high initial capital stock per person employed raises it. The impact of inequality is ambiguous, but only significant over a time span of 10 years or more. Finally, the point estimates of the two different pools show the same signs and almost the same significance levels. However, the estimates associated with the lagged GDP per capita variable are lower (in absolute terms) for the group consisting only of the old EA Member States, suggesting that convergence across these Member States happens at a slower pace than convergence across the broader group of Member States.

[1] See Barro, R. and X. Sala-i-Martin (1992), 'Convergence', *Journal of Political Economy*, Vol. 100, No 2, pp. 223-251.

II. Impact of uncertainty shocks in the euro area

This section discusses the impact of uncertainty on the real economy in the euro area. The empirical analysis uses new country-level indicators of uncertainty for individual euro area Member States derived from the Business and Consumer Surveys. It provides evidence on: i) the differential impact of uncertainty shocks across Member States depending on their structural characteristics; ii) the difference between idiosyncratic and common uncertainty shocks; and iii) the interactions between uncertainty and other adverse shocks (namely, confidence and financial shocks).

The results confirm that the real economy (notably investment) in euro area members is negatively affected by an unexpected spike in uncertainty and responses tend to differ across Member States. Individual structural characteristics of the economy appear to determine responses to uncertainty shocks as much as the origin of the shocks themselves (idiosyncratic vs. common shocks). The Member States with more efficient labour markets, product markets and financial systems seem to be able to better weather uncertainty shocks. Likewise, a higher degree of economic openness and a greater manufacturing share in the economy contribute to dampening the impact of uncertainty. The analysis therefore points to the fact that well-functioning labour, product and financial markets are important to strengthen economic resilience in euro area economies. Resilience in turn may have a positive feedback effect on the perception of risks and uncertainties and is crucial for the functioning of the monetary union. ([50])

II.1. Introduction

Economists tend to agree that sentiments and beliefs represent an important driver of economic agents' decisions. Consequently, abrupt changes (shocks) in agents' beliefs might affect real economic developments, which as an idea goes back to Pigou and Keynes ('animal spirits').([51]) During the last decade, there have been numerous events causing major spikes in uncertainty on the global scale. Since the global financial crisis, the concept of uncertainty has also become an integral part of policy discussions and a booming economic literature has analysed the impact of uncertainty shocks on the real economy.

Whereas there is no single theory describing the impact of uncertainty shocks on economic activity, it can be expected that uncertainty, by affecting the capability of economic agents to assess future prospects, influences their behaviour at present. When uncertainty is high, consumers, for instance, might postpone consumption of durable goods and increase their precautionary savings. ([52]) Firms may adopt a similar 'wait-and-see' approach in terms of

investments. ([53]) The financial sector may find difficult to evaluate the riskiness of projects, which results in credit rationing, especially for firms with weaker balance sheets. Banks as financial intermediaries might suffer problems themselves with external financing. ([54]) *Risk aversion* of economic agents, perceived *irreversibility* of some decisions (investment for instance) and *financial frictions* facilitate the transmission between uncertainty and the real economy.

Whereas uncertainty has been tracked by means of different indicators, most studies agree that spikes in uncertainty induce negative effects on economy activity, especially investment. The vast empirical evidence for the US has been gradually complemented by studies for other countries. In the euro area, there have been numerous events inducing high uncertainty during the recent years. Yet, the empirical evidence documenting the economic impact of such uncertainty shocks is still rather scarce, especially when it comes to cross-country evidence for euro area Member States. ([55])

([50]) The section was prepared by Bořek Vašíček. The author wishes to thank Christian Gayer for useful comments.
([51]) Pigou, A. (1927), *'Industrial Fluctuations'*, MacMillan, London; Keynes, J.M. (1936), *'The General Theory of Employment, Interest and Money'*, Macmillan, London.
([52]) Caballero, R.J. (1990), 'Consumption puzzles and precautionary savings', *Journal of Monetary Economics*, No. 25(1), pp. 113-136.
([53]) Bernanke, B.S. (1983), 'Irreversibility, uncertainty, and cyclical investment', *The Quarterly Journal of Economics*, No. 98(1), pp. 85-106.
([54]) For stylized DSGE model for the euro area see: Bonciani, D. and B. van Roye (2016), 'Uncertainty shocks, banking frictions and economic activity', *Journal of Economic Dynamics and Control*, No. 73, pp. 200-219
([55]) For evidence for the whole area see: Balta, N., I. Valdes Fernandez and E. Ruscher (2013), 'Assessing the impact of uncertainty on consumption and investment', *Quarterly Report on the Euro Area*, Vol. 12, No 2, pp. 7-16; EC (2017), '*European*

This section assesses the impact of uncertainty on real economic developments in the euro area using data for individual Member States, including new country-level indicators of uncertainty. The Business and Consumer Surveys (BCS) administered by the European Commission [56] represent a unique source of information that has not been explored for the construction of country-specific uncertainty indicators yet. [57] The focus of the analysis is on the structural characteristics that may explain differences in country-specific responses to uncertainty shocks. The analysis also touches upon the difference between idiosyncratic and common uncertainty shocks and the relation between uncertainty and other macroeconomic variables (besides economic activity).

II.2. Measures of uncertainty

The level of uncertainty perceived by economic agents cannot be measured in an objective way. There has been a lively discussion in recent years in the literature on how to proxy uncertainty at an aggregate level, i.e. typically for a country as a whole. The economic literature has employed five classes of *observable* indicators that aim to proxy the *unobservable* level of uncertainty:

- **Financial market indicators,** most commonly given by the implied or historical volatility of stock market or volatility of bond market or the exchange rate. Examples of such indicators are the

indices of implied volatility of stock market VIX or VSTOXX. [58]

- **News-based indicators** that rely on the frequency of key words in selected newspapers. The most popular version is the Economic Policy Uncertainty Index relying on the frequency of the terms 'uncertainty', 'economic policy' (and their variations) and policy-relevant terms.[59]

- **Micro-based indicators** such as the cross-sectional (firm-level or industry-level) dispersion of profits or productivity.[60]

- **Survey-based indicators** that are also micro-based but have a subjective nature, like the dispersion of answers regarding expectations for the future in surveys such as the Business and Consumer Survey (BCS) of the European Commission. [61]

- **Macroeconomic data sets and forecasts**, used to infer uncertainty by looking at the forecast dispersion (for example of Consensus Forecast), forecast errors, or the unforecastable component of large sets of macroeconomic (and financial) variables.[62]

Graph II.1 plots examples of each of these indicators for the euro area (except for firms' profit / productivity dispersion, which is not available for the euro area), namely the implied volatility of the stock market (VSTOXX), the Economic Policy Uncertainty index (EPU), the BCS-based dispersion indicator (IQ_DISP) and macroeconomic uncertainty inferred from forecast

Economic Forecast, Winter 2017; ECB (2016), 'The impact of uncertainty on activity in the euro area', *ECB Economics Bulletin*, Issue 8; Gieseck, A. and Y. Largent (2016), 'The Impact of Macroeconomic Uncertainty on Activity in the Euro Area', *Review of Economics*, No 67(1), pp. 25-52; Girardi, A. and A. Reuter (2016), 'New uncertainty measures for the euro area using survey data', *Oxford Economic Papers*, No. 69(1), pp. 278-300.

For individual Member States see: Meinen, P. and O. Röhe (2017), 'On measuring uncertainty and its impact on investment: Cross-country evidence from the euro area', *European Economic Review*, Vol. 92, pp. 161-179; Popescu, A. and F.R. Smets (2010), 'Uncertainty, risk-taking, and the business cycle in Germany', *CESifo Economic Studies*, Vol. 56, No 4, pp. 596-626; Basselier, R. and G. Langenus (2014), 'Recent changes in saving behaviour by Belgian households: the impact of uncertainty', *NBB Economic Review*, December 2014, pp. 53-62; Busetti, F., C. Giordano and G. Zevi (2015), 'Main drivers of the recent decline in Italy's non-construction investment', *Questioni di Economia e Finanza*, No. 276, June 2015.

[56] https://ec.europa.eu/info/business-economy-euro/indicators-statistics/economic-databases/business-and-consumer-surveys_en

[57] The commonly used uncertainty indicators such as implied stock market volatility are not available for most euro area countries.

[58] Bloom, N. (2009), 'The impact of uncertainty shocks', *Econometrica*, Vol. 77, No. 3, pp. 623–685 popularized the use of financial market volatility indices as uncertainty proxies.

[59] Baker, S.R., N. Bloom and S.J. Davis (2016), 'Measuring economic policy uncertainty', *The Quarterly Journal of Economics*, No. 131(4), pp. 1593-1636.

[60] Bloom, N., M. Floetotto, N. Jaimovich, I. Saporta-Eksten, and S.J. Terry (2012), 'Really Uncertain Business Cycles', *National Bureau of Economic Research Working Paper,* No. 18245.

[61] R. Bachmann, S. Elstner and E. Sims (2013), 'Uncertainty and economic activity: evidence from business survey data', *American Econonomic Journal: Macroeconomics*, No. 5(2), pp. 217-249

[62] Jurado, K., S.C. Ludvigson and S. Ng (2015), 'Measuring uncertainty', *The American Economic Review*, No. 105 (3), pp. 1177-1216; Rossi, B. and T. Sekhposyan (2015), 'Macroeconomic uncertainty indices based on nowcast and forecast error distributions', *The American Economic Review*, No. 105(5), pp. 650-655

errors of GDP from the Survey of Professional Forecasters (MU_GDP). [63]

Indications based on the different measures tend to coincide at the most pronounced peaks such as the years 2001-03 (dot-com bubble burst, World Trade Centre attacks, and Iraq war), the beginning of the global financial crisis in 2008-09 and the euro area debt crisis in 2012. For 2016 substantial dispersion between economic policy uncertainty and other indicators is observed, which has gradually faded away during 2017.

Graph II.1: **Uncertainty indicators for the euro area**
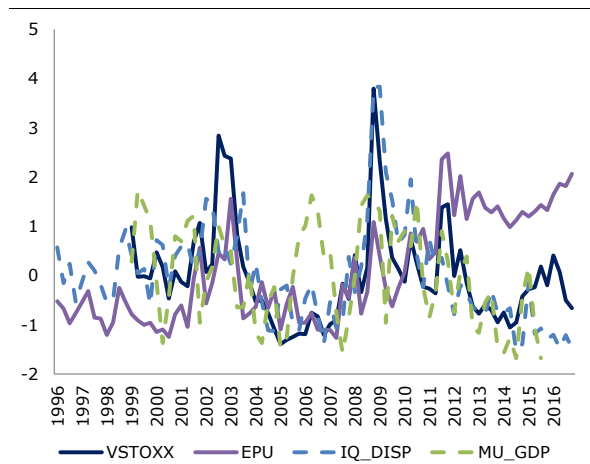
(1) VSTOXX - implied volatility of the EURO STOXX 50 index, EPU - Economic Policy Uncertainty, IQ_DISP - intraquestion dispersion from the BCS, MU_GDP - macroeconomic uncertainty derived from forecast error from the SPF.
Source: Bloomberg (VSTOXX), www.policyundertainty (EPU), author's calculation (IQ_DISP), Rossi and Sekhposyan (2016) (MU_GDP).

Pros and cons of different uncertainty indicators

Each of these indicators has advantages and pitfalls. First, some indicators can be relatively easily obtained or calculated, while derivation of some others is more complex. Besides, *the time availability* of the indicators differs. Namely, most data sources, except for the financial ones, are subject to publication lags, and macroeconomic data tend to be subject to revisions. Second, none of the indicators is fully *representative* for the whole economy and each of them may *reflect other concepts* on top of uncertainty. For example, the stock market volatility can change due to changes in risk

aversion or economic confidence, which differ from uncertainty. Forecast or survey dispersion might reflect uncertainty but also heterogeneity of the agents, which imply that they evaluate the prospects differently either because they possess different information or because the same information might have different implications for them. Third, *the availability* of these indicators *at country level* is an important constraint, also for the euro area. The first two classes of indicators (financial market indicators and news-based indicators) are available for the euro area as a whole and the largest Member States and the third (micro-based indicators) is available only for a few Member States. On the contrary, survey-based indicators and macroeconomic-forecast based indicators can be constructed for most EU Member States, and thus will be used for the empirical analysis in this section.

The BCS are run each month in all EU countries, albeit the time span and coverage may differ somewhat. Advantages of **the survey-based uncertainty indicators** are their timeliness as they can be calculated right after the new BCS is published, and above all their representativeness as they cover a wide range of businesses (industry, services, retail trade and construction) as well as opinions of consumers. Decisions by businesses and consumers are also directly affected by the uncertainty they perceive and they in turn determine overall macroeconomic activity. However, as noted above, dispersion of answers to the surveys may also be driven by other forces than perceived uncertainty, namely heterogeneity of agents that affect their opinions. Therefore, macroeconomic forecast, namely the Survey of professional forecasts (SPF) administered by the ECB, can be used as an additional data source to derive **uncertainty indicators based on forecast errors**. [64] Given their aggregated and ex-post nature, they do not suffer from the problem of heterogeneity. On the other hand, the SPF relies on opinions of very specific group of agents (professional forecasters) and may therefore not be representative of the whole economy.

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[63] More details of the latter two indicators that will be used for the empirical analysis will be provided below.

[64] The forecast-error based uncertainty measure used in this section comes from Rossi, B. and T. Sekhposyan (2016). 'Macroeconomic uncertainty indices for the euro area and its individual member countries', *Empirical Economics*, Volume 53, Issue 1, pp. 1-22. Unlike uncertainty measures based on forecast dispersion (e.g. Jurado et al., 2015, op. cit.) the forecast-error based uncertainty measure does not require large cross section of forecast (not available for most Member States) but only point forecast and actual realization of macroeconomic variables.

New uncertainty measures for individual euro area countries

BCS inquire on a monthly basis around 120,000 businesses with questions about production, orders and employment and around 40,000 consumers on their financial situation and their evaluation of macroeconomic developments. The questions are related to the present situation, the recent past (3 months for business and 12 months for consumers) and the expectation for the near future (again in 3 and 12 months respectively). Importantly, some questions are asked both related to the past (backward-looking) and the future (forward-looking). This dataset allows constructing three different uncertainty indicators. [65] The first indicator (FW_DISP) is based on the dispersion of responses to 22 forward-looking questions (monthly and quarterly). The second indicator (BW_DISP) takes into account also the backward-looking versions of the questions, which allows comparison between the ex-ante and ex-post dispersion. In this way the impact of heterogeneity as driven by different backgrounds of agents or information sets available to them shall be muted. [66] Finally, the third indicator (IQ_DISP) is based on the dispersion of scores across different questions rather than the dispersion of answers to a single question. The underlying assumption is that uncertainty is related with change. If the economic situation changes, the responses to different questions (related to past, present and future) can evolve in different directions and the dispersion of scores across questions increases. [67] Graph II.2 (upper panel) plots these three indicators at country level, using France as an example, and suggests that most peaks of the indicators follow some well-identified events but also some

important differences exist between the three indicators. [68]

Graph II.2: **Different uncertainty indicators constructed from BCS and SPF - example for France**
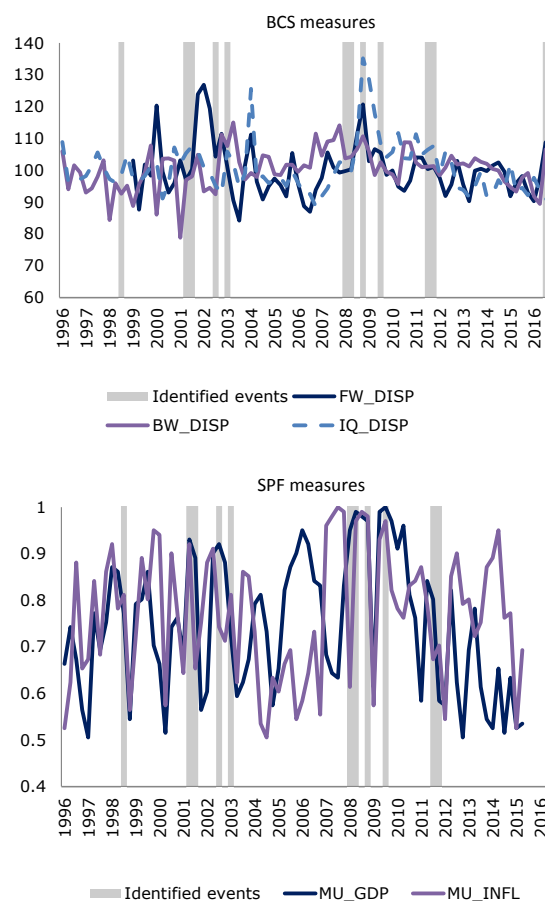
Source: Author's calculations (BCS measures), Rossi and Sekhposyan (2016) (SPF measures).

The lower panel in turn plots two macroeconomic uncertainty indicators, derived from the point forecast from the Survey of Professional Forecasters (SPF) administered by the ECB, which can be calculated for each euro area Member State, namely forecast errors in quarterly forecast of

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[65] Girardi and Reuter (2015), op. cit.

[66] The indicator relies on the differences in dispersion of answers to backward- and forward-looking questions. The responses to questions related to the past shall not be affected by uncertainty but only by the heterogeneity of respondents. Therefore, by scaling of forward-looking questions (reflecting both heterogeneity and uncertainty) to backward-looking questions (reflecting only heterogeneity) the effect of heterogeneity shall be neutralized.

[67] The replies to each question in BCS are summarized in terms of share of respondent giving positive answers minus those giving negative answers. The previous two indicators (FW_DISP and BW_DISP) use question-specific dispersions, i.e. the standard deviation of positive and negative answers to a specific question in the survey. IQ_DISP, in turn, proxies uncertainty by the dispersion of changes of the shares across several survey questions.

[68] In the case of France the FW_DISP indicator captures well the 2001-2003 uncertainty period (dot-com bubble burst, World Trade Centre attacks, and Iraq war). It increases (albeit only moderately) during the Great Recession and temporarily spikes after the Brexit vote (2016, Q3).The BW_DISP is very flat and does not increase much during the Great Recession (2008-2009) and even decreases during the euro area debt crisis (2011).Finally, the IQ_DISP indicator identifies a number of significant events: the Gulf war (1991), the important strikes in 1995 in France, the dot-com bubble burst and WTC attacks (2001), the Iraq war and the strikes in France in 2003, the Lehman brothers collapse (2008, Q4) but again it does not increase significantly during the euro area debt crisis (2011).

GDP (MU_GDP) and inflation (MU_INFL). [69] The indicators are based on the comparison of the realized forecast error with the unconditional distribution of forecast errors for each variable. If the forecast error is in the tail of the distribution, it means that the realization was very difficult to predict, and therefore the macroeconomic environment was very uncertain. Confronting the three BCS indicators with events that can be deemed to trigger spikes in uncertainty in individual euro area countries, the IQ_DISP indicator appears as the most reliable in that for most countries it peaks at the time of such events (such as the global financial crisis). Therefore, this indicator will be used in further analysis as the BCS-based indicator of uncertainty. Similar inspection for the forecast uncertainty indicators suggest that the GDP-based forecast error (MU_GDP) seems to be more related to identified events and will be used in the analysis that follows.

The overall impression is that where there was a major political, economic and financial distress event both types of uncertainty indicators peaked. However, there are also numerous spikes, especially for the forecast-error based indicator, which cannot be reasonably related to any known uncertainty-generating event. In any case, these indicators shall be rather understood as *proxies* of uncertainty rather than *direct measures*. Consequently, it seems appropriate to jointly use various available uncertainty indicators to ensure robustness of the empirical analysis.

Uncertainty in the euro area has a strong common component

While there are apparent differences in dynamics between the BCS-based and forecast-based uncertainty indicators, there is also substantial co-movement of indicators across Member States. This is apparent in Graph II.3 that plots both selected indicators (IQ_DISP and MU_GDP) for the four largest euro area countries. Formal statistical factor analysis confirms that over 80% of the dynamics of each indicator across the Member States can be explained by a single common factor. [70] This suggests that uncertainty in the

euro area is a common rather than idiosyncratic phenomenon. Cyprus, Greece, Ireland and Portugal in turn feature the strongest idiosyncratic components, which is consistent with the economic priors about the specific uncertainty-generating events in these countries. [71]

Graph II.3: **Uncertainty indicators constructed from BCS (IQ_DISP) and SPF (MU_GDP) for four largest EA countries**
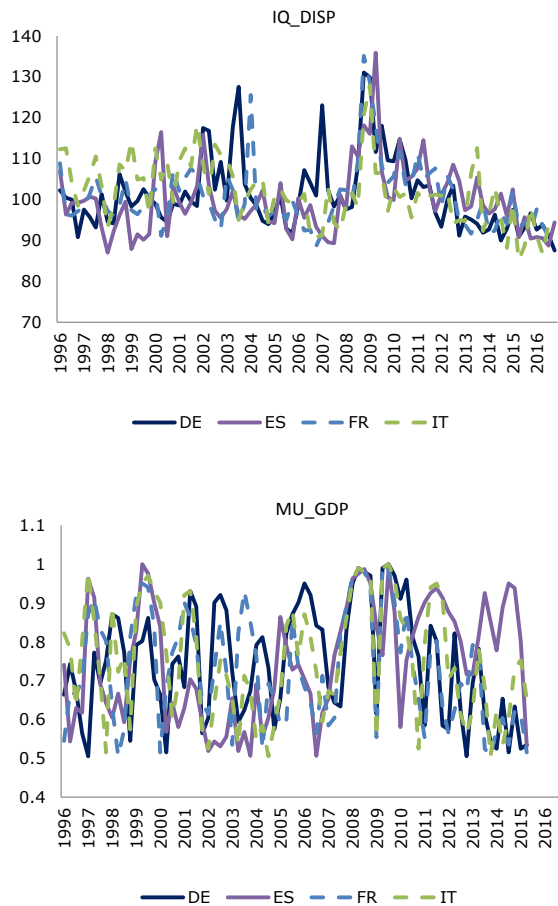
Source: Author's calculations (IQ_DISP), Rossi and Sekhposyan (2016) (MU_GDP).

II.3. Impact of uncertainty in the euro area

The existing empirical studies for the euro area as a whole [72] confirm the detrimental impact of uncertainty on the real economy, especially

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[69] The indicators come from Rossi and Sekhposyan (2016), op. cit. They are by construction bounded on the interval [0.5, 1].

[70] Recently, very similar findings were provided for a larger group of developed countries in Nowzohour, L. and L. Stracca (2017), 'More than a feeling: confidence, uncertainty and macroeconomic fluctuations.' *ECB Working paper*, No. 2100.

[71] The decoupling of these countries has been most apparent in terms of sovereign bond yields, which were often deemed to be related to redenomination risk. See for example: Klose, J. and B. Weigert (2014), 'Sovereign yield spreads during the euro crisis: Fundamental factors versus redenomination risk', *International Finance*, No. 17(1), pp. 25-50.

[72] Balta, et al. (2013), op. cit., EC (2017), ECB (2016), op. cit., Gieseck and Largent (2016), op. cit, Girardi and Reuter (2016), op. cit.

investment. The empirical evidence for the euro area also puts in doubt the common finding for the US that after some time economic activity rebounded strongly offsetting its original decline (overshooting). However, little is known abound the differential impact of uncertainty shocks across euro area Member States. [73] This will be the focus in the rest of this section.

The heterogeneous impact of uncertainty shocks across the euro area

This section provides new empirical evidence on the impact of uncertainty shocks in the euro area. It uses a suite of Bayesian Vector Autoregression (BVAR) models that allows testing the impact of unexpected uncertainty shocks on GDP, consumption and investments. The BVAR includes (besides the measures of uncertainty and real economic activity) other variables to distinguish the causal impact of uncertainty from that of other factors affecting economic activity. [74] It is important, for instance, to distinguish *uncertainty shocks* from *confidence shocks*, as well as from *financial shocks*. [75] Confidence (measured by Economic sentiment indicator, ESI) can affect consumer and investment decisions. Whereas confidence shocks shall be understood as changes in *the level* of confidence in future outcomes (first moment shocks), uncertainty shocks are rather proxied by changes *in the dispersions* of opinions about the

future (second moment shocks). [76] Adverse developments on financial markets often coincide with periods of increasing uncertainty, and financial and uncertainty shock can reinforce each other, but remain separate shocks in nature. Financial shocks can be measured as unexpected changes in asset prices, housing prices, price or volume of banking credit. [77]

Graph II.4 provides a first glimpse at the heterogeneity of responses across the euro area. It documents the impact of domestic uncertainty (proxied by IQ_DISP, MU_GDP and EPU) on GDP, consumption and investment using the impulse-response function from the BVAR model estimated for two sample countries, namely Germany and Spain. The impact of the uncertainty shock is much stronger for Spain than for Germany, irrespective of the uncertainty measure used. While the responses of German GDP, consumption and investment are not statistically significant, [78] the Spanish output suffers a decline, which is even more pronounced and statistically significant for investment across all three uncertainty indicators, and in case of EPU also for consumption. The impact of uncertainty shocks in Spain is also rather persistent and the real economy fully recovers only after five years since the uncertainty shock hit.

The differential impact of domestic uncertainty shocks on the economy, as from the results presented above, can be driven by the different *severity* of the uncertainty shocks hitting each country and by differences in economic *resilience* across Member States. Given the importance of the euro area common uncertainty component, it is interesting to additionally assess how economies of Member States respond to uncertainty shocks that are common rather than idiosyncratic. Graph II.5 compares the impact of such a euro-area wide uncertainty shock (the common factor of country-level measures) on the Spanish and German GDP. The results suggest that GDP declines (at statistically significant levels) as a consequence of

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[73] Meinen and Röhe (2017), op cit. provide evidence of uncertainty impact on investments for four largest euro area countries. Evidence for single Member States is provided e.g. Popescu and Smets (2010), op. cit., Basselier and Langenus (2014), Busetti et al. (2015), op. cit.

[74] A Bayesian Vector Autoregression (BVAR) model is estimated on quarterly data for 1996-2016. The Bayesian shrinkage allows estimating a model with several endogenous variables. The baseline model includes 6 variables (alongside with constant term and linear trend to control for non-stationarity of some variables) in the following ordering: stock prices, the economic sentiment indicators (ESI), the respective uncertainty measure (IQ_DISP, MU_GDP and - in country-specific VAR - also EPU), short-term interest rate (EONIA), log HICP and log real GDP, consumption or investment respectively. The model is estimated with four lags. The results of country-specific BVARs show generalized impulse-response functions (that are invariant to the ordering or variables in the BVAR). The macroeconomic data come from Eurostat, ECB and EC.

[75] News shock is another type of shock studied recently. However, unlike the other shocks, these are shocks that shall be understood as news about future total factor productivity, which affect the real economy only in the longer term. See for example: Jaimovich, N. and S. Rebelo (2008), 'News and business cycles in open economies', *Journal of Money, Credit and Banking*, No. 40(8), pp. 1699-1711; and Barsky, R.B. and E.R. Sims (2011), 'News shocks and business cycles', *Journal of Monetary Economics*, No. 58(3), pp. 273-289.

[76] There is also booming economic literature that studies the role of confidence as an autonomous driver of business cycle fluctuations. See for instance: Bacchetta, P. and E. Van Wincoop (2013), 'Sudden spikes in global risk', *Journal of International Economics*, No. 89(2), pp. 511-521; Angeletos, G.M. and J. La'O (2013), 'Sentiments', *Econometrica*, No. 81(2), pp. 739-779.

[77] Gilchrist, S., J.W. Sim, and E. Zakrajšek (2014), 'Uncertainty, financial frictions, and investment dynamics', *National Bureau of Economic Research Working Paper*, No. 20038.

[78] The confidence intervals along the point estimates are not plotted to save the space.

Graph II.4: **Impact of domestic uncertainty shock on GDP, consumption and investment - Germany and Spain**
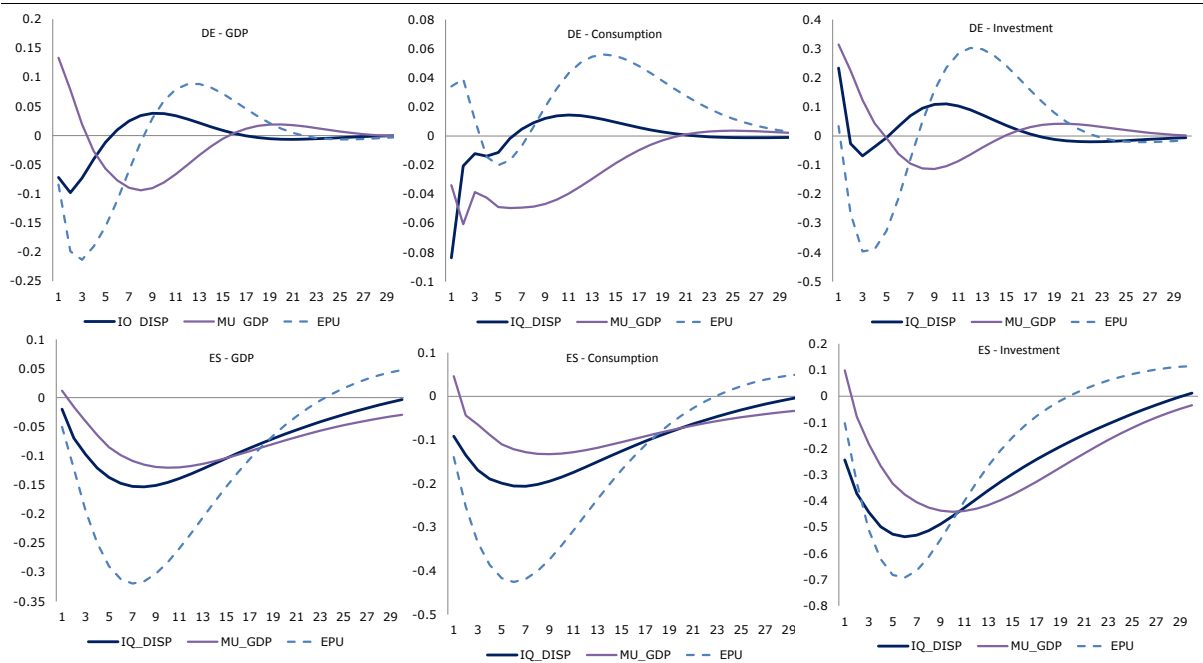
(1) The graph represents estimated response of GDP, consumption and investment following unexpected uncertainty shock in the BVAR model. Uncertainty is proxied by three alternative indicators: IQ_DISP, MU_GDP, EPU. The x-axis represents quarters. The y-axis represents percentage points.
Source: Author's calculations.

the uncertainty shock in both economies (for IQ_DISP and EPU). However, the impact on German GDP is less persistent than on Spanish GDP, which is very apparent especially in the case of the EPU.

The preliminary evidence presented so far suggests that (i) euro area Member States may suffer both from idiosyncratic and common uncertainty shocks, which reflect the high degree of interconnectedness of their economies, and (ii) the response to uncertainty shocks might differ across Member States, reflecting different degrees of economic resilience.

II.4. Uncertainty shocks and structural characteristics of EA countries

Whereas it is impossible to prevent *the occurrence* of uncertainty shocks, it is important to understand which factors determine *the impact* of uncertainty shocks on the real economy, so as to design policies in a way to shape this.

## Structural differences between euro area countries

Previous empirical evidence based on large country samples suggests that financial structures, labour market characteristics and even macroeconomic policies determine how economies react to uncertainty shocks. [79]

Similar analysis can be carried out for euro area countries. This sub-section will explore in particular the role of five structural characteristics, as described below. First, the role of labour markets, including differences in wage bargaining systems, flexibility of wages and labour mobility, is considered. Greater *labour market efficiency* is generally deemed as important for shock absorption capacity and recovery after shocks. Secondly, *product market efficiency* (determined by the

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[79] Carrière-Swallow, Y. and L.F. Céspedes (2013), 'The impact of uncertainty shocks in emerging economies', *Journal of International Economics*, No. 90(2), pp. 316-325; and Claeys, P. (2017), 'Uncertainty spillover and policy reactions', *Ensayos sobre Política Económica*, No. 35(82), pp. 64-77 document that emerging countries suffer larger falls in consumption and investment following global uncertainty shocks. They stress the role of financial development, fiscal policy (if there is sufficient fiscal space) and fixed exchange rate regimes to dampen the transmission of uncertainty on the real economy.

quality of business regulation and the degree of competition) plays an important role too in strengthening economic resilience in that it determines the flexibility of price adjustment.
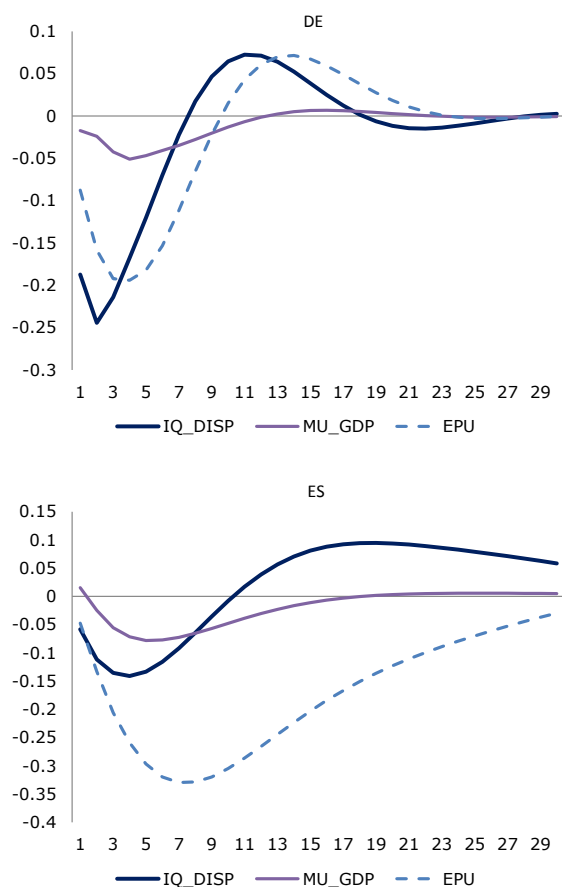
Third, *a well-developed financial system* is crucial to channel credit to companies and households, directing funding to most productive use and supporting innovation. While most euro area countries have bank-based financial systems, the access to loans for small and medium sized enterprises differs. Besides the banking system, there are also notable differences on possibility of financing via local equity markets. Fourth, while trade and financial linkages across the euro area are generally very strong, the degree of *economic openness* is not the same for all the Member States. While

economic openness makes an economy more vulnerable to external shocks, it may also improve its shock-absorption capacity through cross-border risk sharing (via cross-border holdings of financial assets). *The economic structures* of Member States differ in terms of contribution of different economic sectors to overall output. Namely, the shares of industry and services determine also the share of tradable output. A higher share of sectors that produce tradables, like sectors more integrated in global value chains, with higher value added and sectors whose output is less volatile may be beneficial to withstand shocks. While previous characteristics may clearly refer to different sectors, manufacturing is certainly a sector where most of the previous characteristics hold.
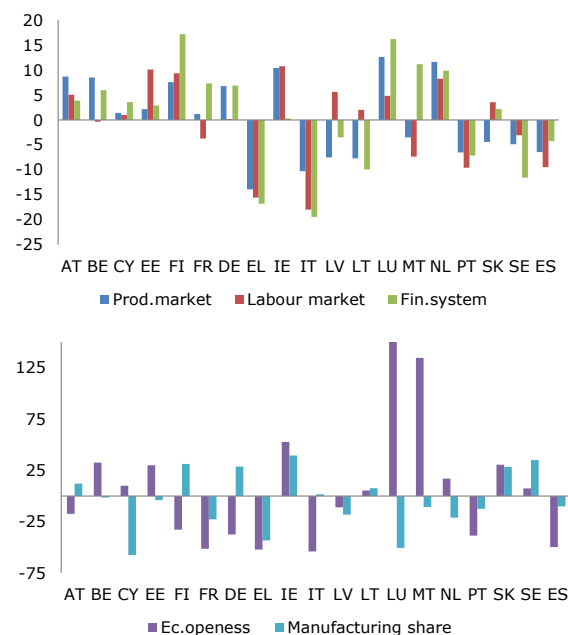
Graph II.6 plots measures of these five structural characteristics for the euro area countries. Namely, the measures of labour and product markets, and financial system efficiency (upper panel) come from World Economic Forum Competitiveness Database. [80]

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[80] These indicators form (alongside nine others) the Global Competitiveness Index and are labelled as pillars 7. (Labour

Graph II.7: **Impact of uncertainty shock on GDP in EA countries according to labour market efficiency**
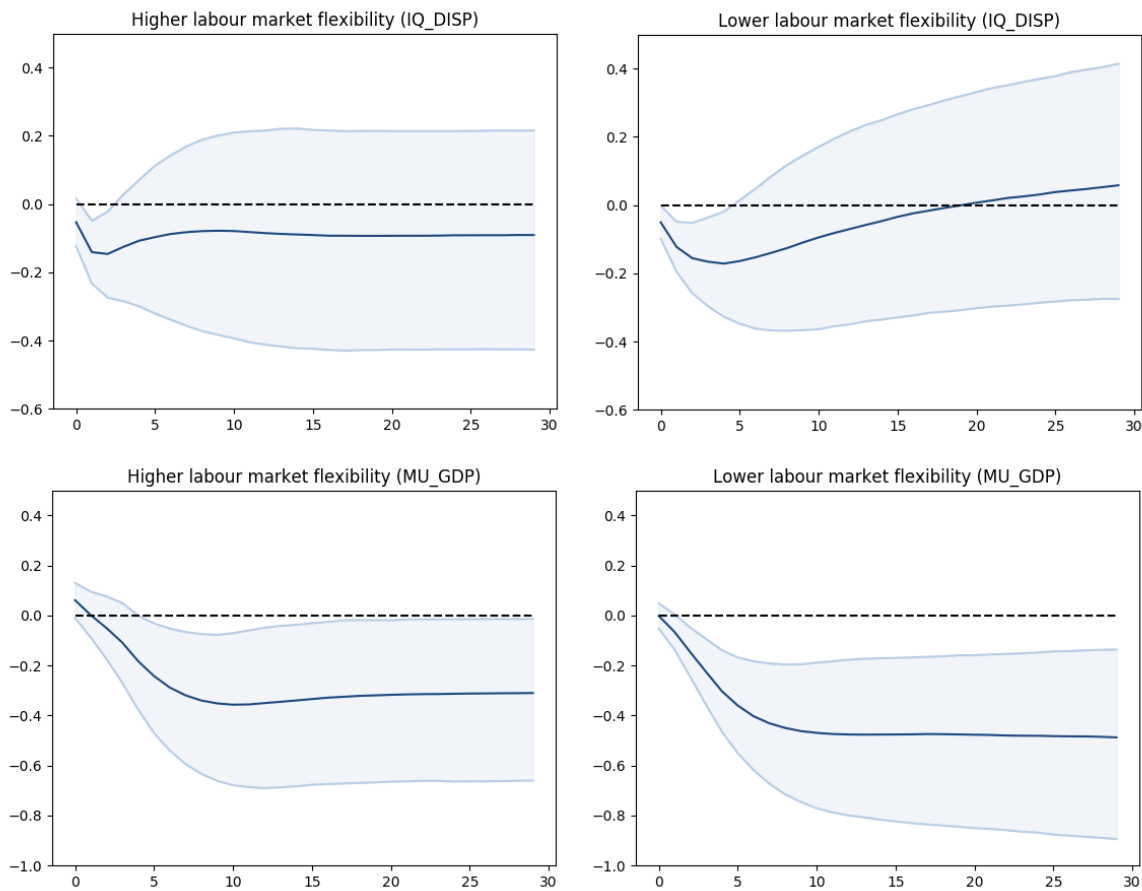
(1) The graph represents estimated response of GDP following unexpected uncertainty shock in the panel BVAR models. The EA countries are split into two subpanels according to labour market efficiency. Relatively higher labour market efficiency: AT, BE, DE, EE, FI, NL, SK, Relatively lower labour market efficiency: EL, ES, FR, IT, PT, SE. Uncertainty is proxied by two alternative indicators: IQ_DISP, MU_GDP. The x-axis represents quarters. The y-axis represents percentage points.
Source: Author's calculations.

The trade on GDP and manufacturing value added on GDP (lower panel) comes from World Development Indicators by the World Bank. Time average is taken for each indicator and country. The indicators are normalized to have zero mean and bars in Graph II.6 represent the (positive or

market efficiency), 6. (Product market efficiency) and 8. (Financial development). The dataset covers the period 2006-2016. The overall score for each indicator is determined as an average score of different sub-indicators. Labour market efficiency is a composite index of 10 characteristics including for example cooperation in labour-employer relations, flexibility of wage determination, hiring and firing practices or country capacity to retain and attract talent. Product market efficiency consists of 16 indicators, for example intensity of local competition, extent of market dominance, effectiveness of anti-monopoly policy, number procedures and days to start a business. Financial system development consists of 8 indicators, for example financial services meeting business needs, financing through local equity market, ease of access to loans, venture capital availability or soundness of banks.

negative) deviation (in p.p.) from the mean euro area value for each of the five indicators.

There appears to be correlation across the first three characteristics (efficiency of labour and product markets and financial system development) within the Member States, i.e. countries that feature more efficient labour markets tend to have also relatively more efficient product markets and financial systems (i.e. the first three bars point to the same, positive or negative, direction). Economic openness (proxied by the sum of exports and imports over GDP) and economic structure (proxied by the share of manufacturing out of total GDP) have lager dispersion across Member States than the former three characteristics. The empirical analysis that follows explores whether these structural characteristics affect the impact of uncertainty

shocks on the real economy of euro area Member States.

## The impact of uncertainty shocks varies with structural characteristics

The empirical analysis uses panel BVAR models. The panel setting allows taking into account the country-level information while addressing the issue of the relatively short data series for individual Member States. [81] In particular, the panel approach is employed to provide evidence for different groups of Member States according to the five structural characteristics defined above. Specifically, the 13 euro area countries that are included in this analysis are split broadly (6 versus 7 countries) according to scores attained for each of the five characteristics. [82] For example, a sub-panel is constructed with Member States with *relatively* more efficient labour markets (i.e. those with higher scores) versus a sub-panel of Member States with *relatively* less efficient labour markets (i.e. those with lower scores). The panel BVAR model is estimated then for each group separately. [83]

Graph II.7 reports the impact of country-specific uncertainty shocks (uncertainty is proxied by IQ_DISP and MU_GDP) on GDP using impulse-response functions from the estimated panel BVAR for Member States with relatively more efficient and less efficient labour markets respectively. While the 90% confidence interval around the mean estimate is rather wide (which may reflect further heterogeneity of responses within each sub-group), it is evident that the impact of an uncertainty shock differs across the two groups. While the impact of the uncertainty shock is mostly statistically insignificant for countries with more efficient labour markets, it is significant for the others (this holds for both measures of uncertainty). The difference is driven mainly by the response of investment but consumption seems to

be (at least temporarily) affected too in countries with lower labour market efficiency. [84] The forecast-error based measure (MU_GDP) induces exceptionally persistent responses of the real economy to uncertainty, which is, in Member States with lower labour market efficiency, statistically significant even after several years from the shock.

For better illustration, Graph II.8 plots the yearly changes in real GDP, consumption and investment alongside the uncertainty indicator (IQ_DISP) for the euro area. There is a visible inverse pattern between real economic developments and uncertainty. This holds for investment as the most volatile part of GDP.

Graph II.8: **Real economic developments and uncertainty in the euro area**
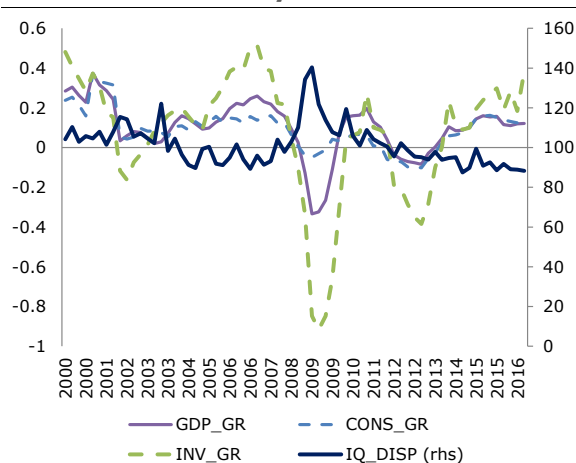
(1) The graph represents yearly changes in real GDP, real consumption and real investment alongside the level of uncertainty as proxied by IQ_DISP indicator.
Source: Eurostat and author's calculation.

The results for product market and financial system efficiency are very similar given [85] that the split of Member States is almost identical (only France switches the position with Slovakia). More efficient product markets allow, for example, for faster adjustment in prices that may be needed when the economy is hit by adverse shocks. Likewise, well developed financial systems feature less rigidity in provision of bank credit or better diversification of financing, which turns out very relevant in times of high uncertainty when banking sector tightens lending standards.

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[81] The list of variables included in the panel BVAR is the same as for normal BVAR (see footnote 24). Pooled estimator is used and report impulse-response functions come from the Cholesky factorization. The data availability allows including 13 euro area countries out of 19, namely Austria, Belgium, France, Germany, Greece, Estonia, Finland, Italy, Netherlands, Portugal, Slovenia, Slovakia and Spain.

[82] The median country is assigned to the upper (lower) group if the sample mean is above (below) the median.

[83] As each cross-section unit (i.e. each Member State) contributes evenly to the overall results, results are driven relatively more by individual country experiences than results for the euro area as whole (where larger Member States obtain higher weights).

[84] These results are not reported here due to space constrains.

[85] These results are not reported here due to space constrains.

Graph II.9: **Impact of uncertainty shock on GDP in EA countries according to trade openness**
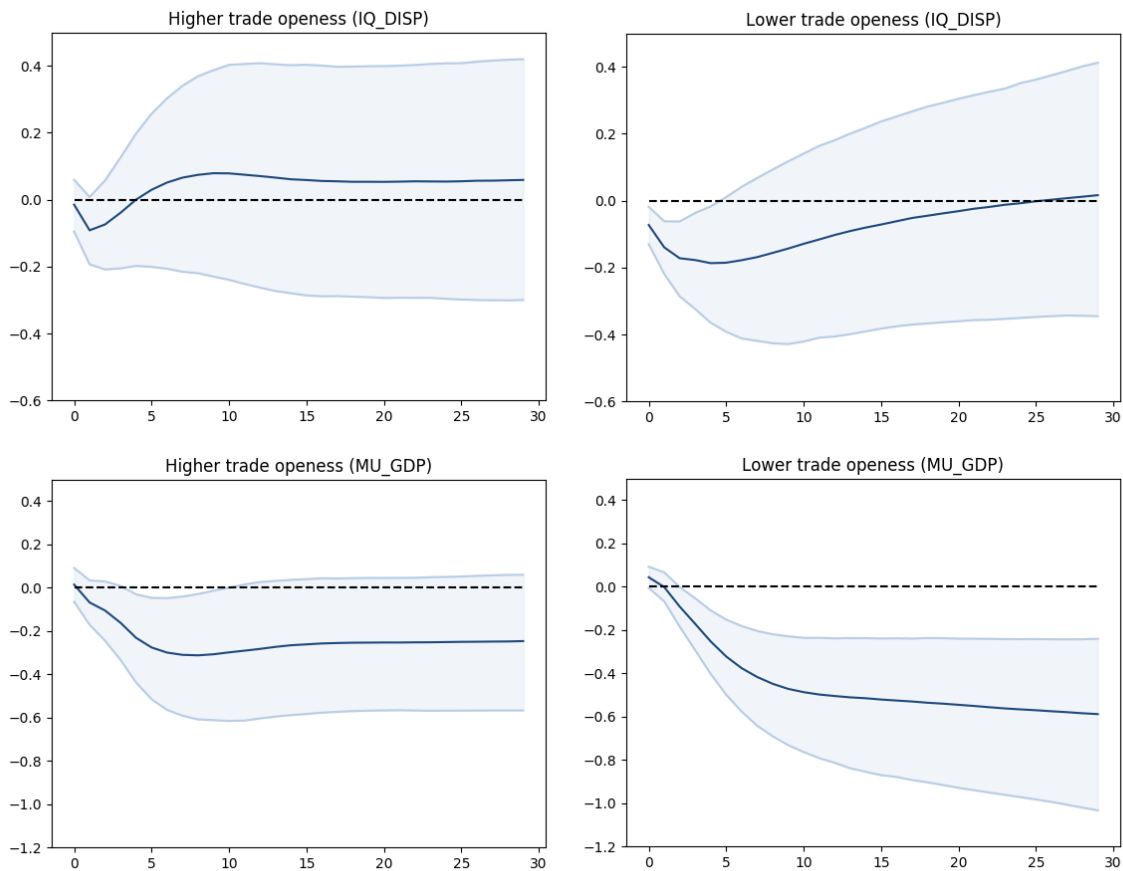
(1) The graph represents estimated response of GDP following unexpected uncertainty shock in the panel BVAR models. The EA countries are split into two subpanels according to trade openness. Relatively higher trade openness: AT, BE, EE, NL, SE, SK, Relatively lower trade openness: DE, EL, ES, FI, FR, IT, PT. Uncertainty is proxied by two alternative indicators: IQ_DISP, MU_GDP. The x-axis represents quarters. The y-axis represents percentage points.
Source: Author's calculation.

As noted earlier, Member States with more efficient labour markets perform also relatively better in terms of efficiency of product markets and functioning of the financial system. Therefore, it cannot be easily disentangled from this simple analysis which of these structural characteristics is relatively more relevant, but the analysis provides clear evidence that all these structural features of the economy affect its response to uncertainty shocks.

Economic openness provides a split of Member States that is much less akin to core versus periphery division. Unsurprisingly, the Member States with higher degree of openness are smaller economies, whereas the group with lower economic openness includes all large Member States (Germany, France, Italy, and Spain). Graph II.9 confirms that economic openness

matters in that more open economies are practically unaffected by uncertainty shocks, under both measures used for the latter. [86] It appears that while openness can, on the one hand, make countries more vulnerable to external shocks, international trade (namely in the form of intra-industry trade) [87] and financial linkages, on the other hand, smooth the impact of shocks through cross-border risk sharing.

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[86] It is also interesting to note that the countries with higher degrees of openness are indeed very open as the mean value of import and exports on the GDP among the analysed Member States is around 110%.

[87] Krugman, P.R. (1981), 'Intraindustry Specialization and the Gains from Trade', *Journal of Political Economy*, Vol. 89, No 5, pp. 959-973.

(1) The graph represents estimated response of GDP following unexpected uncertainty shock in the panel BVAR models. The EA countries are split into two subpanels according to manufacturing share on GDP. Relatively higher manufacturing share: AT, DE, EE, FI, SE, SK, Relatively lower manufacturing share: BE, EL, ES, FR, IT, NL, PT. Uncertainty is proxied by two alternative indicators: IQ_DISP, MU_GDP. The x-axis represents quarters. The y-axis represents percentage points.
Source: Author's calculation.

Finally, Graph II.10 reports effects of uncertainty shocks for the Member States according to their share of value added in manufacturing. This characteristic appears relevant too: countries with higher manufacturing shares turn out to be better able to cushion uncertainty shocks. Here the share of value added in manufacturing out of total GDP shall be understood as a proxy of output tradability, and integration into global value chains. In addition, manufacturing is usually characterised by faster productivity growth. All these can be different reasons why a higher share of manufacturing appears to be associated with greater shock absorption capacity.

EA-wide and international shocks are relevant as well

The previous results show how different groups of Member States respond differently to uncertainty shocks of idiosyncratic nature (i.e. domestic spike in uncertainty), but largely similar results are also obtained when a common euro area uncertainty shock is considered. [88]

Therefore, efficiency of labour and product markets and of the financial system, economic openness and higher share of tradables in the economy all appear to contribute to dampening the effect of a common uncertainty shock. When a common shock hits the euro area some Member

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[88] These results are not reported here due to space constrains.

Graph II.11: **Impact of common euro-area uncertainty shock and global uncertainty shock on GDP of the euro area**
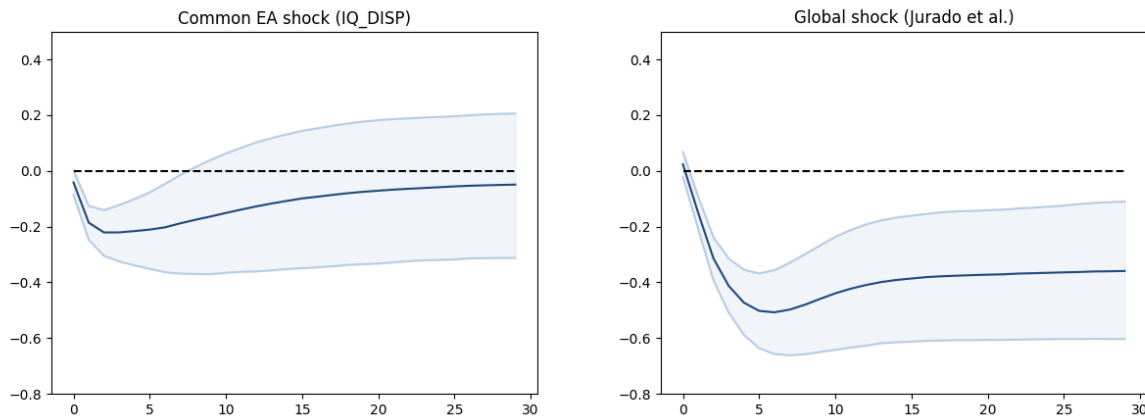
(1) The graph represents estimated response of GDP following unexpected uncertainty shock in the panel BVAR models including 13 EA countries. Uncertainty is proxied by two alternative indicators: common EA factor derived from country-level IQ_DISP measures and global uncertainty taken from Jurado et al. (2015). The x-axis represents quarters. The y-axis represents percentage points.
Source: Author's calculation.

States are affected more than others (see also Graph II.5 where Germany is compared to Spain) but, more importantly, the overall euro area output suffers a significant decline (Graph II.11, left panel).

With globalization, spikes in uncertainty may even attain a global dimension. Graph II.11 (right panel) reports the impact of such a global uncertainty shock on the euro area GDP. [89] The Graph suggests the euro area output suffers a major decline, which is even of higher magnitude than after the euro-area-wide uncertainty shock.

Fortunately, the spells of global uncertainty occur only infrequently during major events such as the first oil shock (1973–1974), the 1981–1982 recession and recently during the Great recession (2007-2009). [90]

Interactions between uncertainty and wider macroeconomic developments

Beyond the analysis of the impact of uncertainty shocks on the real economy, it is interesting to evaluate what is the impact of spikes in uncertainty on other macroeconomic and financial variables. Box I explores the relation between uncertainty and other variables included in the empirical

model. Namely, it suggests that an increase in perceived uncertainty about the future may decrease economic confidence and provide some hardship to the financial sector today. This can in turn have a feedback effect on perceived uncertainty.

The interaction between uncertainty and macroeconomic policies is another area that has been explored recently in the literature. There are three aspects of this nexus. First, macroeconomic policies may affect perceived uncertainty and EPU was indeed directly proposed to track uncertainty related to broader economic policies. Moreover, some recent studies explicitly construct measures of fiscal and monetary policy uncertainty and test their impact on macroeconomic and financial developments. [91] Second, there is evidence that macroeconomic policies respond to uncertainty shocks [92] and can alleviate their impact on the economy. [93] Third, the presence of uncertainty

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[89] The measure is based on Jurado et al. (2015), op. cit.
[90] Berger, T., S. Grabert, and B. Kempa (2017), 'Global macroeconomic uncertainty', *Journal of Macroeconomics*, No. 53, pp. 42–56.

[91] See for instance Johannsen, B. K. (2014), 'When are the effects of fiscal policy uncertainty large?', *Finance and Economics Discussion Series, Federal Reserve Board*, No. 2014-40, Creal, D.D. and J.C. Wu (2017), 'Monetary policy uncertainty and economic fluctuations', *International Economic Review*, No. 58, pp. 1317-1354, Kurov, A., and R. Stan (2018), 'Monetary policy uncertainty and the market reaction to macroeconomic news'. *Journal of Banking & Finance*, No. 86, pp. 127-142.
[92] Figure 1 in the box suggests that a spike in uncertainty drives EONIA down suggesting that monetary policy may respond to an uncertainty shock by monetary easing. However, EONIA is affected also by other factors besides the monetary policy.
[93] Carrière-Swallow and Céspedes (2013), op. cit. and Claeys (2017), op. cit..

may (by affecting agents' behaviour) also affect the effectiveness of macroeconomic policies. [94] The detailed analysis of these factors is nonetheless beyond the scope of the analysis in this section.

II.5. Conclusions

Spikes in subjective perceptions of uncertainty cannot be entirely avoided as they can originate outside the economic system, and economic theory suggests that psychological factors such as perceived uncertainty represent an inherent driver of behaviour of economic agents.

This section presented new empirical evidence on the impact of uncertainty shocks in the euro area when country-level data, including uncertainty indicators, are used. It turns out that uncertainty indicators of individual Member States share a very strong common component. This suggests that unexpected spikes in uncertainty (uncertainty shocks) are often common rather than idiosyncratic events.

Besides the issue of where the shocks originate from, it is crucial how euro area economies respond to them. This section looked at groups of Member States that share certain structural characteristic rather than at individual countries.

The evidence suggests that relatively less efficient labour markets, product markets and less developed financial systems, as well as a lower degree of trade openness and diversification of the economy, induce a deeper and more persistent impact of uncertainty shocks on output, especially on investment. Moreover, the aforementioned structural features of the economies may have an impact (feedback effect) on the subjective perception of risk and uncertainty by economic agents, thus reinforcing the link structural features – uncertainty effects.

Given the relationship highlighted by the analysis presented in this section between the aforementioned key structural characteristics of the economy and the impact of uncertainty shocks, it appears all the more important to strengthen the resilience of euro area economies through efficient labour and product markets and well-functioning financial markets, which make economies able to withstand shocks and recover from them without protracted effects on output and employment. The analysis presented in this section indeed points at labour, product and financial markets as areas where structural reforms might prove particularly useful to strengthen resilience, therefore dampening the effects of uncertainty shocks.

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[94] Aastveit, K.A., G.J. Natvik, and S. Sola (2013), 'Economic uncertainty and the effectiveness of monetary policy', *Norges Bank Working Paper*, No. 17; Pellegrino, G. (2017), 'Uncertainty and the real effects of monetary policy shocks in the euro area', *Melbourne Institute Working Paper*, No. 15/17.

Box II.1: **Interactions between uncertainty and other shocks**

While most empirical literature agree that uncertainty shocks have negative impact on the real economy (which is also confirmed in this section), there is no consensus on how uncertainty affects other macroeconomic variables. This is driven by significant diversity in model settings across empirical studies, in terms of uncertainty indicators employed but also other macroeconomic and financial variables included in the models.

Graph 1 plots responses of the other four variables (besides the uncertainty itself and the measure of real economy), which were included in the panel BVAR model used in this section, to an uncertainty shock. [1] The results show that the stock prices experience a protracted decline (upper left chart), the economic sentiment drops quickly but only for a short period (upper right chart), the short-term interest rate declines (lower left chart) and there is also a minor and short-lived decline in prices (lower right chart).

Graph 1: **Impact of common euro-area uncertainty shock on other euro area variables**
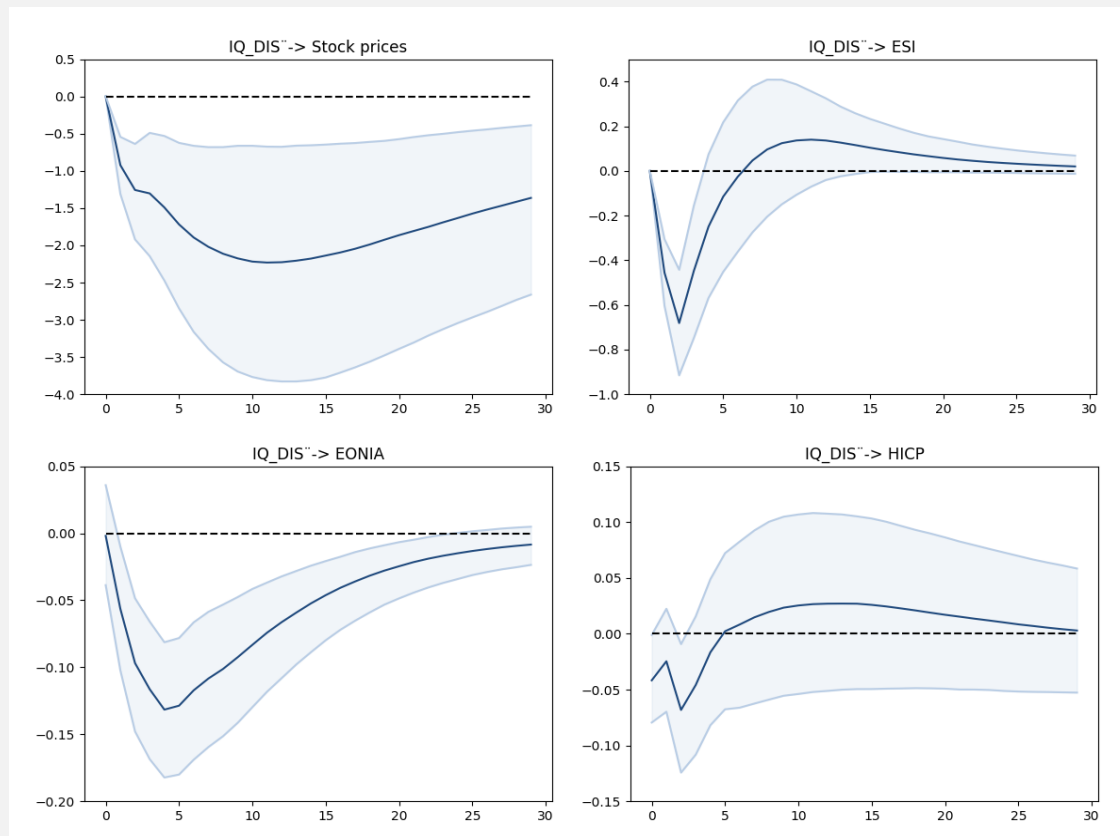
(1) The graph represents estimated response of stock prices, ESI, EONIA and HICP following unexpected uncertainty shock in the panel BVAR models including 13 EA countries (AT, BE, DE, EE, EL, ES, FI, FR, IT, NL, PT, SE, SK). Uncertainty is proxied by IQ_DISP. The x-axis represents quarters. The y-axis represents units of each variable.
Source: Author's calculation.

The direction of the economy's responses following an uncertainty shock can be useful to understand the nature of the shock. Specifically, a decline in economic activity coupled with a decline in economic sentiment

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[1] While the common euro area shock from the indicator IQ_DISP is used for this estimation, the use of country-level IQ_DISP indicators or the indicator MU_GDP does not largely change the findings.

and in prices resembles the effects of a recessionary aggregate demand shock. Therefore, through the effect on aggregate demand, uncertainty might affect the real economy. (²)

However, uncertainty can also change as a consequence of other shocks. Graph 2 documents the increase in the uncertainty indicator (IQ_DISP) following a drop in stock market prices (proxy of financial shock, left panel) and Economic sentiment indicator (proxy of confidence shocks, right panel). These results overall suggest the existence of a two-sided relation between uncertainty and other adverse shocks in the euro area.

Graph 2: **Impact of euro area financial shock / economic sentiment shock on uncertainty**
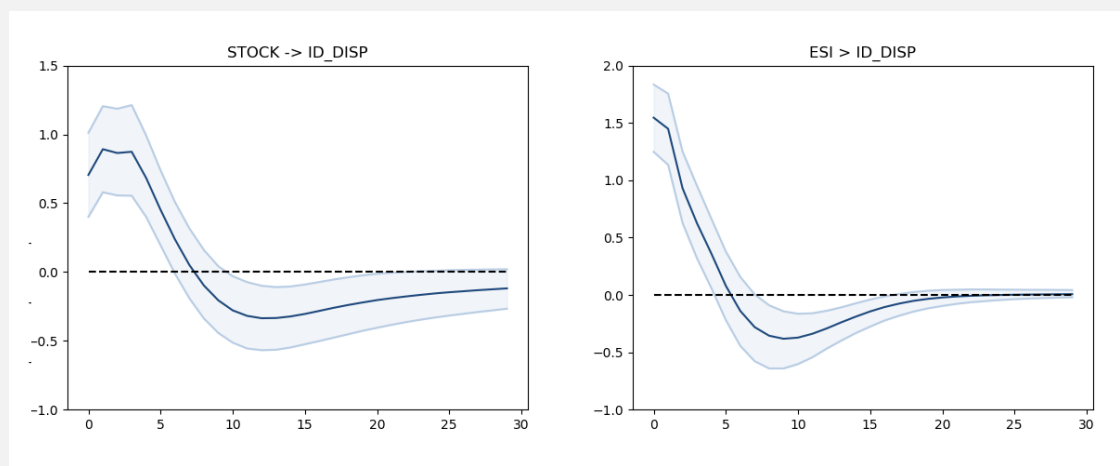
(1) The graph represents estimated response of uncertainty (proxied by IQ_DISP) following unexpected financial and confidence shock in the panel BVAR models including 13 EA countries (AT, BE, DE, EE, EL, ES, FI, FR, IT, NL, PT, SE, SK). Financial shock is proxied by shock in stock prices, confidence shocks is proxied by shock of ESI. The x-axis represents quarters. The y-axis represents units of each variable.

Source: Author's calculation

(²) Leduc, S. and L. Zheng (2016). 'Uncertainty shocks are aggregate demand shocks', *Journal of Monetary Economics*, No 82, pp. 20-35; Basu, S. and B. Bundick (2017). 'Uncertainty shocks in a model of effective demand', *Econometrica*, No. 85 (3), pp. 937-958.

III. Long-term labour market effects of the Great Recession

This section contributes to the analysis of long-term labour market effects of the Great Recession in the euro area. First, the section shows empirical results suggesting that the risk of unemployment persistence and labour market polarization should not be ignored. For several euro area Member States, there is indeed statistical evidence of a slow labour market adjustment using a dataset covering a sample ranging from the mid-90s (for some Member States from the early 00s) until 2016. Moreover, the dispersion of both unemployment and employment rates across euro area members appears to have increased from the start of the crisis until mid-2013, after which it tempered somewhat, but still remains above pre-crisis levels. Between 2014 and 2017 labour market reforms introduced in a number of euro area Member States may nonetheless have contributed to improving labour market adjustment going forward, though there remains scope for further reforms in this policy area.

Two mechanisms that may trigger labour market persistence are empirically investigated in this section. The econometric analysis suggests that wage adjustments, over the period 1999-2015, reflected primarily changes in short-term unemployment, while being less responsive to changes in the long-term unemployment rate. Moreover, labour reallocation from sectors that were booming before the crisis towards sectors with stronger growth potential was sluggish. The policy implications of these empirical findings are briefly discussed, thereby highlighting the merits of policy initiatives that limit skill erosion and support skill formation during persistent downturns, as may be the case for well-designed short-time working arrangements. ([95])

III.1. Introduction

The euro area reached its highest employment rate in the second quarter of 2017, at almost 71% percent of the total population, slightly above its pre-crisis peak. Euro area unemployment has decreased steadily since peaking at more than 12% in the second quarter of 2013, but remains high at 9%.

While unemployment is still above its pre-crisis level, ongoing structural changes such as globalisation and technological progress pose new labour market challenges. Addressing these challenges calls for a further improvement in the functioning of the labour markets and the employability of the labour force.

From this perspective it is then important to know to what extent the Great Recession has left scarring effects in the labour markets of euro area Member States. Such adverse effects can take several forms, ranging from depressed career prospects for the young people trapped in persistent unemployment spells to permanent decreases in the euro area's production capacity. Channels via which such effects may arise include a deterioration of long-

term unemployed workers' employability (due to, for instance, skills erosion), permanent decreases in labour force participation (due to, for instance, early retirement), changes in labour market structure (such as stronger labour market polarization that may hinder the reallocation of labour).

This section examines to what extent scarring effects in euro area labour markets may have prevailed. It assesses the empirical significance of a selected set of mechanisms that may trigger such effects, while pointing at reforms undertaken between 2014 and 2017 in a number of Member States that can be expected to improve the responsiveness of labour markets going forward. The second sub-section starts with a brief overview of the labour market underperformance and divergence in the euro area experienced with the crisis. The third sub-section assesses econometrically the degree of persistence in unemployment and employment contract types, making a distinction along the age and gender dimensions. While several mechanisms can be identified that may trigger sluggish labour market adjustment, the fourth and fifth sub-sections empirically investigate how significant the low responsiveness of wages to long-term unemployment and sectoral skill-mismatch has been over the past, potentially generating the erosion of employability of specific groups of

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workers. For instance, long-term unemployment may cause a loss in skills and stigma, while workers employed in sectors booming before the crisis, such as construction, may have lacked the necessary skills to get employed in sectors with stronger growth potential. The sixth sub-section discusses some of the policy implications of the findings, while the last sub-section draws conclusions. ([96])

## III.2.   Labour market effects and divergence

In the euro area, employment and unemployment rates show strong and persistent fluctuations. In the third quarter of 2008, the euro area employment rate reached its highest level at around 70%, but in subsequent quarters, when the crisis hit hardest, it fell notably, bottoming out at around 67% in the first quarter of 2013 (GraphIII.11). In subsequent quarters it rebounded and by the fourth quarter of 2016 the euro area employment rate had almost reached its pre-crisis level. At the same time, the euro area unemployment rate reached its lowest level, at around 7%, in the first quarter of 2008, but rose to 12% in the second quarter of 2013 and gradually fell back to 9.5% in the first quarter of 2017.

Compared to the euro area, US unemployment showed a much stronger and swifter adjustment to lower levels following the hit of the crisis, while employment showed persistence at its lower post-crisis level. This may suggest that labour market participation was a stronger adjustment channel in the US than in the euro area. ([97])

While for the euro area as a whole the employment rate recovered to its pre-crisis level, employment rates at a more disaggregated level show a more diverse pattern. By early 2017, several Member States, including Greece, Spain and Cyprus,

recorded employment rates that were still significantly below their pre-crisis rates, while others (especially Germany) recorded rates well above (Graph III.22). More generally, the dispersion of employment rates (as measured by the coefficient of variation) increased from the start of the crisis until mid-2013, after which it tempered somewhat but was still above pre-crisis levels by early 2017 (Graph III.33). Nevertheless, there is a strong difference between men and women as well as between different age groups. While the dispersion of female employment rates showed a declining trend even at the height of the crisis, the dispersion of male employment rates recorded a notable rise in 2009 and early 2010, followed by a moderate decrease so that by end 2016 it was still well above pre-crisis level. This could be due to country dispersion in demand shocks in male-dominated manufacturing.

Graph III.1: **: Euro area and US employment (ER) and unemployment (UR) rates**
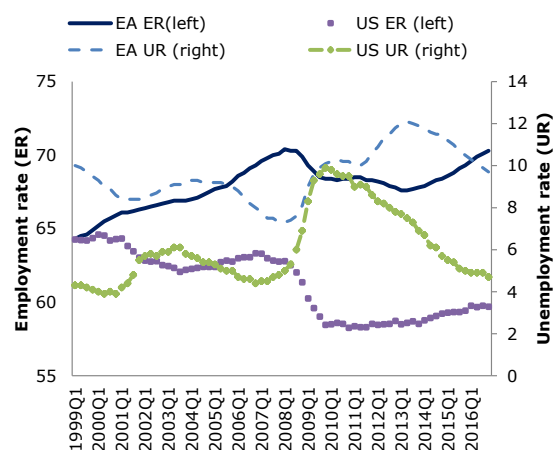
(1) Scale on left-hand side vertical axis refers to employment rate; scale on right-hand side vertical axis refers to unemployment rate.
(2) US employment rate measured as employment to population ratio for people 16 years and over. ER employment rate covers population aged 20 to 64 years.
Source: Eurostat and Bureau of Labour Statistics

Focussing on different age groups, youth employment rates showed by far the strongest dispersion (Graph III.44). This dispersion was already high before the crisis but it then increased strongly up to late 2013, followed by a gradual decrease. Nevertheless, it was still well above its pre-crisis level by end-2016. At the same time, the dispersion of prime-age workers' employment rates remained fairly stable between 2000 and 2016, while the same metric showed a decreasing trend for older workers.

([96]) In this section macroeconomic aggregates are analysed. Such analysis has to be distinguished from the microeconomic analysis that tracks the impact of persistent unemployment spells over the affected persons' life-cycle, including their income and job opportunities. For a review of the literature analysing the damaging effects of the crisis on individuals' working careers and future life chances, see Fondeville, N. and T. Ward (2014), 'Scarring effects of the crisis', Social Situation Monitor Research note 06/2014.
([97]) Less generous unemployment benefit schemes with less coverage in the US than in euro area may be a mechanism that explains this different pattern. More on the labour market recovery in the euro area in comparison to the US and the role of rigidities can be found in Ruscher, E. and B. Vasicek (2015), 'The euro area recovery in perspective', *Quarterly Report on the Euro Area*, Vol. 14, No. 3.

By early 2017, unemployment rates were still very high in several euro area Member States, especially in Greece, Spain and Cyprus, while they were rather low in Germany and Malta (Graph III.55). Moreover, while the dispersion of unemployment rates across euro area Member States decreased gradually in the first years of EMU, it increased dramatically at the onset of the crisis and only started to decrease gradually by late 2013 (GraphIII.66). By early 2017 it was still well above its pre-crisis level. The dispersion of male unemployment rates strengthened at the onset of the crisis, it started to weaken fairly quickly, while the dispersion of female unemployment rates increased at a more gradual pace, and was still hovering around its peak by the end of 2016. A sectoral difference in the gender of the working force, with male-dominated mining and manufacturing experiencing more pronounced fluctuations in demand, might explain the result (Graph III.66).

Graph III.2: **Employment rates across euro area Member States**
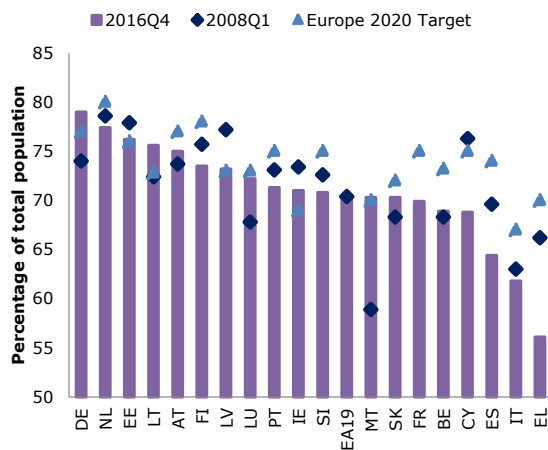
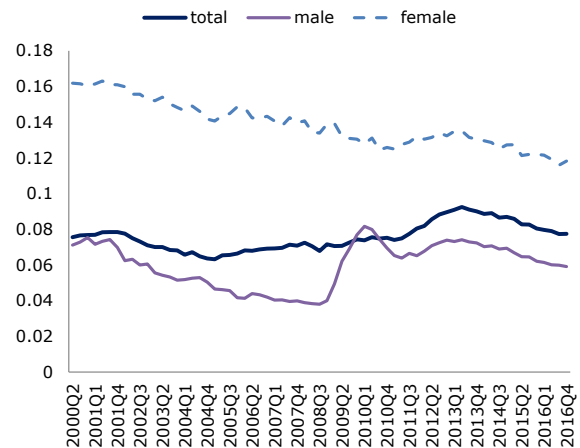*Source:* Eurostat, Labour Force Survey.

While the dispersion of the unemployment rate of older persons was highest before and during the first years of the crisis, it has become less intense compared to other age groups in recent years (Graph III.77).

III.3.   Does history matter in the long run?

Given the labour market developments presented above, an important policy issue is to know whether unemployment and employment rates show a tendency to recover back to pre-crisis levels or to improve, or whether the Great Recession has left permanent scarring effects. In the latter case,

an assessment of policy measures taken so far to improve the responsiveness of labour markets going forward is of utmost importance.

Graph III.3: **Employment rate – euro area dispersion by gender**

(1) Employment rate dispersion is the coefficient of variation of Member States' employment rates
Source: Authors' estimation based on Eurostat, Labour Force Survey.

To address the aforementioned questions, past developments can be statistically analysed with a view to test whether the underlying data generating process is characterised by a unit root (i.e. a process which will not return to its equilibrium once it gets temporarily disturbed). If such process is present, the unemployed may get "trapped" in their unemployment spell even if the shock that caused their unemployment has disappeared. Such processes can be reversible or irreversible. Reversibility will emerge if a temporary shock has a permanent effect, but this effect can be reversed if a shock of the same size in the opposite direction hits the economy. For example, structural unemployment may increase if workers' skills and motivation erode in the face of persistent unemployment spells. Conversely, during a significant upturn structural unemployment may decrease as more unemployed get hired and acquire new skills on the job. Such process can be irreversible if there is no symmetry between positive and negative shocks. ([98])

([98])   See Baldwin (1989), 'Sunk-Cost Hysteresis', NBER *Working Paper* No. 2911.

Graph III.4: **Employment rate – euro area dispersion by age**

(1) Employment rate dispersion is the coefficient of variation of Member States' employment rates.
Source: Authors' estimation based on Eurostat, Labour Force Survey.

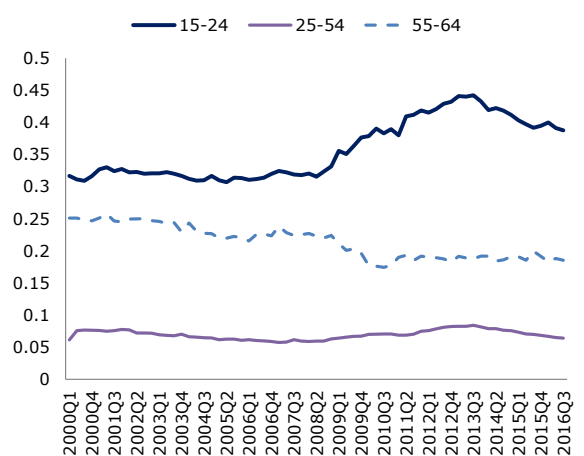Graph III.6: **Unemployment rates – euro area dispersion by gender**
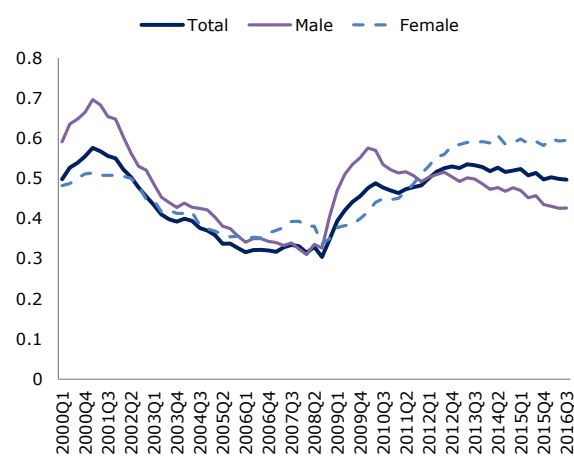
(1) Unemployment rate dispersion is the coefficient of variation of Member States' unemployment rates.
Source: Authors' estimation based on Eurostat, Labour Force Survey.

Graph III.5: **Unemployment rates across euro area Member States**
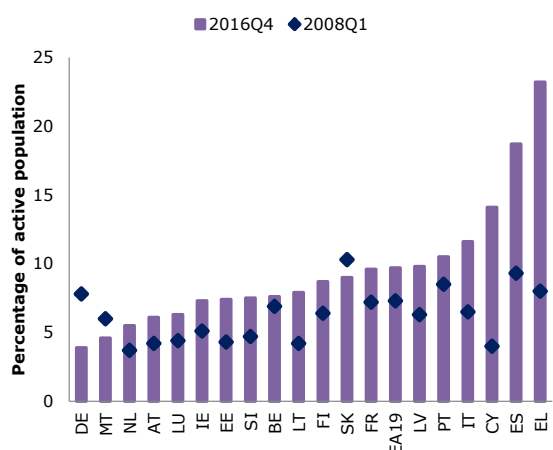
Source: Eurostat, Labour Force Survey.

III.3.1. Risk of unemployment persistence

In this section, the data generating process underlying the unemployment rates in the euro area is identified applying several variants of the unit root tests for the unemployment rates of the male, female and total workforce, as well as the young (aged 20 to 24 years) and older (aged 55 to 64 years) workforce.

Graph III.7: **Unemployment rate – euro area dispersion by age**
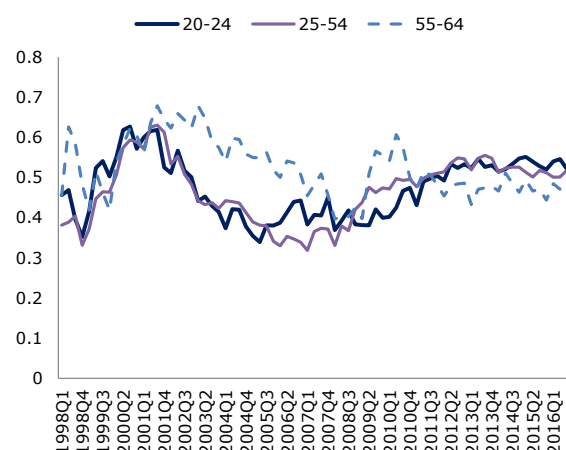
(1) Unemployment rate dispersion is the coefficient of variation of Member States' unemployment rates.
Source: Authors' estimation based on Eurostat, Labour Force Survey.

From a macro-economic perspective distinguishing between these groups is useful as they may face heterogeneous labour market conditions. The young are inexperienced and at the beginning of their learning process, while the older tend often to be less receptive to acquire new skills or update their skillset. Male and female workers may also face different conditions to the extent that, for example, women are more likely to be confronted with (illegal) discrimination/stigmatization or have stronger family responsibilities, while childcare facilities may not be sufficient to cater for demand. Hence, it is to be expected that the underlying data

generating mechanisms differ between these groups.

Augmented Dickey-Fuller (ADF) tests were run for several variants. [99] Table III.11 shows, in the first column, the significance level at which the null-hypothesis of a unit root can be rejected and the sample size in the second column. Reading the results in this (and following) table(s), the following caveats should be kept in mind. First, by definition the unemployment rate fluctuates between 0 and 100, but left on its own a unit root data generating process may generate values that exceed these bounds. As such, a unit root should be considered as a (local) approximation to the behaviour of unemployment during a particular sample period. [100]

Second, there is the possibility of reverse causality. For example, to the extent that economic agents suddenly realise that their future outlook was too optimistic, they would, decrease their contemporaneous consumption and investment in anticipation of lower future output, thereby triggering a recession. [101]

Third, unit root tests may be biased toward a false unit root null when the data are trend stationary with a structural break (e.g. a change in labour market institutions). [102] However, while structural breaks may hamper the statistical testing of unit roots, an observed break in unemployment series may indicate "genuine hysteresis" effects in the sense that the unemployment rate has permanently transited to a new equilibrium – which shows as a break in the series (i.e. an "endogenous" structural break). [103] Finally, a short sample size may limit the power of these tests.

The results in TableIII.11 suggest that a unit root, i.e. non-stationarity, of unemployment rates can be rejected with confidence in Belgium and Finland for all groups considered in this section, i.e. unemployment in these countries does not seem to be persistent. By contrast, the null hypothesis of non-stationarity cannot be rejected, for the total, nor for any of the groups, in Italy and Cyprus, i.e. unemployment in these countries appears to be persistent.

Table III.1: **Time series properties of unemployment rates**

	Total		Women		Men		Young		Older	
	Signi-ficance	Sample	Signi-ficance	Sample	Signi-ficance	Sample	Signi-ficance	Sample	Signi-ficance	Sample
BE	***	87Q4-16Q4	***	87Q1-16Q4	*	88Q4-16Q4	**	00Q3-16Q3	***	99Q3-16Q3
DE		91Q3-16Q4		91Q3-16Q4		91Q4-16Q4	**	06Q1-16Q3	***	07Q1-16Q3
EE	**	01Q1-16Q3	**	01Q1-16Q3	**	01Q1-16Q3	na	na		00Q4-16Q3
IE	*	85Q4-16Q4	**	85Q3-16Q4	*	85Q4-16Q4		01Q3-16Q3		02Q1-16Q4
EL		99Q2-16Q3		99Q2-16Q3	*	99Q2-16Q3		00Q4-16Q3		00Q2-16Q3
ES		86Q4-16Q4	*	87Q3-16Q4		87Q1-16Q4		00Q4-16Q4		98Q3-16Q4
FR	*	83Q4-16Q4		83Q4-16Q4		84Q2-16Q4		05Q1-16Q4		05Q1-16Q4
IT		84Q1-16Q4		84Q1-16Q4		84Q3-16Q3		00Q2-16Q3		99Q3-16Q3
CY		00Q4-16Q4		00Q4-16Q4		01Q3-16Q4		04Q3-16Q3		05Q3-16Q3
LV	**	99Q1-16Q3	*	99Q4-16Q3	*	99Q1-16Q4		02Q1-16Q4		04Q3-16Q3
LT		99Q2-16Q4	*	99Q4-16Q4	**	99Q1-16Q4		03Q1-16Q3		02Q4-16Q3
LU		84Q2-16Q4	*	83Q3-16Q4		85Q2-16Q4	na	na	na	na
MT		00Q3-16Q4	***	02Q1-16Q4	**	00Q3-16Q4	na	na	na	na
NL	**	83Q4-16Q4	***	83Q3-16Q4	***	83Q4-16Q4		02Q2-16Q3	***	02Q4-16Q3
AT		96Q4-16Q3		96Q2-16Q3	*	97Q4-16Q3	***	01Q2-16Q3		00Q2-16Q3
PT		85Q3-16Q4		85Q1-16Q4		83Q4-16Q4		00Q1-16Q4	*	98Q3-16Q4
SI		97Q4-16Q4		96Q2-16Q4		96Q2-16Q4		96Q3-16Q4	***	99Q4-16Q3
SK		99Q4-16Q4		99Q4-16Q4		99Q4-16Q4	**	00Q2-16Q3		99Q4-16Q3
FI	***	89Q1-16Q4	**	90Q1-16Q4	***	89Q1-16Q4	***	00Q2-16Q3	**	99Q4-16Q3

(1) Significance: *** for p < 0.01, ** for p < 0.05, * for p < 0.1; Sample: sample size; na: not available.
(2) Test performed for several variants, i.e. without any additional explanatory variables, with a constant and with a constant and a trend (most significant reported in table); length of lagged dependent variable selected on the basis of the AIC information criteria. More details available upon request.
Source: Authors' estimates based on Eurostat, Labour Force Survey.

Non-stationarity for youth unemployment rate can be rejected with high confidence for Austria and Finland, and at a somewhat lower confidence level for Germany and Slovakia, perhaps due to the work/study schemes developed in these countries. Non-stationarity for older workers can be rejected with strong confidence for Belgium, Germany, the Netherlands and Slovenia, and at a somewhat lower confidence level for Finland and Portugal. The significance level for men and for women shows a similar pattern across Member States, except for the Netherlands, where the null-hypothesis can be rejected with strong confidence for men but not for women.

All in all, this first look at the data suggests that for several Member States there is some statistical evidence that there may be a risk of very slow labour market adjustment. A further exploration of the data shows that for the euro area as a whole the null hypothesis of a unit root can be rejected with strong confidence, both as a common unit root for all Member States and as different unit roots across

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(99) These include variants covering a constant, a constant and a trend, as well as a variant without constant and trend. Each variant was estimated with lagged dependent variables, whereby the Akaike Information Criterion (AIC) was used to select the lag length.

(100) See Gali, J. (2015), 'Hysteresis and the European unemployment problem revisited', in ECB Forum on Central Banking, Inflation and unemployment in Europe, Conference proceedings.

(101) See Blanchard, O., E. Cerutti and L. Summers (2015), 'Inflation and Activity – Two Explorations and Their Monetary Policy Implications', *NBER Working Paper* 21726.

(102) See Perron (1989), 'The Great Crash, the Oil Price Shock and the Unit Root Hypothesis', *Econometrica* Vol. 57, No. 6, pp. 1361–1401.

(103) Belke, A., Göcke, M. and L. Werner (2014), 'Hysteresis Effects in Economics – Different Methods for Describing Economic Path-dependence', *Ruhr Economic Papers* No. 468.

Member States. Estimating a threshold autoregressive model [104] suggests that Spain, followed by Cyprus, Italy, Estonia and Greece, show the most significant increase in likelihood if one compares the asymmetric variant [105] with the symmetric variant. [106] This may suggest that in these Member States the reversibility of the high unemployment rates is less likely.

III.3.2. Risk of labour market polarization and marginalisation

Apart from the risk of workers staying unemployed once the macroeconomic causes of their unemployment have faded, the risk that workers get trapped in non-standard employment types, such as (involuntary) part-time and fixed-term contracts, should also be explored.

Since the onset of the crisis there has been a significant rise in non-standard employment contracts in several Member States. Between the first quarter of 2008 [107] and the last quarter of 2016 the share of people working part-time, while wanting to work longer hours, increased very sharply in Cyprus, Spain and Greece (Graph III.88). [108] A similar development can be observed for fixed-term contracts.

While non-standard employment contracts can be a stepping stone towards full-time permanent contracts, especially for young people, the risk that such contract arrangements persist exists, thereby strengthening labour market polarization. Such polarization may arise as workers with temporary or part-time contracts often have fewer opportunities to train or acquire new skills, and are more likely to face stigmatisation on the side of employers (who may use past contract types as screening device to judge employability). At the

aggregate level these types of effects may then negatively affect potential productivity growth. [109]

Graph III.8: **Underemployed part-time workers**
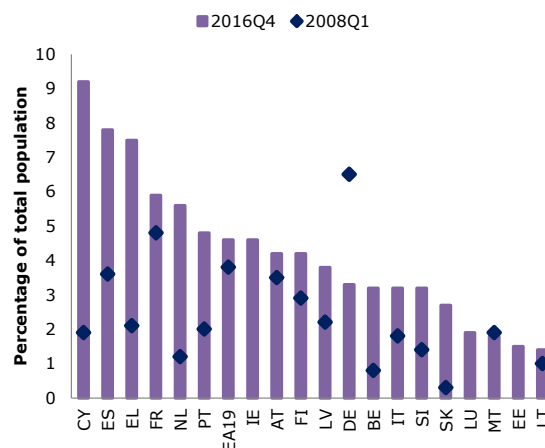
(1) Underemployed part-time workers are persons working part-time who wish to work additional hours and are available to do so.
Source: Eurostat, Labour Force Survey.

There is also a risk of labour market marginalisation in the face of long unemployment spells as several Member States recorded sharp increases in their long-term unemployment rates between 2003 and 2015 [110], especially Greece, Spain, Cyprus and Portugal (GraphIII.99). Strong rises in long-term unemployment carry the risk that more people become vulnerable to labour market marginalisation. Such outcome may be triggered as the long-term unemployed often lack opportunities for skill formation and training and may get trapped in social isolation and poverty, which in turn reduces opportunities to find quality work. The long-term unemployed may get discouraged to search for a job. Moreover, employers may use the duration of unemployment spells as a screening device, thereby stigmatising the long–term unemployed as having low productivity or work motivation. The persistent detachment of these people from the labour market may also affect wage setting to their detriment – as explored in more detail in sub-section 4.

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[104] This allows for asymmetry in the data generating process between an increase and decrease in unemployment. See Enders and Granger (1998), 'Unit-Root Tests and Asymmetric Adjustment With an Example Using the Term Structure of Interest Rates', *Journal of Business and Economic Statistics*, Vol. 16, pp. 304 – 311.

[105] For instance, due to labour hoarding an output downturn may induce an increase in unemployment which is weaker than the decrease in unemployment during an output upturn (similar in absolute terms).

[106] These empirical results are available upon request.

[107] First quarter for which harmonised data are available.

[108] Germany is the only Member State that recorded a sharp decrease during the same period.

[109] However, in the short-run, a high share of non-standard contracts may discipline wage setting, thereby strengthening the Member States' price and cost competitiveness, which in turn may boost labour demand.

[110] Respectively, the first and last year for which harmonised data for all euro area Member States are available. Slovakia, Germany, Estonia and Lithuania recorded notable decreases between 2003 and 2015.

Applying the same statistical techniques as in the previous sub-section shows [111] that the null hypothesis that the share of involuntary part-time work in total employment will not return to its equilibrium, once the disturbance has disappeared, can be rejected with strong confidence only for Germany and Luxembourg, followed by Malta, Slovenia, and Slovakia (Table III.2). Focussing on specific groups, the null-hypothesis for the group of young (which can also be labelled the "unexperienced") can be rejected with strong confidence for Germany, France, Austria, Slovenia and Slovakia (for 5 Member States the data are not available).
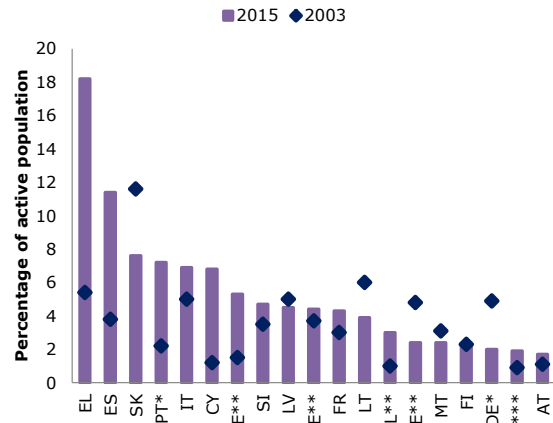
Table III.2: **Time series properties of underemployed part-time workers**
(Percentage of total employment)

	Total		Women		Men		Young		Older	
	Signi-ficance	Sample	Signi-ficance	Sample	Signi-ficance	Sample	Signi-ficance	Sample	Signi-ficance	Sample
BE		08Q2-16Q4		08Q2-16Q4		08Q2-16Q4		08Q2-16Q4	na	na
DE	***	08Q2-16Q4	***	08Q2-16Q4	**	08Q2-16Q4	***	08Q2-16Q4	***	08Q2-16Q4
EE		09Q3-16Q4	na	na	na	na	na	na	na	na
IE		11Q2-16Q4		09Q3-16Q4		11Q2-16Q4		09Q2-16Q4		08Q4-16Q4
EL		08Q2-16Q4		08Q3-16Q4		08Q2-16Q4		08Q2-16Q4		08Q2-16Q4
ES		08Q3-16Q4		08Q3-16Q4		09Q1-16Q4		08Q3-16Q4		10Q3-16Q4
FR		08Q2-16Q4		08Q2-16Q4	**	08Q2-16Q4	***	08Q3-16Q4	**	08Q2-16Q4
IT		08Q2-16Q4		08Q2-16Q4		08Q2-16Q4		08Q2-16Q4	*	08Q2-16Q4
CY		08Q3-16Q4		08Q3-16Q4		10Q3-16Q4		08Q4-16Q4		08Q2-16Q4
LV	*	08Q4-16Q4		08Q2-16Q4	*	08Q4-16Q4	na	na	*	08Q4-16Q4
LT	*	10Q1-16Q4		10Q1-16Q4	*	09Q1-16Q4	na	na	na	na
LU	***	09Q2-16Q4	na	na	na	na	na	na	na	na
MT	**	08Q2-16Q4	**	08Q2-16Q4	na	na	na	na	na	na
NL		08Q2-16Q4		08Q3-16Q4		08Q2-16Q4		08Q2-16Q4		08Q3-16Q4
AT		08Q3-16Q4		08Q3-16Q4		08Q2-16Q4	***	10Q1-16Q4	***	08Q2-16Q4
PT		08Q2-16Q4		08Q2-16Q4		08Q2-16Q4		09Q1-16Q4		08Q2-16Q4
SI	**	09Q2-16Q4	**	08Q2-16Q4	***	08Q2-16Q4	***	10Q1-16Q4	na	na
SK	**	09Q4-16Q4	***	10Q3-16Q4		10Q4-16Q4	***	12Q4-16Q4		08Q4-16Q4
FI	*	08Q3-16Q4		08Q4-16Q4		08Q2-16Q4		08Q2-16Q4		09Q1-16Q4

(1) Underemployed part-time workers are persons working part-time who wish to work additional hours and are available to do so. See also notes in Table II.1.
Source: Authors' estimates based on Eurostat, Labour Force Survey.

No important differences between men and women are found. Germany is the only euro area Member Sate (among those for which data are available) for which the null-hypothesis can be rejected for all groups with high confidence. Finally, the null hypothesis of a unit root for the long-term unemployment rate can only be rejected with strong confidence in the case of Luxembourg, followed by Belgium, Estonia, Ireland and the Netherlands (as indicated in Graph III.99). All in all, the available evidence on labour market matching efficiency in the EU suggests that, as the fraction of the long-term jobseekers rises, the average speed at which the unemployed find a job tends to fall significantly. Matching efficiency deteriorated in the euro area with the crisis. This in turn reduced exit rates, thereby raising the share of the long-term unemployed. Such reinforcing

feedbacks called for adequate policy responses, such as well-targeted active labour market policies.

Graph III.9: **Long-term unemployment rate**


(1) The long term unemployment rate is the share of unemployed persons since 12 months or more in the total number of active persons in the labour market. Active persons are those who are either employed or unemployed.
(2) Stars * attached to country label indicates significance level at which null-hypothesis of hysteresis can be rejected. See note (1) in Table II.1.
Source: Eurostat and authors' estimates.

III.4. Possible factors affecting the persistence of labour market shocks and policy responses

The previous analysis suggests that only in a few cases the null-hypothesis of a unit root can be rejected with strong confidence (though these tests may have limitations). From a policy perspective it is important to notice that, while an analytical distinction can be made between a permanent change in long-run equilibrium following a temporary shock (i.e. hysteresis as measured by a unit root) and persistence (i.e. a very sluggish adjustment to the unchanged long-run equilibrium), in policy terms such difference is less relevant as waiting for markets to clear can take too long to be in line with a strategy promoting smart, sustainable and inclusive growth and upward convergence.

Persistence of labour market shocks…

The risk that persistently high unemployment rates may cause scarring effects, which hinder a full recovery and convergence to the best performing Member States, deserves due attention. Transmission mechanisms via which such scarring effects may emerge include the following.

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[111] Albeit for a shorter sample size starting in most cases in the first quarter of 2008.

- **Erosion of skills and employability.** As already mentioned in previous sections, when the unemployed are trapped in a persistent unemployment spell, their employability may decrease as their skills and motivation to search for a job are eroded, which in turn lowers the likelihood to find a job. This process may then be reinforced to the extent that employers use the duration of unemployment spells as a screening device to assess workers' productivity and employability. [112]

- **Sectoral skills mismatch.** When there are strong changes in economic structures leading to new skills being required and old skills becoming obsolete, skill mismatch may also emerge that may trigger hysteresis effects (in the absence of effective policies to train the unemployed).

- **Irreversible labour market exits.** When older people are encouraged to take early retirement by firms facing weak demand for their goods and services, the labour force may decrease permanently. Firms may have a strong incentive to call for early retirement if that is cheaper than firing older workers, while older employees may have a strong incentive to accept such an offer if the (financial) penalty for early retirement is low.

- **Underinvestment in capital goods.** If firms close, or if they cancel or postpone investments, in the face of a depressed outlook, then it will become more difficult to find employment as it takes time and effort to restore lost production capacity. A lack of investments embedding the latest innovations and technological advances may aggravate this sluggishness.

- **Secular stagnation.** If effective aggregate demand remains persistently below potential output, unemployment may get stuck at a level above the non-accelerating inflation unemployment rate. [113]

- **Unresponsive wages.** To the extent that wages are bargained between employers and the employed, and that negotiated wages are binding to all other workers and employers active in the industry, wages might not reflect the interests of the unemployed, in particular the long-term unemployed, and could be set at a level above market clearing level. In this case unemployment persists. [114]

… triggering adequate policy responses

Euro area governments are well aware of the aforementioned risks and since the onset of the crisis they have taken important policy initiatives to strengthen the well-functioning of labour markets and the employability of the labour force, thereby reducing the risk that permanent scarring effects going forward.

Labour market reforms undertaken varied across euro area Member States and over time. [115] At the onset of the crisis labour market measures were implemented to cushion the short-term impact of the crisis on employment. For instance, several euro area Member States introduced or strengthened existing short-time working arrangements, triggering a temporary reduction in working time while the employment contract remained in place. This has reduced the risk of a permanent erosion of skills and employability, especially when workers in such schemes were also invited to participate to training schemes. [116]

By 2010, policy initiatives had already shifted more towards policies aimed at improving the adjustment capacity of labour markets, especially in Member States with major adjustment needs. This involved, inter alia, active labour market policies,

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[112] See Schmillen, A. and M. Umkehrer (2013), 'The scars of youth: effects of early-career unemployment on future unemployment experience', IAB Discussion Paper, No. 6/2013, Institute for Employment Research.

[113] Secular stagnation may be driven by an increasing propensity to save and a declining propensity to invest. In turn, this may be triggered by an ageing population, rising inequality, and deleveraging. See Larry Summers (2016), 'The Age of Secular Stagnation: What It Is and What to Do About It', *Foreign Affairs*, March/April 2016 Issue.

[114] See Blanchard, O. and L. Summers (1986), 'Hysteresis and European Unemployment', *NBER Macroeconomics Annual* 1986, Volume 1, pp. 15-90. See also sub-section II.5.

[115] For a comprehensive overview, see for instance the different issurs of the annual European Commission report on 'Labour Market and Wage Developments in Europe'.

[116] These arrangements are especially attractive for employers facing high firing and hiring costs and workers with very specialised skills. For employees such arrangements may be attractive as it prevents lay-offs and spreads the adjustment burden over all of the workers rather than concentrating the impact on a few. Nevertheless, on the downside, such schemes may temporarily support jobs that turn out to be unsustainable in the long term. For more details on short-time working arrangements, see, for instance, Arpaia, A. (2010), 'Short time working arrangements as response to cyclical fluctuation', European Economy Occasional Papers 64.

and reforms of employment protection legislation and wage setting.

In recent years there has been a gradual refocus to longer-term structural challenges, such as the emergence of new forms of work, the need to ensure an effective social protection coverage for a more diverse workforce, as well as the need to strengthen labour market resilience. [117]

All in all, important reforms have been made to lower structural unemployment, increase labour force participation, and in general make labour markets more performant. There is nonetheless still room for reforms going forward, such as reducing the labour tax wedge (e.g., in Germany), improving active labour market policies (e.g., in Italy and Spain), and excessive job protection for permanent contracts (e.g., in Portugal and Spain). [118]

III.5. Responsiveness of wages to long-term unemployment

This section tackles empirically the specific issue of the impact of long–term unemployment on wage setting. The estimated wage equation [119] explains growth in nominal compensation per employee in terms of short-run movements in labour productivity and prices, an error correction term (which measures the discrepancy between real wages and labour productivity in the previous period), as well as unemployment. A distinction is made between short- and long-term unemployment, as well as between a rise and a decrease in unemployment. [120]

Table III.3: **Responsiveness of nominal compensation per employee growth: 1999-2015**

Dependent variable: growth nominal compensation per employee				
	V1	V2	V3	V4
Unemployment rate		-0.15 (-2.34) **		
Short-term unemployment rate	-0.46 (-2.10) **		-0.11 (-0.64)	-0.41 (-1.70) *
Long-term unemployment rate	-0.22 (-1.87) *		-0.17 (-1.67) *	-0.30 (-2.24) **
Dummy * short-term unemployment rate	0.07 (0.97)			0.07 (0.87)
Dummy * long-term unemployment rate	0.23 (2.70) ***			0.21 (2.29) **
Prices	0.66 (4.92) ***	0.77 (7.06) ***	0.78 (6.37) ***	0.69 (4.81) ***
Productivity	0.53 (5.67) ***	0.47 (6.02) ***	0.47 (5.87) ***	0.56 (5.49) ***
Error correction term (one year lag)	-0.30 (-5.93) ***	-0.24 (-5.78) ***	-0.24 (-5.39) ***	-0.31 (-5.92) ***
Market openness	-0.01 (-0.90)	-0.01 (-0.95)	-0.01 (-0.88)	-0.01 (-0.98)
Minimum wage	0.45 (4.57) ***	0.42 (4.71) ***	0.42 (4.54) ***	0.44 (4.10) ***
Degree of wage coordination (naive)	-0.00 (-1.25)	-0.00 (-1.01)	-0.00 (-0.97)	
Level of wage bargaining (naive)	0.00 (0.25)	-0.00 (-0.00)	-0.00 (-0.06)	
Adjusted R-squared	0.78	0.79	0.79	0.77
Country fixed effects	Yes	Yes	Yes	Yes
Number of observations	265	265	265	265

(1) Market openness= (exports + imports of goods and services) / nominal GDP. Dummy =1 if rise in unemployment rate else =0. Error correction term is lagged gap between real wage and productivity in logarithm.) "Naïve" refers to dummy with a 1, ….5 scale. Separate dummies with (0,1) values did not affect the estimates significantly; variant V4 is the version V1 with separate (0,1) dummies for coordination and bargaining.
Source: Authors' estimate based on AMECO database (macro-variables), Eurostat (long-term unemployment, minimum wage set to 0 for AT, DE, CY,FI, IT), ICTWSS-Database (wage coordination variables).

Pooling the data for the whole euro area for the period 1999-2015, applying an instrumental variables least squares estimator and estimating an unrestricted parametrization provides the estimation results presented in Table III.3. [121] In the first variant (V1) in Table III.3, [122] the point estimate of the unconstrained short-term unemployment rate is negative and significant, suggesting that a 1 pp. increase in the short-term unemployment rate triggers a 0.46% decrease in nominal compensation per employee. The point estimate of the long-term unemployment rate is less significant and suggests that a 1 pp. increase in long-term unemployment rate triggers a 0.22% decrease in nominal compensation, which is about half the responsiveness of the short-term unemployment rate.

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[117] See, for instance, European commission (2017), Labour market and wage developments in Europe, Annual review 2017

[118] As recommended in the 2017 European Semester Country Specific Recommendations (at https://ec.europa.eu/info/publications/2017-european-semester-country-specific-recommendations-commission-recommendations_en) and in International Monetary Fund (2017), 'Euro Area 2017 Article IV Consultation', IMF Country Report No. 17/235.

[119] Given that the reservation wage and expected inflation are not observed, the specification follows the approach outlined in Blanchard, O. and L. Katz (1999), 'Wage Dynamics: Reconciling Theory and Evidence', NBER *Working Paper* No. 6924.

[120] This is done by using slope dummies for respectively the short- and long-term unemployment rate. These slope dummies take the value 0 in case the short or long-term unemployment increase and the value 1 in case the short or long-term unemployment decrease.

[121] Annual data have been used as the focus of this section is on the impact of unemployment and its composition on nominal compensation per employee. The use of quarterly data would have required specifying the short-run dynamics rigorously - which would be beyond the scope of this section.

[122] The other variants in Table II.3 have been included to illustrate the sensitivity of the parameters to the specific parametrization used. They are not discussed in this section.

However, the point estimates also indicate a significant asymmetry in the impact of a rise and a decrease in the long-term unemployment rate. The estimate for the slope dummy on long-term unemployment (which takes value 1 in case of long-term unemployment decreases and 0 otherwise) shows a significant positive value of 0.23. This suggests that a 1 pp. increase in the long-term unemployment rate weakens the decrease in compensation per employee by 0.23%. For the short-term unemployment rate the point estimate on the corresponding slope dummy is not significantly different from zero. Summarising, while an increase or decrease in the short-term unemployment rate decreases or increases nominal compensation per employee by 0.46%, a decrease in long-term unemployment increases nominal compensation per employee by 0.22%, while an increase has a negligible impact on nominal compensation per employee (of 0.22%-0.23%=0.01%).

All in all, these empirical results suggest that long-term unemployment played a minor role in wage setting, especially in the downturn phase, and that wage adjustments reflected primarily changes in short-term unemployment (together with changes in prices and productivity). This implied that the long-term unemployed tended to remain unemployed even if the cause of their unemployment had disappeared.

III.6. Matching efficiency: sectoral reallocation and unemployment persistence

This sub-section investigates empirically a second important issue, the sectoral implications of protracted unemployment after the outbreak of the Great Recession in the euro area. It aims at explaining differentiated country responses by looking at the tradable and non-tradable sectors and the role of sectoral misallocation in some euro area Member States. In periphery Member States where non-tradables increased in importance before the crisis, it might have been more difficult to switch to tradable sectors once the crisis started, due to the skills structure of the workforce induced by sectoral specialisation (enhanced by the imbalances that built up prior to the crisis). Labour force in the construction sector, for example, requires less specialised skills than in manufacturing, thus attracting workers that tend to also be less ready to acquire new skills that could help them switch to another sector. Many of the

aforementioned reforms undertaken by euro area Member States in recent years are indeed aimed at easing labour market adjustment, also in terms of transitions across sectors, while protecting workers during the transition.

Before the crisis there was an increase in the relative size of the non-tradable sectors [123] (measured by the ratio of gross value added or employment in non-tradables to gross value added or employment in tradable sectors). This was evident in some euro area Member States, such as Italy, Spain, Portugal, Greece, Cyprus and Ireland (here labelled as euro area periphery), contrary to the rest of the euro area (here labelled as euro area core) (Graph III.100). There appears to be a positive relationship between the increase in the relative size of the non-tradable sectors before the crisis and the depth of the negative output gap during the double dip recession between 2008 and 2012 (Graph III.121).

This suggests that Member States where non-tradable sectors expanded the most in the years before the global financial crisis had a more pronounced negative cyclical impact. This is due to the negative demand shock being more pronounced in non-tradables (as external demand in the tradable sectors recovered sooner). Such a deep shock in cyclical positions can often lead to structural consequences (see for example evidence for Europe in the 1980s in Blanchard and Summers, 1986). [124]

Periods of negative output gap are also associated with rising labour costs. Graph III.112 shows a negative relationship between the output gap and the share of labour compensation in GDP. A more negative cyclical position is associated with a higher labour costs-to-output ratio since the wage share is usually contemporaneously countercyclical as labour productivity suffers from the drop in demand. The association between depressed cycles

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[123] Based on the NACE Rev.2 classification the division between tradable and non-tradable sectors in the AMECO database is used here. The tradable sectors are Agriculture; Mining and quarrying; Manufacturing; Electricity, gas, steam and air conditioning supply; Water supply, sewerage, waste management and remediation activities; Wholesale and retail trade; Transportation, Accommodation and food services; Information and communication. The non-tradable sectors are: Construction; Finance and Insurance; Real estate; Professional, scientific and technical activities; Administrative and support services; Public administration; Education, Health services; Arts and entertainment; Other services.

[124] Blanchard, O. and L. Summers (1986), *ibid.*

Graph III.10: **Relative share of non-tradables, pre-crisis**
1999=100

A. in value added

B. in employment
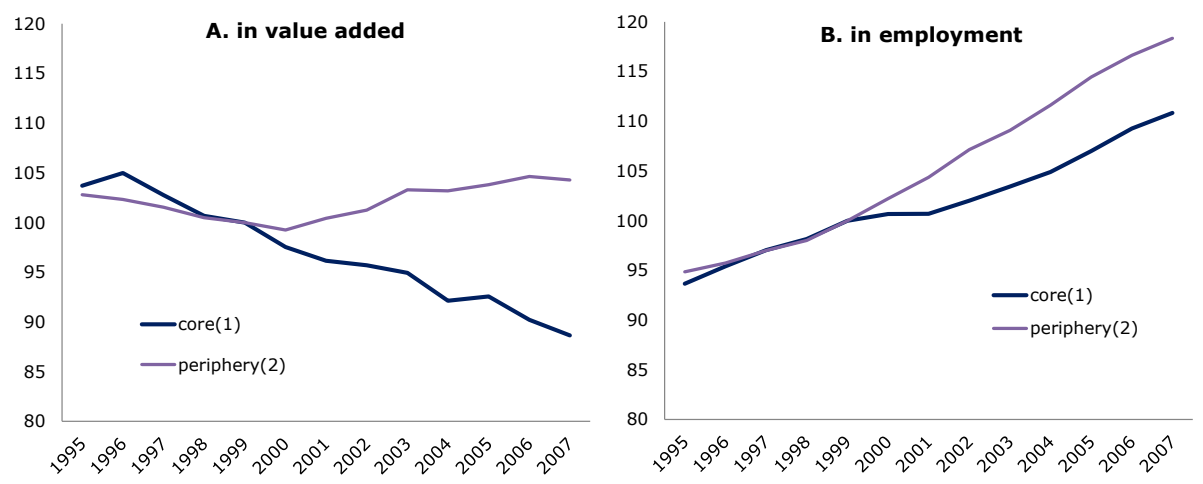
(1) BE, DE, EE, FR, LV, LT, LU, NL, AT, SL, SK, FI (2) IE, GR, ES, IT, CY, PT
Source: AMECO.

and higher labour costs is more pronounced in the non-tradable sectors than for the total economy (right hand panel). In normal circumstances, labour market adjustment that follows a negative demand shock operates through a reduction in headcount (or hours worked) as a result of the labour cost pick-up. [125] Such reactivity to the costs of employing labour is however not equally pronounced in all euro area Member States (see Box III.1). It is therefore not surprising that there is also a positive relationship between the extent to which economies moved towards non-tradables before the crisis and the rise in their structural unemployment (measured by the NAWRU) since the start of the crisis. (Graph III.133) This suggests a relationship between the sectoral composition of an economy before the crisis and the persistence of unemployment afterwards. One of the reasons behind this is sectoral mismatch.

III.6.1. Empirical analysis of unemployment persistence adjusted for sectoral mismatch

A measure of sectoral mismatch is needed in order to test whether efficiency in cross-sectoral reallocation played a role in the protracted response of unemployment to the adverse shock during the Great Recession. Such measure is available in Arpaia et al. (2014). [126] The authors

develop a measure of sectoral mismatch by calculating the coefficient of variation of unemployment rates in several sectors of economic activity, assigning each unemployed individual to the sector to which his or her last job belonged. [127]

Since the coefficient of variation measures variability in relative terms, Member States where a wide-spread demand shock suppresses employment in all sectors will have a relatively lower mismatch index value than Member States where the Great Recession resulted in numerous job losses only in some sectors, i.e. real estate, not compensated by job creation in other sectors. Sectors are also weighted by their share in total employment, so that large job losses in a relatively less important (in terms of employment) activity area weigh less.
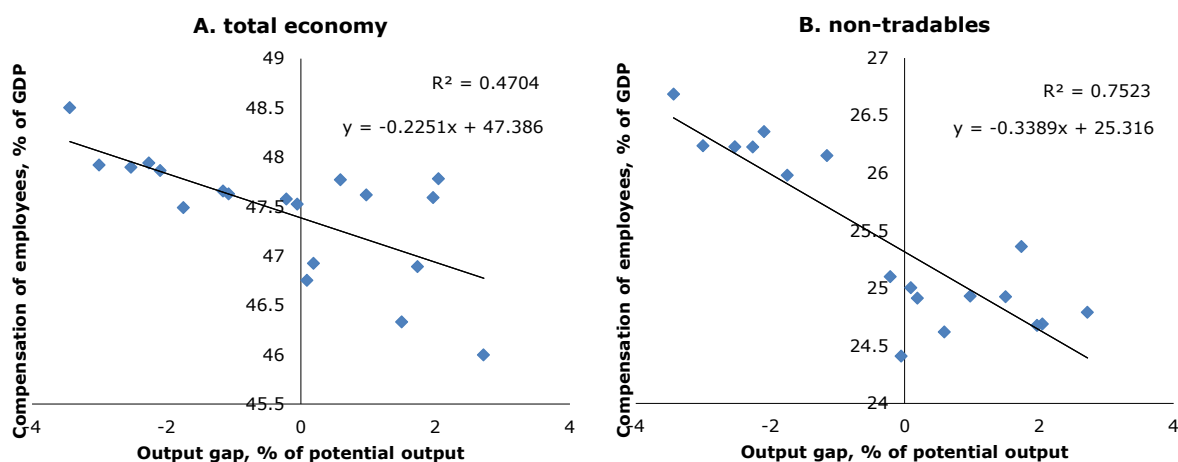
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[125] Assuming that in the short-run wages are downward rigid.
[126] Arpaia, A., A. Kiss, and A. Turrini (2014), 'Is unemployment structural or cyclical? Main features of job matching in the EU after the crisis', *European Economy Economic Papers*, No. 527.

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[127] The economy is subdivided in 15 sectors: Agriculture; Manufacturing (incl. mining, quarrying, electricity, water supply, sewerage); Construction, Wholesale trade, retail trade, repair of motor vehicles; Transportation and storage; Accommodation and food service; Information and communication; Finance and insurance; Real estate, professional activities, and administrative and support services; Public administration; Education; Health and social work; Arts, and other service activities; Activities of households as employers; Activities of extraterritorial organisations. Data on sector of previous unemployment was provided by Eurostat.
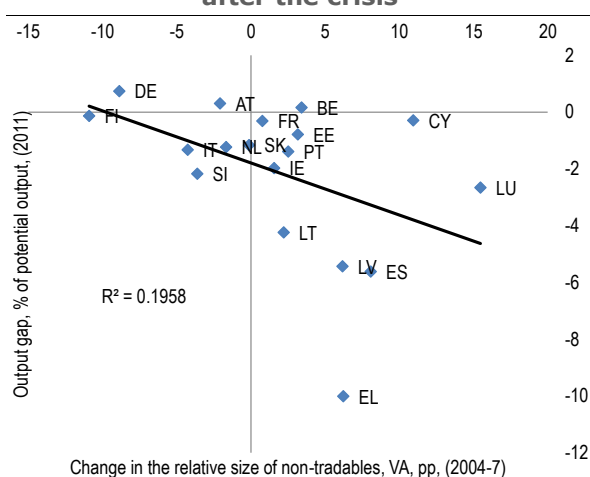
Graph III.11: **Cyclical conditions and workers' compensation**
euro area, 1998-2016

A. total economy

R² = 0.4704

y = -0.2251x + 47.386

B. non-tradables

R² = 0.7523

y = -0.3389x + 25.316

Source: AMECO.

Graph III.12: **Relative size of non-tradables before the crisis and cyclical conditions after the crisis**

R² = 0.1958

Source: AMECO.

Graph III.144 shows the mismatch indicator in the euro area core and periphery. The graph shows that sectoral mismatch peaked several quarters after the start of the Great Recession in both the euro area core and periphery Member States. In the core the most recent data available (first quarter of 2016) show that sectoral mismatch has returned to its pre-crisis levels, even though a short-lived upswing was observed after the steep decrease during the reallocation phase that followed the crisis shock. In the periphery the sectoral mismatch indicator has also decreased from its steep crisis rise but this downward correction has been much more gradual than in the core, even though the most recent values of the indicator for both country groups are similar.

Overall, after the steep crisis increase in sectoral misallocation in the euro area periphery, these Member States have been relatively slower in accommodating workers back to employment than the core, and sectoral mismatch in the periphery remains higher than before the crisis.

The sectoral mismatch indicator is used to test the role of sectoral misallocation for persistence in unemployment in the following way. First, for each country, in a simple ordinary least squares (OLS) regression, the quarterly unemployment rate is regressed on the sectoral mismatch indicator in Arpaia et al. (2014).

The purpose of this regression is to obtain a residual, which by definition is unrelated to sectoral misallocation, in the sense that the latter does not contribute to its movements. This residual, called unemployment adjusted, represents unemployment that is not related to difficulties in the need for workers to move between sectors of economic activity. Next, unit root tests for persistence are performed on the original unemployment series and on unemployment adjusted and the associated p-values (related to accepting or rejecting the assumption of persistent unemployment) are compared. [128]

Note that the purpose of this empirical exercise is to underline cross-country differences in the degree

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[128] Augmented Dickey-Fuller (ADF) Tests similar to the ones above were used. In order to facilitate the cross-country comparison all tests were run with a constant and no trend and with a 4 quarter lag structure.

Graph III.13: **Relative size of non-tradables before the crisis and NAWRU after the crisis**
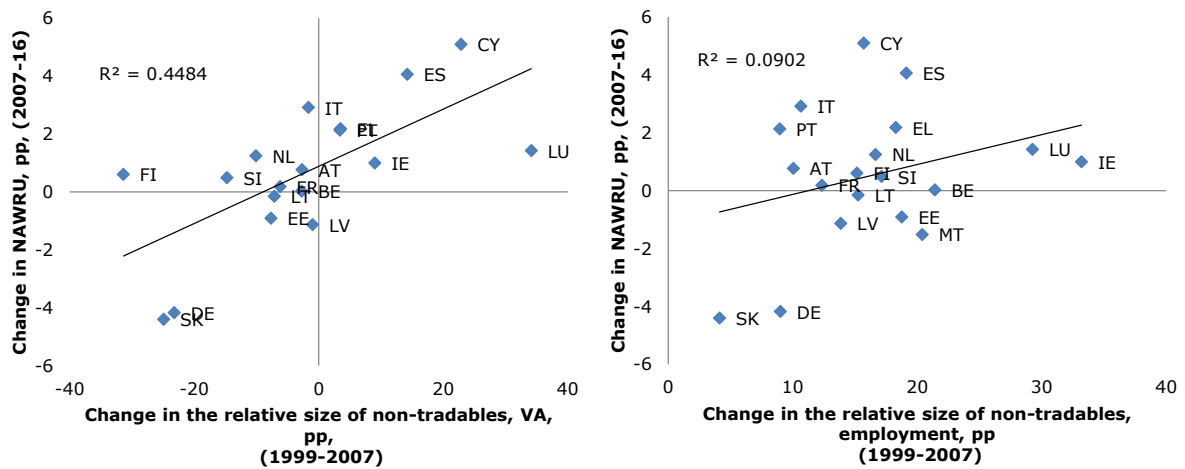

Source: AMECO.

to which unemployment can be seen as persistent, depending on whether the original unemployment rate or its sectoral misallocation adjustment are used. The purpose is not to look for the most appropriate specification of unemployment that does or does not exhibit a unit root.

Results in Table III.44 identify Member States in the euro area periphery, such as Portugal, Italy and Spain, as the ones where unemployment persistence, as measured by the unit root tests, was affected by sectoral misallocation. In Portugal the values associated with not rejecting the null hypothesis of a unit root presence are almost 30 pp. higher if unemployment is not adjusted for sectoral misallocation. Had unemployment been adjusted for sectoral misallocation the unit root presence in Portuguese unemployment would have been rejected with 89% certainty or very close to a critical value of 90%, which is commonly used. Slovenia also falls in the category of Member States where unemployment was affected by sectoral mismatching and this is especially pronounced in terms of male unemployment. This finding is probably related to the traditional relative importance of male-dominated manufacturing in Slovenia and to the structural transformation downsizing this sector during the country's transition from a centrally-planned to a market-based economy.

Graph III.14: **Sectoral mismatch indicator**
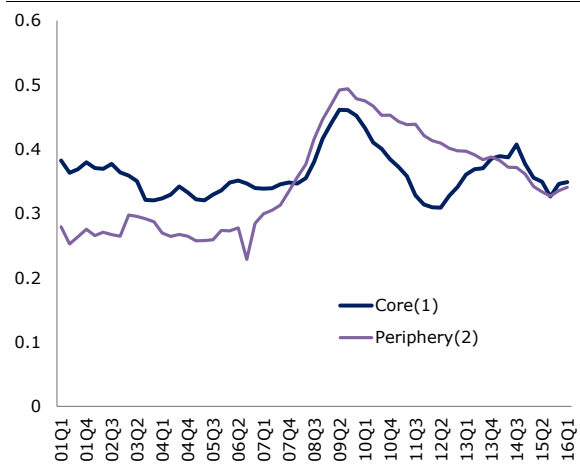
(1) BE, DE, EE, FR, LV, LT, LU, NL, AT, SI, SK, FI (2) IE, GR, ES, IT, CY, PT.

Source: Update of Arpaia et al. (2014).

On the other hand, France also falls in the category of Member States affected by mismatch, in terms of its total and male unemployment rates, the latter perhaps due to the structure of its economy. The French economy has traditionally been much more services-oriented than the economies of Germany, Italy or Spain. [129] Since services are much less male-dominated than manufacturing, it is likely that the longer tradition of market-based services in France has helped female workers switching between sectors, thus making the female

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[129] For example, on average between 1999 and 2016, market services represented 52% of gross value added in France, while they accounted for 48% of gross value added in Spain. Manufacturing on the other hand represented 13% of value added in France, 15% in Spain and 17% in Italy.

	total unemployment	same adjusted for sectoral mismatch	impact adjustment in the p value	male unemployment	same adjusted for sectoral mismatch	impact adjustment in the p value	female unemployment	same adjusted for sectoral mismatch	impact adjustment in the p value
				all ages					
PT	0.38	0.11	0.27	0.43	0.13	0.30	0.33	0.06	0.27
FR	0.69	0.44	0.24	0.79	0.59	0.19	0.40	0.38	0.03
SI	0.68	0.52	0.16	0.68	0.46	0.22	0.64	0.51	0.12
IT	0.79	0.65	0.14	0.74	0.58	0.16	0.66	0.55	0.11
AT	0.43	0.33	0.10	0.79	0.70	0.10	0.19	0.21	-0.02
ES	0.59	0.52	0.07	0.68	0.61	0.07	0.49	0.38	0.11
NL	0.21	0.20	0.01	0.21	0.22	-0.01	0.08	0.06	0.02
EE	0.11	0.11	0.00	0.12	0.16	-0.03	0.15	0.15	0.00
LU	0.11	0.11	0.00	0.60	0.52	0.07	0.02	0.02	0.00
SK	0.63	0.63	0.00	0.53	0.52	0.02	0.66	0.68	-0.02
MT	0.73	0.74	-0.01	0.16	0.14	0.02	0.88	0.89	-0.01
DE	0.85	0.87	-0.02	0.85	0.84	0.00	0.83	0.86	-0.03
LV	0.20	0.22	-0.03	0.25	0.32	-0.07	0.13	0.10	0.02
				less than 25 years					
PT	0.47	0.22	0.25	0.57	0.29	0.28	0.38	0.09	0.29
FR	0.39	0.15	0.23	0.56	0.15	0.41	0.27	0.14	0.13
SI	0.43	0.21	0.21	0.59	0.23	0.37	0.50	0.46	0.04
IT	0.61	0.54	0.07	0.82	0.58	0.23	0.75	0.63	0.12
BE	0.05	0.02	0.03	0.14	0.02	0.13	0.02	0.07	-0.05
LU	0.07	0.05	0.02	0.50	0.43	0.07	0.03	0.03	0.00
MT	0.27	0.27	0.01	0.00	0.00	0.00	0.57	0.52	0.04
AT	0.05	0.05	0.01	0.12	0.13	0.00	0.03	0.03	0.00
ES	0.57	0.58	-0.01	0.54	0.59	-0.05	0.73	0.69	0.04
EE	0.23	0.24	-0.01	0.24	0.22	0.02	0.37	0.35	0.02
SK	0.22	0.23	-0.01	0.35	0.35	0.00	0.25	0.24	0.01
LV	0.24	0.26	-0.02	0.31	0.38	-0.07	0.41	0.40	0.01
NL	0.06	0.27	-0.21	0.01	0.26	-0.24	0.08	0.14	-0.05
DE	0.33	0.62	-0.29	0.53	0.68	-0.15	0.39	0.47	-0.08

Table III.4: **Unemployment persistence and sectoral mismatch**
ADF unit root tests, H0 = presence of a unit root, p-values

Source: Arpaia et al. (2014), DG ECFIN calculations (all test have the same 4 lag structure and a constant).

unemployment rate not persistent due to misallocation. [130]

Looking at youth unemployment (age 25 and below) in Table III.44 shows that, with the exception of Spain, countries where youth unemployment persistence was affected by sectoral mismatches were the same as for all-age group unemployment. This is not to say, for instance, that youth unemployment in Spain is not persistent but that its protracted nature is not caused by the inability of young people to find new jobs in other economic sectors after becoming unemployed.

III.7. Conclusions

The empirical analysis, based on data covering a sample ranging from the mid-90s (for some Member States from the early 00s) until 2016 presented in the previous subsections suggests that wages responded weakly to long-term unemployment and that sectoral skills mismatch hindered labour reallocation in the wake of a strong boom and bust hitting more strongly specific sectors of the economy, like construction. Both mechanisms carry the risk that the unemployed may get trapped in persistent unemployment spells, which would in turn limit Member States' resilience and growth potential.

Nevertheless, appropriate policy responses can limit these risks. Indeed, labour market reforms introduced in euro area Member States in recent years (in the area of active labour market policies, employment protection legislation, wage bargaining) already contribute to improving the responsiveness of the labour market moving forward. As indicated in the 2017 country-specific recommendations directed to Member States, there nonetheless remains scope to continue reforming along these lines in a number of Member States.

[130] Member States like Cyprus and Greece are not included in the analysis as for them the two indictors in Arpaia et al. (2014), the one that measures dispersion of the sectoral shares of unemployment (used here) and the other based on vacancy rates, differ substantially. See Graph A.5 in Arpaia et al. (2014).

Box III.1: Panel VARs on response of employment growth to labour costs

This box measures the dynamic responsiveness of employment growth to changes in labour costs in several euro area Member States.

In normal circumstances wages are downward sticky, due for example to collective bargaining that sets wages for some time ahead. When a negative demand shock occurs firms should adjust headcount in response to the higher labour costs in order to minimise the impact on profitability. Such response in the labour production factor may be delayed due to labour market rigidities, i.e. costly layoff of workers, that in effect amounts to opening up a gap between labour productivity and labour costs. In the Great Recession labour hoarding was witnessed in several countries also because in its initial stages firms were reluctant to part with their workers given the uncertain developments and adjustment through hours worked preceded adjustment though number of employees.

A panel vector autoregression (panel VAR) attempts to trace the dynamics of employment to changes in labour costs. A standard way to estimate a panel VAR is the mean-group estimator in Pesaran and Smith (1995)[1]. A separate mean group estimator panel VAR of lag order one is run for Germany, France, Spain, Portugal and Austria. The endogenous vector in annual frequency in several economic sectors between 2000 and 2015[2] consists of (in that order): the growth of total employment in terms of persons, the growth of real gross value added (GVA) and the growth of real compensation per hour worked. The panel VAR includes a vector of exogenous variables that do not vary by economic sector. These are: the growth of real GDP and the consumer-price index. The panel VAR also includes a constant.

The choice of endogenous variables is motivated by the need to find how the dynamics of employment react to an increase in real compensation per hour. Identification of shocks is obtained by recursive ordering in a Cholesky decomposition with the assumption that changes in labour costs affect employment growth only with a lag. This is based on the likely adjustment costs of changing the number of employees. The assumption is that when faced with a negative demand shock firms first cut hours (compensation per hour increases) and only later decrease headcount. The endogenous vector also includes real GVA growth in each sector where recursive ordering means that it affects employment growth with a lag, because after a demand shock changes in inventories typically precede changes in employed labour.

The mean-group estimator implies that the VAR coefficients in each economic sector differ but have similar means and variances. This means that the VAR coefficients of the different economic sectors are heterogeneous but they share a common mean. In the Pesaran and Smith (1995) approach the main interest is in the mean cross-sectional estimator across panels.

Graph 1A shows the response of mean sectoral employment growth to a **_positive_** shock in the growth of compensation per hour in the euro area countries that were evaluated in five separate panel VARs. In order to trace the more direct impact of a demand shock to employment Graph 1B shows the response of mean sectoral employment growth to a **_negative_** shock in the growth of real gross value added in the same euro area countries.

It is evident from the graph that in Austria, Germany and France the responsiveness of employment growth to changes in labour costs is several times lower than in Portugal and Spain. The impact of a negative demand shock is also higher in Spain and Portugal, while being positive but not statistically different than zero (95 % confidence bands not shown) in France.

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[1] See also Dieppe et al. (2016) for a description of the Matlab routine to estimate a mean-group estimator panel VAR.
[2] The economic sectors are: Manufacturing; Electricity, gas, steam and air conditioning supply; Water supply, sewerage, waste management and remediation activities, Construction; Wholesale and retail trade; Transportation; Accommodation and food services; Information and communication; Real estate; Professional, scientific and technical activities; Education, Health services; Arts and entertainment.
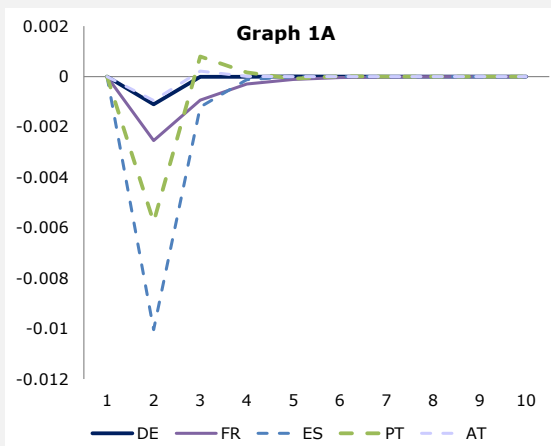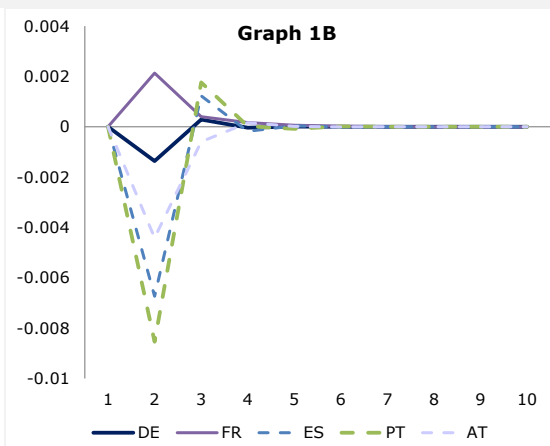
The risk of erosion of skills and employability for people facing (persistent) unemployment or underemployment spells calls for retraining and life-long leaning to prevent the build-up of skill mismatches, as well as well-targeted active labour market policies for the long-term unemployed. More specifically, the re-integration of the long-term unemployed calls for individualised, tailored support, including help with job search as well as further education and training. [131]

Addressing the skills mismatch calls for adequate skills formation, a strengthening of cross-border mobility by making degrees and educational achievements more internationally comparable and recognized, and aligning better education and training with the rapid pace of change in the labour market - as has been outlined in the recently launched New Skills Agenda for Europe. [132]

All in all, the analysis reinforces the message that policies aimed at reducing the length of the unemployment spells and facilitating job transitions are key to avoid the risk of cyclical problems turning into structural ones. Such policies should aim primarily at limiting further increases in long-term unemployment and the build-up of skill-mismatches, hence facilitating labour market adjustments with an important positive impact on the functioning of the EMU.

Finally, structural labour market reforms should be based on social dialogue as the involvement of the social partners in the reform process is crucial to design and implement such reforms.

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[131] See also the Council Recommendations on the integration of the long-term unemployed into the labour market (2016/C 67/01).

[132] See European commission (2016), 'A New Skills Agenda For Europe. Working together to strengthen human capital, employability and competitiveness', SWD(2016) 195 final.

IV. The start of a new cycle: Recent housing price dynamics in Europe and their macroeconomic implications

After a slump between 2007 and 2013, real house prices in Europe are bottoming out and, in cases, rebounding at accelerating speed. While important in absolute terms, the magnitude of the correction experienced is generally limited when compared to the cumulated growth during the pre-crisis boom so that house prices in most Member States remain close to the peak values reached in 2007-2008. This could suggest that in some cases, further downward correction may be expected. Meanwhile, in a number of countries, recent house price increases have been substantial, reaching more than 5% per annum.

The analysis of vulnerabilities linked to residential real estate markets is an essential part of the macroeconomic imbalances procedure (MIP). The risks of over-valuation on the housing market are gauged using a variety of indicators and models which compare house price developments with the underlying fundamentals. These tools paint a contrasted picture of house price developments in the euro area. In some countries, notably Belgium, Luxembourg and Austria, house prices are increasing from an already high level compared to fundamentals. This warrants a detailed analysis of potential risks in the upcoming country reports in the context of the European Semester. By contrast, a majority of the euro area countries with recent strong price increases do not show clear signs of over-valuation.

Beyond prices, a number of factors need to be taken into account when assessing vulnerabilities on the residential real estate market. In particular, the strength of households' balance sheet and the health of the banking sector are important qualifiers. In countries like the Netherland and Finland, the high household indebtedness could represent a vulnerability in the event of a downward house price correction.

The section provides a historical comparison of the current cycle with previous house price cycles. It analyses the current recovery in housing markets and assesses the extent to which risks are building up again. (133)

IV.1. Introduction

House price slumps are usual companions to banking crises. As a matter of fact, a review of historical episodes of banking crises shows that a rapid increase in housing prices is among the best predictors of a looming banking crisis. (134) Most recently, the origins of the 2007 financial crisis are rooted in the burst of the sub-prime housing market bubble in the United States, which then had ripple effects throughout the world. In Europe, the genealogy of the crisis is less clear-cut, with the economies being diversely affected by a mixture of spill-over effects and bursting of home-grown imbalances. In particular, the interplay between a decline in real house prices and the deteriorated macroeconomic environment has had a durable negative impact in most Member States.

Real house prices in the euro area contracted by 12% on average between 2007 and 2013. In Estonia and Ireland, house prices plummeted by close to 50% between the pre-crisis peak and the trough. A number of EU Member states outside the euro area also experienced a strong correction in real house prices.(135) Such sharp decreases in housing prices impacts on the real economy through a number of channels. First, a drop in housing prices reduces the wealth of households, potentially putting a number of them in a situation of negative equity. In countries where wealth effects are large, this has a feedback effect on growth. A decrease in housing prices reduces the value of the collateral against which banks ensure that their loans will be repaid. This results in balance sheet constraints in the banking sector which eventually hamper credit growth and investment. Construction is also directly affected as orders plummet. Indeed, value added in the construction sector decreased by 14% in the EU

(134) Reinhart, C. and K. Rogoff (2008), 'Is the 2007 US sub-prime financial crisis so different? An international historical comparison', *American Economic Review*, Vol. 98, N°2, pp. 339-344.

(135) For example Romania saw a 55% decrease in real house prices between 2008 and 2014.

between 2007 and 2013 and construction employment decreased by 20%.

The economic recovery, which started in 2013, is expected to gain steam. [136] GDP growth in the euro area is set to stand at 2.2% and the unemployment rate is set to fall to 9.1%, compared to 12.0% in 2013. With improving in cyclical conditions, house prices are also generally back to positive growth rates. However, in light of different experience in post-crisis with house price developments, the on-going recovery may have different implications in the various Member States. In a number of them, the correction in house prices has been much smaller than the previous hike. While the favourable economic outlook, and in particular the low level of interest rates, supports the recovery of housing markets, notably in countries which are still affected by large deleveraging needs, it could also nurture growing imbalances in others. Renewed attention is thus warranted to ensure that the upcoming cycle does not lead to a repetition of the recent episode of booms and bust.

This section reviews the recent developments in housing markets in the euro area with a view to assess potential risks. The first subsection presents evidence on the extent to which housing imbalances at the time of the financial crisis in the EU as a whole have been resolved. Then, focusing specifically on the euro area, a review of recent developments in housing markets is conducted. Specific focus is put on the potential risks of price over-valuation in Member States. To conclude, the last sub-section outlines priorities for country monitoring going forward and discusses potential policy avenues in the euro area. While the focus is put on dynamics in the euro area, aspects of housing market developments in non-euro area countries of the European Union can also be relevant to put into perspective dynamics in the euro area. Dynamics in non-euro area countries is thus used as a benchmark when appropriate.

IV.2. Housing markets during the global financial crisis: a mostly synchronised boom and bust

Booms and bust on the housing market are in no way a novelty. Over the last 40 years, Member States have experienced a number of episodes of strong growth followed by an adjustment in house price. The adjustment has been severe at times. For example, real house prices decreased by 50.4% in the Netherlands between 1978 and 1985. Similarly, they decreased by 49.7% in Finland between 1989 and 1993. However, compared to previous housing cycles since 1970, the increase in prices which ended with the 2007 crisis and affected similarly the euro area and the overall EU was unprecedented on several grounds.

Graph IV.1: **Duration of housing cycles in the EU (in quarters)**
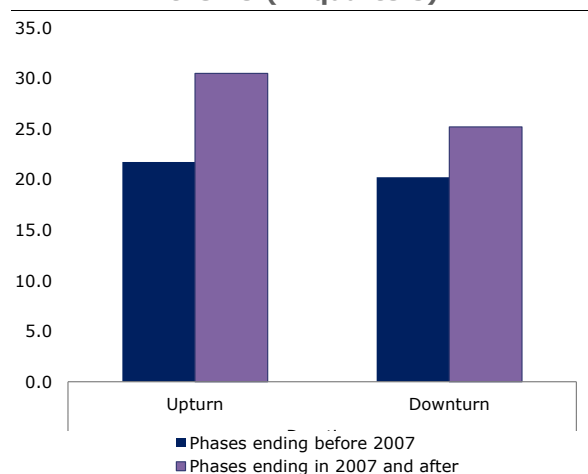
Simple average of phase durations across the EU. Upturns ending after 2007 refer to pre-crisis increases. The upturn in DK, which ended in 2006 Q3 is included in that group. Downturns after 2007 are post-crisis episodes. Only completed phases are considered. Peak and trough are based on local maxima over a 25-quarter rolling-window.
Source: Eurostat, ECB, BIS, OECD.

First, it lasted significantly longer than previous upturns (Graph IV.1). Before the current cycle, upturns in real house prices had lasted on average for little over 5 years. By comparison, the hike in real house prices which ended in 2007-2008 lasted almost 8 years. In the Netherlands and Belgium, the increase in real prices was uninterrupted between 1985 and 2008. Second, the increase experienced prior to 2007 surpassed that of the upturn phases recorded in OECD countries over the last 40 years. [137] Focusing on the EU, the house price boom which ended in 2007 saw real house prices increase on average by 120% (Graph IV.2). This is almost three times as large as the average for the previous cycles. Extreme examples

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[136] European Commission (2017), 'European Economic Forecast – Autumn 2017', *European Economy*.

[137] Bracke, P. (2013), 'How long do housing cycle last? A duration analysis for 19 OECD countries', *Journal of Housing Economics*, Vol. 22, pp. 2013-230.

include Latvia and Ireland where real house prices in 2008 where close to 3.5 times higher than during the previous trough.

Graph IV.2: **Magnitude of housing cycles in the EU (in %)**
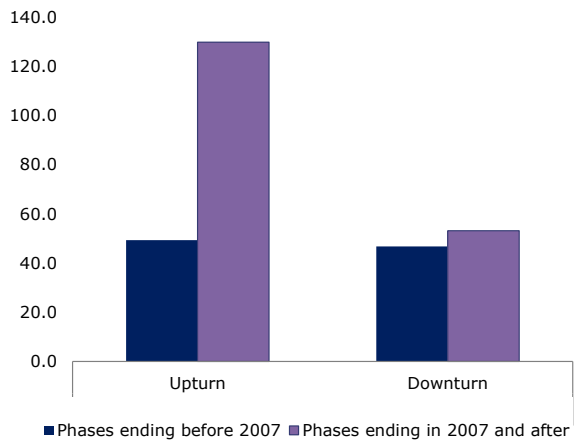
Simple average of phase magnitudes across the EU. Upturns ending after 2007 generally refer to pre-crisis increases. Downturns after 2007 are post-crisis episodes. Only completed phases are considered. Peak and trough are based on local maxima over a 25-quarter rolling-window. In order to have comparable metrics for upturns and downturns, magnitudes are computed in both case as the difference between the peak and the trough values as a percentage of the latter.
***Source:*** Eurostat, ECB, BIS, OECD.

Finally, from a cross-country perspective, the boom was much more synchronised than previous examples. [138] Prices increased rapidly ahead of the financial crisis in almost all EU Member States. Taking a longer-term perspective, the increase in land prices, due to the conjunction of increasing demand and long-term supply constraints on land availability, have pushed house price indices in Europe to levels that are unprecedented in the last 150 years. [139] Germany and Portugal stand as the two main exceptions to the strong housing price dynamics in the 2000's. In Germany, the impact of the reunification resulted in a positive supply shock which resulted in muted house prices developments in the following two decades. In real terms, house prices in Germany decreased between 1996 and 2008 before finally picking up. In 2016 they were only close to their 1990 level. In Portugal, the poor economic performance recorded

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(138) Girouard, N., M. Kennedy M., P. van den Noord P. and C. André (2006), 'Recent housing price developments: the role of fundamentals', OECD Economics Department Working Papers No. 475.

(139) Knoll K., M. Schularick and T.Steger (2017), 'No price like home: global housing prices, 1870-2012', *American Economic Review*, Vol. 107(2), pp. 331-353.

between 2000 and 2008 resulted in almost flat house prices over the period, in contrast with the rest of the EU.

Graph IV.3: **Correction of the pre-2008 housing boom**
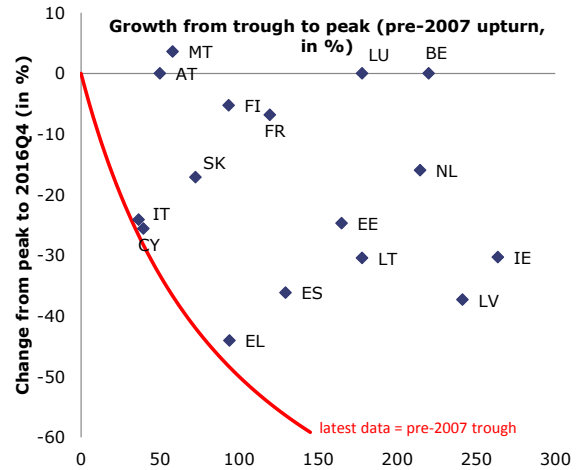
Countries which did not experience a boom (DE, PT) are excluded. Trough values refer to the latest troughs in the sample period prior to 2008. The continuous line indicates the post-crisis adjustment needed to compensate the pre-crisis growth in house prices.
Source: European Commission, ECB, BIS, OECD.

Looking at the house price cycles in the EU which preceded the current phase, the duration of the correction in prices was generally similar to that of the preceding upturn. In addition, at the end of the downturn, house prices in real terms were back to pre-boom levels. Since the global financial crisis, a number of EU economies have experienced severe correction in real house price indices compared to their peak. International evidence suggests that real house prices are not stationary, meaning that they do not revert to a given "long-term value". Still, the magnitude of the decrease in house prices since the crisis has often been linked to the previous growth. It was notably strong for example, in Latvia, Ireland and Bulgaria. Still, even in these countries, the magnitude of the correction remains lower than that of the price hikes recorded before the crisis (Graph IV.3). Only Italy, Cyprus and Greece have experienced decrease in real house price indices bringing prices back to their pre-boom levels. In several countries, the improving economic situation has brought the correction in real house prices to an end. Housing prices have experienced a turnaround since 2013 and are now on an increasing trend. With some exceptions, such as Estonia and France where the adjustment in prices lasted less than 2 years, the timing of the turnaround is somehow consistent with previous evidence on housing price cycles. Despite a strong

Graph IV.4: **Real house price developments in the EU (2010=100)**
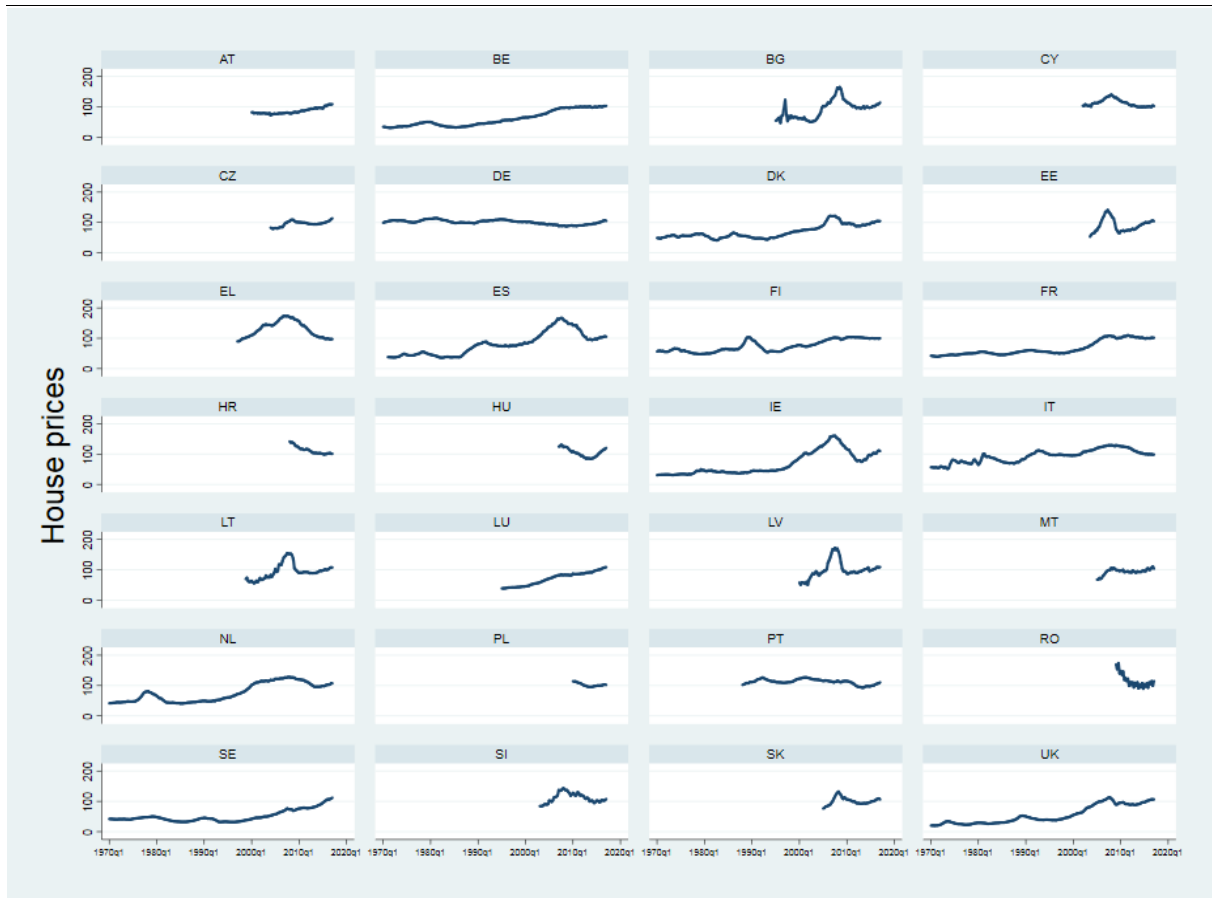
housing boom ahead of the crisis, the adjustment was particularly limited in Belgium and in the United Kingdom. Characteristically, Luxembourg and Sweden did not experience any correction in house prices and these two countries have seen uninterrupted growth in real house prices since 1995.

Overall, the comparison between the developments in real house prices since 2007 and the previous house price cycles suggest that the adjustment in house prices has only been partial. This gives raise to two possible interpretations. The more benign one posits that the increase in house prices experienced prior to the financial crisis was of an exceptional nature, reflecting notably the increasing integration and sophistication of financial markets in the EU, meaning that prices should not be expected to correct further. This is consistent with the view that real house prices are not mean-reverting. A more pessimistic observer, wary of previous crisis episodes, could also consider that a number of exceptional factors, among which the low interest rates and low commodity prices, have

brought about a temporary recess in the real house price cycle which is however set to come to a closure with further adjustment in real prices to come in the next few years. The remainder of the article broadens the scope of the review to assess the extent to which fundamental factors driving housing prices and other macroeconomic variable can help draw where euro area housing markets stands between these two polar cases.

IV.3. Recent developments: gradual recovery and rising heterogeneity

In 2016, house prices across the euro area are resolutely on an upward trend. Euro area Member States experienced an acceleration in house prices, which increased by at least 5% in real terms in a third of them. The hike has been particularly strong in Ireland, Latvia, Luxembourg and Slovakia, where real house prices increased at a rate above 7% per annum. Estonia and Ireland, which experienced a strong house price correction during the crisis, saw price increase by more than 25% in cumulated terms since 2013. In the EU at large, some

countries record even stronger growth. In particular, in Hungary and in Sweden, prices increased by close to 30% over the last three years. The buoyant growth in house prices in the euro area could give rise to concerns over the repetition of an asset price bubble in some Member States.

A clear difference should however be made between countries which experienced a sizeable correction in house prices after 2007 and those for which the increase has remained barely uninterrupted (Graph IV.5). In this latter category, Luxembourg and, outside the euro area, Sweden, stand as the epitomes of countries where real house prices appear to be growing towards ever increasing heights (Graph IV.3).([140]) In Malta, although significant price correction occurred after 2007, the recent price growth has brought prices back to or above their 2007 value. In Belgium and France, although prices have not significantly gone down compared to 2007, house prices seem to have stalled since then.

Graph IV.5: **Real house price growth (2007 Q4 - 2016 Q4)**
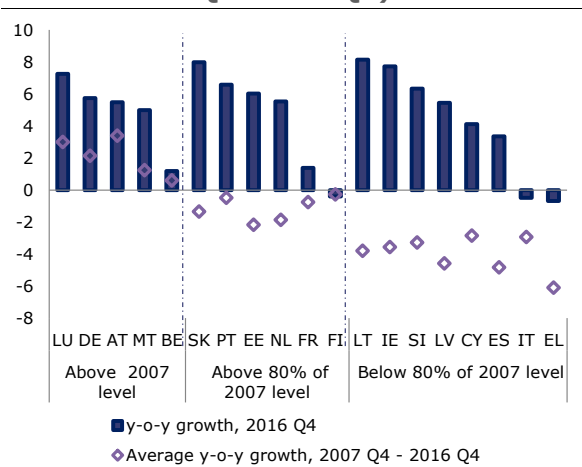
Compounded average growth rate in house prices.
Source: European Commission, ECB, BIS, OECD.

By contrast, in a majority of cases, the recent increase come after sizeable corrections and housing markets are only at the early stage of recovery. Indeed, in spite of the recent hike in price dynamics, house prices generally remain well below their pre-peak levels in the countries which experienced a sizeable bust in real house prices in 2008. The diversity seen in the house price dynamics across the euro area calls for specific

attention in light of the convergence of interest rates across the area induced by the common monetary policy as there are risks that a rate appropriate in one country could be too low to avert potential credit-fuelled house price booms in another.

Indicators on the volume of construction and on investment also provide evidence of a rapid, but still nascent recovery. With few exceptions (Greece, Latvia, Portugal and Slovenia) investment in dwellings increased in 2016. Still, for the euro area as a whole, dwelling investment represented 5.1% of GDP in 2016, markedly below the 6.7% peak reached in 2006 and 2007 and also below the pre-boom levels. Similarly, building permits are on a gradual but still subdued upward trend.

As house prices plummeted and macroeconomic perspective darkened, the annual number of building permits granted in the euro area was divided by 2.6 between 2006 and 2009. Since then, construction activity remained almost flat up until 2016. The failing population growth over that period has notably put downward pressure on construction activity. Since 2013 the number of building permits is rising again, as is the case for prices. However, in spite of population growth which is close to its historical average, the recovery in building permits appears much more limited than for prices, shedding a more nuanced light on the current recovery.

The turnaround in the housing market is supported by the overall positive economic outlook in the EA. After the drop in GDP in 2009, the EA experienced several years of sluggish economic activity. In volume terms, GDP surpassed its 2007 level in 2015 and it is has been growing above potential for the third year in a row. Meanwhile, in a context of positive population growth, the gross disposable income per capita increased by 1.6% in real terms in 2016, a level last seen in the early 2000's. Disposable income determines the ability of households to purchase housing and such an increase is thus set to result in higher demand for housing, with positive impact on prices.

([140]) No significant bust was observed in Sweden, Luxembourg or Austria, meaning that prices have continued their upward trend.

Graph IV.6: **Building permits and population changes (EA 19)**

- Number of building permits (2010=100, lhs)
- Y-o-y change in population (in %, rhs)
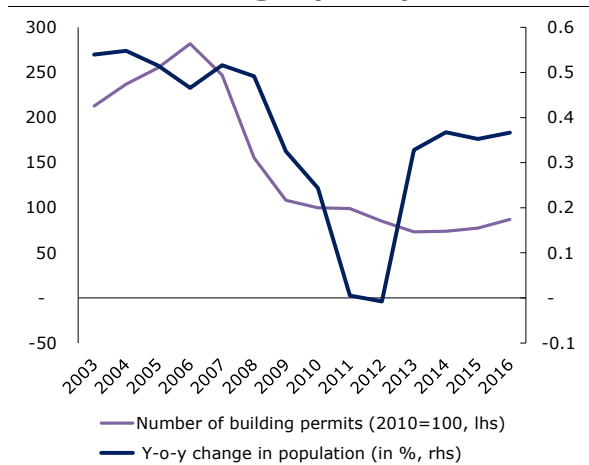
Source: European Commission.

Meanwhile, mortgage rates across the euro area have continued to decrease in 2016 on the back of accommodative monetary policy. The relatively low interest rates improve the ability of households to borrow, further supporting housing market growth. These macroeconomic tailwinds are expected to continue supporting housing prices in the medium term. According to the European Commission forecast, [141] the economic growth experienced in the euro area in 2016 is expected to remain strong in 2018 and 2019. The positive employment dynamics should be supportive of real income growth.

Credit market developments are an important companion to the housing market cycle. The relationship between credit and housing is two-way. On the one hand, increasing housing prices will reduce the ability of households to finance the purchase without getting indebted, thus increasing the use of mortgages. Conversely, lenient credit conditions by banks increase the access to credit of previously credit-constrained households. This increases the potential demand for houses, putting upward pressure on real house prices. Due to the endogenous relationship between housing and credit, mortgages can be subject to the same type of bubbles as housing. Indeed, in the 2000's, the conjunction of large liquidity available in the banking sector and positive housing price outlook led to a rapid increase in mortgage credit in most EA Member States.

Indeed, the outstanding amount of mortgage credit in the euro area doubled between early 2000 and the end of 2007. In 2008, credit conditions tightened considerably and mortgages as a share of GDP dropped (Graph IV.7). Since then, the deleveraging by households has resulted in a gradual decrease in mortgage credit as a share of GDP. Also, while banks have started to ease credit standards in 2013, the extent of the relaxation is of a much lower magnitude than the preceding tightening. [142] Going forward, the remaining deleveraging needs for the household sector in a number of Member States, together with balance sheet constraints in the banking sector in some others, mean that credit developments could remain muted.

Graph IV.7: **Mortgage credit growth and lending standards in the EA**

- Variation in mortgage credit to GDP (lhs)
- Cumulated change in lending standards (rhs)
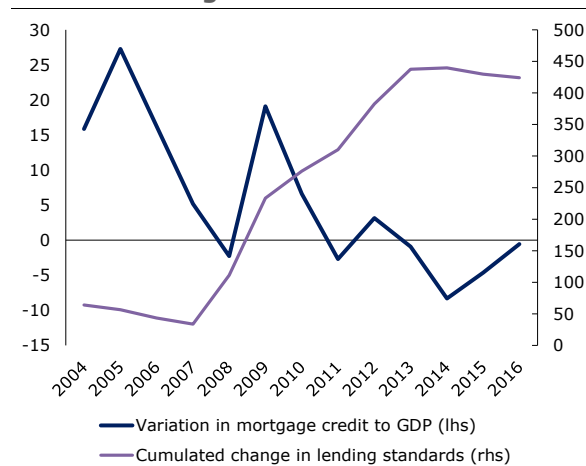
Mortgage credit as a share of GDP: LV included in the aggregate for the first year in 2010, EE in 2008, SK in 2006, MT and CY in 2005. Together, these Member States represent 0.9% of total mortgages in the EA Cumulated change in net percentage change in lending standards for the euro area since 2003. Net percentage changes correspond to the difference between the share of responding banks reporting a tightening of credit standards and the share reporting a loosening.
Source: ECB, European Commission.

So much as the pre-2008 housing cycle was characterised by a homogenous increase in housing prices throughout the euro area, the adjustment phase has been marked by raising heterogeneity. Even among the countries where prices adjusted,

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[141] European Commission (2017), 'European Economic Forecast – Autumn 2017', *European Economy*.

[142] The quarterly Eurosystem bank lending survey assesses changes in lending standards. It is considered to have a "tightening bias": banks report more often a tightening than a loosening of credit conditions. This limits the interpretation of cumulated changes in credit conditions. However, specific questions where introduced on the level of credit standards since 2014. In 2017, 37% reported a tightening compared to 2010 and 24% a loosening. Compared to 2003, 48% of banks report a tightening and 8% a loosening.

different paths can be delineated, which depend notably on the level of indebtedness. Indeed, a high level of household debt constrains both the ability of household to access credit to invest in a new home and, at the aggregate level, may constrain the ability of banks to expand credit, thus acting as a drag on housing markets. Indeed, a number of countries with large household indebtedness (e.g. Cyprus, Portugal or Spain) continue to experience negative credit flows in the household sector and weak construction activity.

In addition to having led to heterogeneous developments in housing prices across Member States, increasing gaps in housing prices between regions are also recorded. For several Member States, statistics at the regional level show that, over the past few years, house prices in the main cities have grown much faster than in the rest of the country. For example, in Austria, dwelling in Vienna are 82% more expensive in 2016 than in 2008 while, in the rest of the country, prices have increased by a much lower 48% over the same period. Such discrepancies between regions are common as both the level and the volatility of house prices depend on local characteristics including land availability, regulatory constraints and planning system. ([143]) However, in a context where the construction sector remains depressed and where few construction projects are started, the increase in housing demand will mostly translate into price increases. The impact can be expected to be the strongest in places where supply constraints are already strong in normal times, notably in cities.

Overall, recent developments in the EA suggest that except in few Member States, housing markets have recovered from the crisis. Prices are on an upward trend in most of the EU and volume and credit are also recovering. Such a trend is also set to continue as macroeconomic circumstances continue improving.

Still, the discrepancies between the situations in the various Member States have widened in the last few years as some countries are still burdened by the legacy of the financial crisis. This calls for a detailed assessment of the risks in the various Member States. Even within Member States, gaps

can be observed between house price dynamics in the various regions. Such discrepancies pose important challenges for policy action and the related vulnerabilities need to be monitored.

IV.4. Housing price valuation gaps

In order to complement the assessment in the housing market, specific metrics are routinely used to assess the risk of a correction. These include the ratio between house prices and the gross disposable income of household or with rents. Econometric modelling is also useful to determine the extent to which fundamental drivers can explain developments in house prices. As is the case for any asset price, the assessment of potential over-valuation of house prices is subject to considerable uncertainty. Still, combining various approaches can help identify potential deviations from long-term trends and highlight mounting vulnerabilities.

Graph IV.8: **Valuation gap based on the price-to-income ratio**
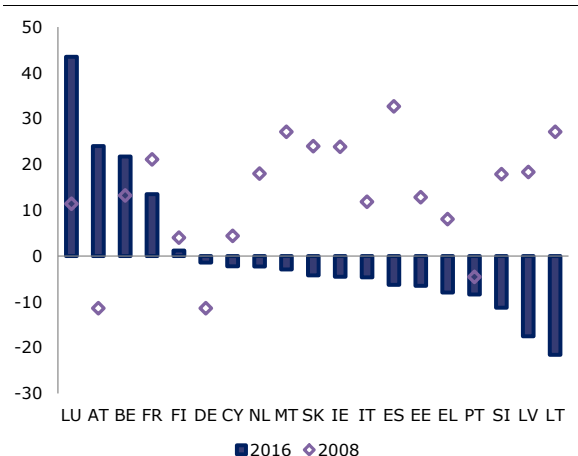
Valuation gaps are based on the difference between the latest data for the ratio and the average computed over 1995-2016.
Source: European Commission, ECB, BIS, OECD.

The price-to-income ratio assesses developments in the affordability of housing. By comparing changes in the house price index to that of households' gross disposable income per capita, the ratio helps identify potential risks of corrections. ([144]) A hike in the price-to-income ratio is likely to make it more difficult for households to purchase a dwelling. They would thus turn toward renting or postpone their purchase. This will result in a

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([143]) Hilber C. and W. Vermeulen (2014), 'The impact of supply constraints on house prices in England', *Economic Journal*, Vol. 126, pp. 358-405.

([144]) As the housing prices are an index, the actual value of the ratio does not have an economic interpretation and cannot be compared across countries.

decrease in demand, and an adjustment in prices. The credit market, by allowing households to finance their investment through indebtedness, can cushion the adjustment. Still, comparing the price-to-income ratio to its long-term value helps characterising the current situation of potential home-owners. Similarly, comparing the current price-to-rent ratio to its long-term average provides an assessment of the yield that investors can expect from housing investment. Too low a yield is set to discourage potential investors, thus bringing the ratio back to its long-term value.

The price-to-income and price-to-rent ratios confirm the findings that the adjustment in house prices has been uneven (Graph IV.8 and IV.9). Ahead of the financial crisis, the price-to-income and the price-to-rent ratios reached levels which were much above historical benchmarks. In more than 10 Member States, both ratios were more than 10pp above their long-term average in 2008. Such developments gave rise to the concern that both series could have experienced a structural break, and that the gap to long-term levels may no longer provide a reliable indication of potential vulnerabilities. In particular, increasing access to credit, which allows households to buy dwelling representing a larger percentage of their income could contribute to increase the price-to-income ratio that households can sustain.

Graph IV.9: **Valuation gap based on the price-to-rent ratio**
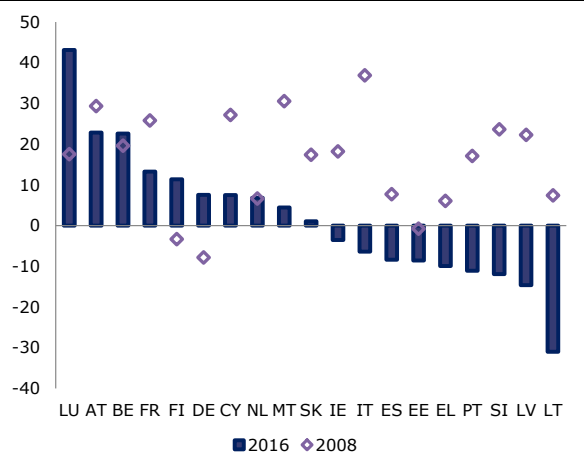
■2016 ◇2008

Valuation gaps are based on the difference between the latest data for the ratio and the average computed over 1995-2016. *Source:* European Commission, ECB, BIS, OECD.

However, with the exception of a few Member States, countries in the euro area have seen a sharp decrease in both ratios after the crisis. In 2016, more than half of the EA Member States record

price-to-income and price-to-rent ratios that are below their long-term average (Graph IV.8 and IV.9). The correction in the ratios since 2008 has been particularly large in Latvia and Greece which now appear to have considerable scope for price increase based on these metrics. By comparison, a number of Member States show very large adjustment need based on the approach through ratio: in particular, in Luxembourg and Austria, the ratios have continued to grow throughout 2008-2016 and they are at record level. In Luxembourg, house prices are 40 pp. beyond the level suggested by historical analysis of ratios. In Belgium and France, although the two valuation ratios corrected somewhat after 2008, the valuation gaps based on ratio analysis exceed 10 pp. [145]

Graph IV.10: **Model-based valuation gap**

■2016 ◇2008
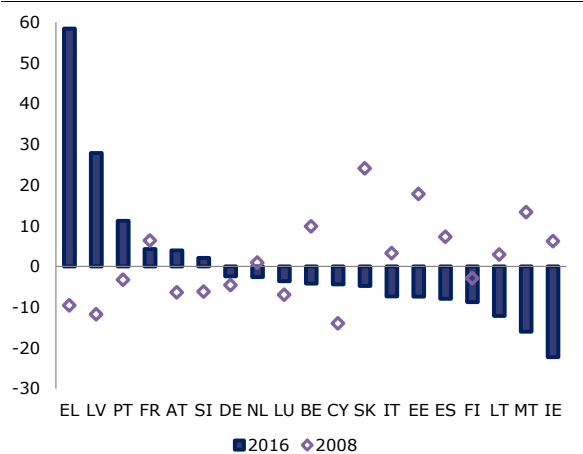
Source: European Commission, ECB, BIS, OECD

In order to further investigate the contribution of fundamental economic drivers to the developments in house prices, an econometric analysis can be conducted. Such reviews are routinely done, either at the country level or taking groups of countries, to disentangle the role of the various fundamentals. [146] Based on a panel approach, the contributions of fundamental drivers to the change in house prices in the EU can be computed (see Graph IV.10 and Box IV.1 for a description of the

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[145] In Malta, due to the absence of sectoral account providing households' gross disposable income, the overall gross domestic income is used. This metric may be biased due to the large offshore sector.

[146] For a review of the available studies on countries and group of countries, see Girouard, N., M. Kennedy M., P. van den Noord P. and C. André (2006), 'Recent housing price developments: the role of fundamentals', OECD Economics Department Working Papers N° 475.

Box IV.1: An error-correction model for housing prices in the EU

In order to take into account the simultaneous impact of various fundamental drivers of house prices, a cointegration analysis can be developed. [1] In line with the long-term properties of house price series, the relationship between house prices in real terms (RHP) and a number of determinants (X) is estimated.

$$RHP_t^i = \alpha^i + \beta . X_t^i + \eta_t^i$$

As the aim of the analysis is to estimate house prices benchmarks, the specification focuses on fundamental drivers of house prices and do not include explanatory variables that may be subject to the same boom and bust cycles as house prices themselves. In particular, mortgage loans are not included in the specification. The explanatory variables considered need to be available for all European countries over a sufficiently long period.

Overall, the specification used focus on four explanatory variables: population, disposable income, housing investment and interest rates. Statistical tests confirm that these variables are cointegrated. A panel cointegration relationship is thus estimated, using dynamic OLS and country fixed-effects. All coefficients are significant at the 1% level:

− Population: Demographic developments have a long-term positive impact on the housing market as housing demand in the long term is primarily driven by growth in the number of households.

− Real per capita disposable income: The higher the per-capita disposable income of households, the more they can spend to purchase a house. The positive elasticity of real house price to real per-capita disposable income is a sign that housing is a superior good.

− Real housing investment: Housing investment is used as a proxy for the flow of housing services. Housing investment increases the stock of housing but also denotes higher demand. Its impact on house prices is a priori ambiguous but is estimated to be positive.

− Real long term interest rates increase the cost of credit. As a consequence, they have a negative impact on housing demand and on house prices.

Table 1:

	Coefficients	**Standard errors**
Total population	1,89	0,28
Disposable income	0,57	0,07
Housing investment	0,39	0,05
Long-term interest rate	-0,016	0,004
Nb of cross-sections		*19*
Nb of observations		*492*

As an alternative to the panel data analysis, for countries with sufficiently long time-series, country-specific cointegration relationships are estimated. The model-based valuation gap is then computed as the average of the gaps provided by the panel and country-specific analyses.

[1] Philiponnet N. and A. Turrini (2017), 'Assessing housing price developments in the EU', European Economy.

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methodology). [147] In some countries where fundamentals remain depressed, and notably in Greece and Portugal, the usual drivers of house prices suggest an even stronger adjustment than the current one. Conversely, for countries where prices have increased throughout the global financial crisis, the econometric analysis can provide a more nuanced view of price developments. In particular, such an analysis makes it possible to assess the extent to which the growth in house prices in these countries reflects a continuous improvement in fundamentals or if it results from over-valuation.

In Austria, while fundamentals account for most of the house price growth, the valuation gaps have

[147] Philiponnet N. and A. Turrini (2017), 'Assessing housing price developments in the EU', *European Economy,* Discussion paper N° 48.

also risen since 2008 (Graph IV.11). For other countries, and notably in Luxembourg, the house price increases since 2008 are below what developments in its macroeconomic drivers would suggest, and house prices have come closer to their fundamental level. However, the adjustment in the valuation gap is often quite limited compared to the previous increase. This is notably the case in France and Belgium.

Graph IV.11: **Contribution of fundamentals to real house price growth**
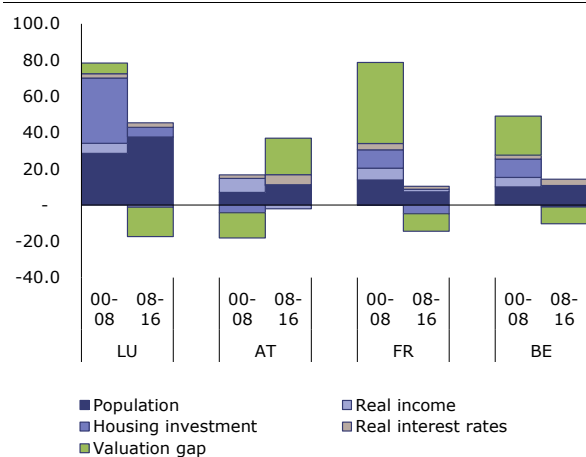
Source: European Commission, ECB, BIS, OECD.

The individual valuation benchmarks can be combined into a single synthetic indicator. Such an approach then provides a mapping of the valuation gaps in the various Member States based on the potential house price adjustment needs and on recent dynamics (Graph IV.12). According to this mapping, Luxembourg, and Austria appear as the euro area countries which cumulate very large house price over-valuation and strong price dynamics. Outside the euro area, Sweden and the United Kingdom also show fast increasing prices and over-valuation. Although fundamental drivers explain part of the increase, these countries are the ones for which the risk of an adjustment in prices going forward appears the strongest.

A second group of countries, more numerous, includes the Member States where the recent acceleration in house prices has brought prices close to their benchmark level. This group of countries with "catching-up housing markets" notably includes Latvia and Slovakia and outside the EA, Bulgaria, the Czech Republic, Hungary and Romania. In these countries, house prices have recorded very large increases over the last few months. For these countries, time series for house

prices are generally relatively short and valuation metrics are thus subject to uncertainties. Still, the various methodologies do not signal specific over-valuation concerns. The recent price dynamics nevertheless calls for careful monitoring. In particular, credit developments and regional disparities should be reviewed. Indeed, while prices at the aggregate level appear to be in line with fundamentals, they may be well above in constrained areas such as the capital city. In the other Member States, while prices adjustment cannot be ruled out, risks of over-valuation or of spiralling housing price inflation appear less acute.

Graph IV.12: **Overall valuation gap and real house price growth (in %, 2016)**
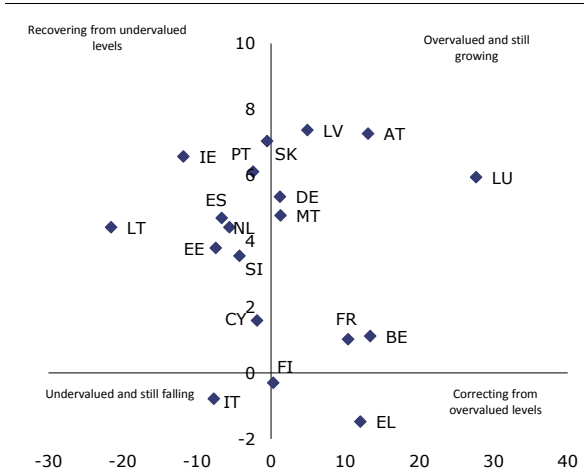
The overall valuation gap is computed as the simple average of the price-to-income, price-to-rent and fundamental gap
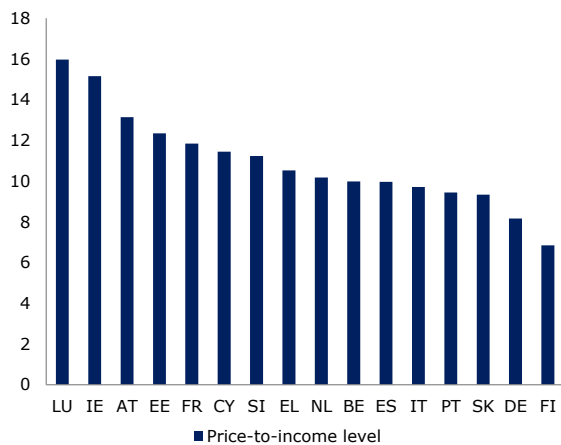*Source:* European Commission, ECB, BIS, OECD.

The price-to-income and price-to-rent ratios provide indications of the deviation compared to historical benchmark. However, as information on the level of prices is not available in a comparable way across countries, these analyses rely on indices and they do not allow for a cross-country comparison of housing prices in levels. [148] The approach above can thus be complemented by looking at housing prices in level. Based on a database for residential real estate prices per square meter in the EA, one can compute the number of years of income necessary for an average household to purchase a 100 square meter dwelling (Graph IV.13). [149] In 2016, in 9 EA Member

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[148] In addition, the analysis through ratios posits that these are mean-reverting in the long-term, a property which may be difficult to establish for countries with relatively short time series.
[149] Bricongne, J.-C., P. Pontuch and A. Turrini (forthcoming), 'Lessons from housing prices in level', *European Economy*, Discussion paper.

States, the average person needed more than 10 years of disposable income to purchase a flat. With few exceptions, and notably the case of Ireland, these countries are also the ones where the other valuation approaches signal potential valuation gaps.

Graph IV.13: **Price-to-income in level (in EUR/sqm, 2015)**

Data is not available for BG, HR, LT, LV, MT and RO
Source: European Commission, "Assessment of the housing markets outlook: new insights from house prices in levels", in European Commission (2016), European Economic Forecast – Winter 2016, European Economy.

The possible consequences of a downturn in housing price cycles depend on the strength of households' balance sheets and on the health of the financial sector. The level of household debt is thus an important qualifier when assessing the risks related to the housing cycle. High household debt or high interest burdens make households more vulnerable to a correction in the housing market. The incidence of variable-rate mortgages also needs to be taken into account. In countries where a significant share of loans are with variable rates, as is the case for example in Cyprus, a hike in interest rates could prompt a drop in demand for housing. Accordingly, in the warning addressed by the European Systemic Risk Board (ESRB) to eight Member States on vulnerabilities in the residential real estate sector, it focused on countries with high valuation risks but also to countries, such as Finland or the Netherland, where valuation risks appear limited but where the financial situation of household would make them vulnerable to a shock to the housing sector (Graph IV.14). By comparison, the group of countries with "catching-up" housing markets show limited household indebtedness, suggesting that the impact of a

potential shock on housing prices would be limited.

The situation of the banking sector, and its ability to weather potential shock, is also an important qualified of risks on the housing market. After several years of depressed profitability in the banking sector, notably due to the need to strengthen capital, the resilience of banks in the EA appears to have improved. In most countries, banks record positive return on equity and the level of non-performing loans are decreasing.

Graph IV.14: **Household debt and interest burden, 2016**
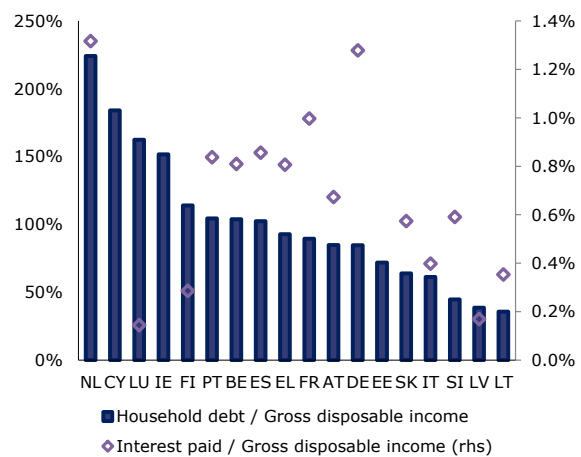
Household gross disposable income is not available for Malta.
Source: European Commission.

IV.5. Conclusion and policy implications

Before the global financial crisis, countries in the EU experienced an exceptionally long and strong expansion in house prices. Most Member States participated in a housing boom which brought house prices to record levels. This homogenous hike crumbled after the global financial crisis and housing markets in the euro area followed diverging paths. Most Member States experienced a phase of correction, which lasted between two to six years, and prices then started to recover on the back of the general improvement in the economic situation. In some countries, the protracted deterioration in economic fundamentals has resulted in ever decreasing house prices, to levels that are well-below fundamentals. Finally, some Member States have experienced ever higher house prices hand in hand with still increasing household indebtedness irrespective of the crisis.

The acceleration in house prices in a number of Member States both in the EU and in the EA, notably in the Nordics and in Central Eastern Europe, raises question on the medium-term developments. Indeed, the magnitude of the correction in real house prices has generally remained below the one observed in previous bust episodes, suggesting that further adjustments are possible. Taking into account the uncertainties surrounding the use of valuation metrics, valuation gaps for most of the euro area seem to dispel the view that prices are set to adjust further. In the countries where house prices have rebounded after a correction following the 2008 crisis, valuation metrics generally suggests that risks of downward adjustments are limited. Data on construction activity and on mortgage also signal that housing markets are at an early stage of recovery. Still, in a number of them, including Ireland, Cyprus, Luxembourg, the Netherland and Finland, household debt is well above their gross disposable income. This means that a correction in housing prices would translate into stress on households' balance sheets, with possibly large implications on economic growth. By contrast, in some Member States no or only minor adjustments in prices have occurred and the various valuation metrics all point toward significant risks of over-valuation. This is notably the case for Luxembourg and, to a lesser extent, for Belgium and Austria where price developments need to be adequately monitored. Finally, the abrupt acceleration in house prices seen in some Member States, notably Latvia, Slovakia and, outside the euro area, Bulgaria, the Czech Republic, Hungary and Romania, marks the beginning of a new housing cycle and risks of a correction in prices appears contained at the current juncture. In light of the aggregate household balance sheet, the macro-economic risks also appear limited. Still, if the current dynamics were to be sustained, risks could build up over the coming years and the potential formation of a housing bubble and the accompanying distortions should be avoided.

Housing market outcomes are shaped by a broad range of national policies. Macro-prudential policies, rental market regulations, taxation and zoning are the main broad categories that influence the supply and demand for housing. Due to the close relationship between housing prices and mortgage developments, macro-prudential measures, which are aimed towards financial stability by avoiding excessive risk taking by banks on the mortgage market, have a profound impact on the housing market. In light of the systemic risks linked to developments in the residential real estate market, the ESRB issued warnings to eight EU Member States, out of which five in the euro area.[150] Since then, measures to limit the loan-to-value ratio have notably been introduced in Austria, Finland and Netherlands. Action has also been taken to limit risky lending practices and strengthen the capital buffer of banking institutions. [151] The way the rental market operates also has deep implications on housing prices. A high degree of rent control, such as for instance in Austria and Germany, while pursuing social objectives, can contribute to a home ownership bias with adverse effect on housing price dynamics. Regarding the tax system, more than one-third of the Member States subsidise mortgage debt financing, notably through mortgage interest deductibility. Such measures tend to favour home-ownership and favour high-income households. They have been reduced or abandoned in most Member States. Mortgage interest deductibility remains high in some countries, including Belgium and the Netherlands. Finally, restrictions to the supply of housing contribute to house price volatility. While relaxing zoning regulations in a context of accelerating housing prices can help address this issue, deregulation may lead to excessive diversion of resources towards construction. [152]

Overall, the discrepancy between the situations in the housing cycle in the euro area calls for differentiated policy responses across the various Member States. Policy action should reflect both the magnitude and the nature of the risks in the various Member States. The strength of economic and financial linkages within the euro area mean that the bursting of imbalances, notably linked to real estate, in one country can generate significant spill-overs to the others. Such concerns are at the core of the oversight conducted by the ESRB and the European Commission, notably through the Macroeconomic Imbalance Procedure. Still, corrective actions mainly reside with national authorities which need to take an inclusive approach at housing market policies.

([150]) Austria, Belgium, Denmark, Finland, Luxembourg, Netherlands, Sweden and the United Kingdom.
([151]) ESRB (2017), A review of macroprudential policy in the EU in 2016, ESRB.
([152]) Glaeser E., J. Gyourko and A. Saiz (2008), 'Housing supply and housing bubbles', *Journal of Urban Economics*, Vol. 64, pp. 198-217.

V. ECB's asset purchase programmes and changes in international investment positions of euro area countries between end-2014 and end-2016

This section looks closer at changes in the sectoral composition of gross foreign assets and liabilities which accompanied massive injections of central bank liquidity through the ECB's expanded asset purchase programme between end-2014 and end-2016. It focuses in particular on eight euro-area countries where flows of central bank reserves induced the largest changes in external positions of their national central banks. It shows that portfolio rebalancing towards foreign financial assets by the private non-banking sector in the main TARGET2 debtor countries has likely contributed to the recent divergence in TARGET2 balances. This divergence might have also reflected repayments of gross foreign liabilities by their banking sector (excluding NCBs). In other words, the private sector in the main TARGET2 debtor countries seems to have taken the opportunity offered by the increased provision of liquidity by the Eurosystem to improve its NIIP. This should make it more resilient to a possible future tightening of global financing conditions. ([153])

V.1. Introduction

This section focuses on overall changes in the sectoral composition of international investment positions of four euro-area Member States with the highest TARGET2 ([154]) claims (i.e. Germany, Luxembourg, the Netherlands and Finland) as well as four euro-area Member States with the largest TARGET2 liabilities (i.e. Italy, Spain, Greece and Portugal) between end-2014 and end-2016. It attempts to identify changes in gross foreign assets and liabilities of each sector of the economy which might have been among the main drivers of recent divergence in TARGET2 balances of some euro-area national central banks (NCBs). ([155]).

With policy rates close to their effective lower bound, the Eurosystem balance sheet has played a crucial role in the ECB's monetary policy setting in recent years. The ECB decided in September 2014 to purchase simple and transparent asset-backed securities ([156]) (ABSs) under an ABS purchase programme (ABSPP) and euro-denominated

covered bonds ([157]) under its third covered bond purchase programme (CBPP3). In January 2015, the ECB announced the expanded asset purchase programme (EAPP), encompassing the existing purchase programmes (ABSPP and CBPP3) and a new public sector purchase programme (PSPP, aka QE) which was launched in March 2015.

The combined monthly purchases under the EAPP were initially set at EUR 60 billion on average and were expected to be conducted until September 2016 (with the horizon being conditional on sustainably achieving an inflation path consistent with the aim of inflation rates below, but close to, 2% over the medium term). In March 2016, the ECB decided to increase the monthly pace of asset purchases to EUR 80 billion on average and to extend the expected horizon of purchases until March 2017. At the same time, it started purchasing investment-grade euro-denominated bonds issued by non-bank corporations established in the euro area under a new corporate sector purchase programme (CSPP). Finally, in December 2016, the ECB announced that from April 2017, net asset purchases were intended to continue at a reduced monthly pace of EUR 60 billion at least until the end of December 2017.

By purchasing domestic debt securities held by non-residents, euro-area NCBs also directly affect net international investment positions (NIIPs) of other main sectors of their economies. Purchases of domestic government debt securities from non-residents ceteris paribus improve the NIIP of the

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([153]) The section was prepared by Anton Jevčák and Gerda Symens. The authors wish to thank Stefan Zeugner and Martin Schmitz for useful comments.

([154]) TARGET stands for Trans-European Automated Real-time Gross settlement Express Transfer system. TARGET2 is the second generation of TARGET. It is the real-time gross settlement system owned and operated by the Eurosystem and used by both central banks and commercial banks to process payments in euro in real time.

([155]) Keeping in mind that whereas changes in TARGET2 balances only reflect net cross-border flows of central bank money, most other components of the NIIP can apart from actual financial transactions also be affected by valuation changes.

([156]) An asset-backed security is issued by a special purpose entity and backed by a specified pool of underlying assets.

([157]) Covered bonds are debt securities issued by a bank and collateralised against a pool of its assets.

government sector, while purchases of domestic corporate debt securities as well as covered bonds and ABS held by non-residents lower foreign liabilities of the corporate and of the banking sector excluding the NCB (as long as non-residents hold their newly created euro liquidity with foreign banks). Whereas all NCBs within the Eurosystem conduct purchases under the PSPP, purchases under other programmes are only implemented by some euro-area NCBs. Nevertheless, public sector securities purchased under the PSPP accounted for 84% of net financial asset purchases under the EAPP throughout 2015 and 2016 with securities issued by supranational institutions representing 11% of the PSPP portfolio. Apart from domestic asset purchases by NCBs from non-residents, changes in the sectoral composition of the NIIP can also be induced by purchases of domestic securities from domestic residents, if these sellers (i.e. banks, households or corporations) use the newly injected euro liquidity to acquire foreign assets or repay their foreign liabilities.

V.2. Recent changes in the sectoral composition of NIIPs of the largest TARGET2 creditor and debtor countries

The Eurosystem purchased more than EUR 1.5 trillion of financial assets under the EAPP in 2015 and 2016. This led to a substantial increase in excess liquidity held by the euro-area banking sector at the Eurosystem which reached almost EUR 1.2 trillion by end-2016. In line with the portfolio balance theory (see e.g. Woodford (2012) [158]), the increased amounts of excess liquidity were expected to stimulate demand for higher-yielding financial assets and thus lead to a further decline in financing costs in the euro area. However, while financing costs indeed declined across the euro area between early 2015 and late 2016 (as confirmed e.g. by the evolution of bank lending rates), the excess liquidity also disproportionately accumulated in certain euro-area countries.

TARGET2 balances are net claims or liabilities of euro-area national central banks vis-à-vis the ECB which result from cross-border payments settled in central bank money. Asset purchases by a NCB can thus also directly affect TARGET2 balances if the

TARGET2 account used by the EAPP counterparty to receive payment for securities sold to this NCB is located in another euro-area country. In fact, according to the ECB, by early 2017, around 80% of all EAPP purchases had involved non-domestic counterparties, with around 50% of all assets purchased from non-euro-area residents. [159]

Graph V.1: **TARGET2 balances**
(May 2008 - Jul 2017, bn Euro)
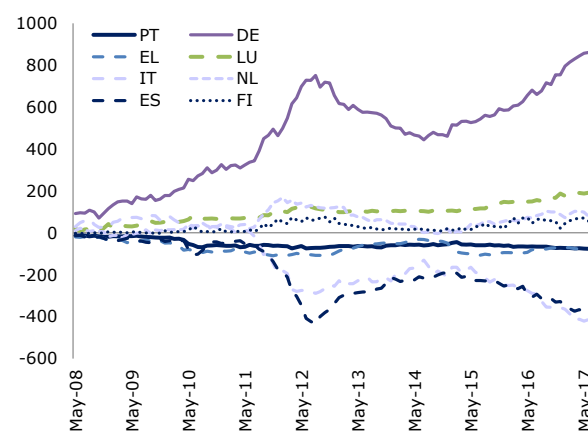
Source: ECB

TARGET2 balances widened considerably during the euro-area crisis, between mid-2011 and mid-2012, as the most vulnerable countries experienced massive capital flight. Banks in these countries substituted Eurosystem funding for market-based funding that had dried up. As this liquidity was largely used to fund cross-border payments to banks resident in non-vulnerable countries, TARGET2 balances built-up. The cumulative TARGET2 claims of countries with positive balances thus peaked at above EUR 1 trillion in mid-2012 but then declined gradually to below EUR 600bn by mid-2014, thanks to the revival of foreign funding inflows into countries most strongly hit by the crisis. TARGET2 balances, however, started to widen again in the second half of 2014, concurrently with the start of asset purchases by the Eurosystem. The positive balance of TARGET2 creditor countries thus gradually increased again to above EUR 1 trillion in late 2016.

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[158] Woodford, M. (2012), 'Methods of Policy Accommodation at the Interest-Rate Lower Bound', presented at the Symposium on The Changing Policy Landscape in Jackson Hole on 31 August 2012.

[159] For more detail discussion of the impact of the EAPP on TARGET2 balances see the ECB Economic Bulletin, Issue 7/2016 and Issue 3/2017 and the ECB Occasional Paper No 196.

In the case of the four largest TARGET2 creditor countries, the aggregate NIIP of their NCBs improved by EUR 230bn between end-2014 and end-2016. The improvement was substantially lower than the overall increase in their TARGET2 claims over this time period, which amounted to almost EUR 446bn, as the foreign liabilities of these NCBs also increased substantially, i.e. by EUR 242bn. This largely reflected an increase in their liabilities to non-euro-area residents (possibly related to their reserve management services [160]) as well as higher liabilities to other euro-area residents (such as supranational institutions) and higher intra-Eurosystem liabilities (notably related to proportionately larger issuance of banknotes relative to the share of these NCBs in the ECB's capital [161]).

Graph V.2: **TARGET2 Creditor Countries - Sectoral Composition of the NIIP**
(2008Q4-2016Q4, % of GDP)
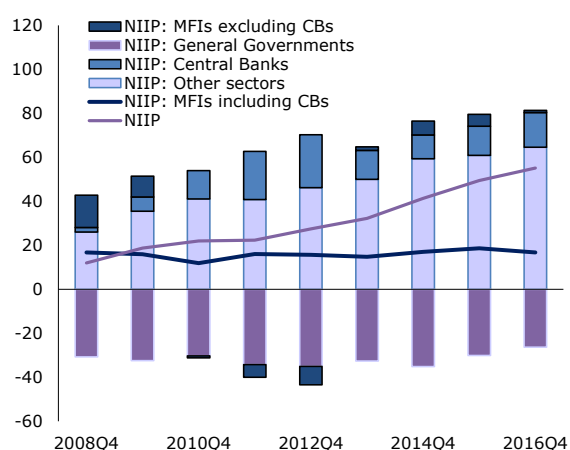
Source: Eurostat and Commission services' calculations

On the other hand, the NIIP of their banking sector (i.e. monetary financial institutions, MFIs) excluding NCBs, deteriorated by almost EUR 200bn due to the EUR 312bn decline in their gross foreign assets between end-2014 and end-2016. As

a result, the NIIP of their entire banking sector (including NCBs) "only" improved by some EUR 33bn between end-2014 and end-2016. At the same time, total gross foreign liabilities of government sectors in these creditor countries declined by EUR 294bn (as compared to EUR 395bn of domestic securities purchased under the PSPP by their NCBs) and thus induced an improvement in their aggregate NIIP by EUR 274bn.

Finally, the NIIP of other sectors [162] continued to follow its long-term upward trend, increasing from below EUR 2.3 trillion to above EUR 2.6 trillion. This likely mainly reflected the persistent current account surpluses of Germany, the Netherlands and Luxembourg which cumulatively amounted to almost EUR 645bn over 2015 and 2016 (while Finland actually recorded a cumulative current account deficit of EUR 3.5bn over this time period). Moreover, the change in the NIIP of other sectors masked much more substantial gross flows as their gross foreign assets holdings increased by more than EUR 2.9 trillion while their gross liabilities increased by almost EUR 2.6 trillion. This reflected the fact that these countries continued to attract large foreign capital inflows, also in the form of equity flows, such as FDIs and investments into mutual funds, which were re-channelled into foreign asset holdings.

In the main TARGET2 debtor countries, the aggregate NIIP of their NCBs deteriorated by EUR 210bn between end-2014 and end-2016. The deterioration was smaller than the overall increase in their TARGET2 liabilities over this time period which amounted to almost EUR 326bn. This was thanks to the fact that their foreign assets also increased by EUR 148bn, mainly as a result of an increase in their intra-Eurosystem claims (in particular related to the allocation of euro banknotes within the Eurosystem) as well as higher holdings of foreign securities (largely acquired through the EAPP).

In parallel, gross foreign liabilities of their banking sectors excluding NCBs declined by EUR 218bn, with their aggregate NIIP improving by EUR 184bn. Consequently, the NIIP of their entire banking sector (including NCBs) "only" deteriorated by EUR 27bn between end-2014 and

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[160] The Eurosystem Reserve Management Services are a range of banking services offered by the Eurosystem to central banks, monetary authorities, state institutions and international organisations to enable them to manage their euro-denominated reserve assets comprehensively, efficiently, and in a safe, confidential and reliable environment. The full range of these services is provided by certain national central banks of the Eurosystem - Eurosystem Service Providers - within a single framework coordinated by the ECB.

[161] If the actual issuance of banknotes in circulation exceeds the NCBs' share in the ECB's capital, the surplus is recorded as net liability related to the allocation of euro banknotes within the Eurosystem under liabilities related to other operational requirements within the Eurosystem.

[162] The "other sectors" category comprises: (a) other financial institutions not covered by the MFI definition; (b) non-financial enterprises (public and private); (c) non-profit-making institutions serving households; and (d) households.

end-2016. The IIP data thus indicate that banks in the main TARGET2 debtor countries used some of central bank reserves created through the EAPP or other liquidity providing monetary policy operations to repay their debt liabilities to banks in the TARGET2 creditor countries (as reflected in the decline of their gross foreign assets).

Graph V.3: **TARGET2 Debtor Countries - Sectoral Composition of the NIIP**
(2008Q4-2016Q4, % of GDP)
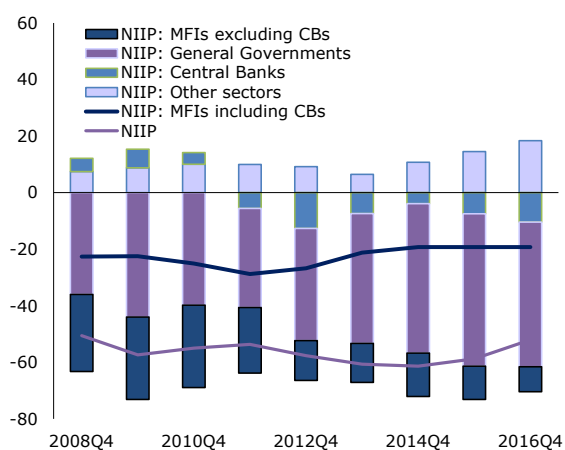
Source: Eurostat and Commission services' calculations

On the other hand, the total gross foreign liabilities of government sectors in these debtor countries actually increased by EUR 9bn (as compared to EUR 385bn of domestic securities purchased under the PSPP by their NCBs) and thus accounted for almost half of the overall deterioration in their aggregate NIIP by EUR 19bn. This was, however, solely driven by developments in Spain, where gross foreign liabilities of the government sector increased by EUR 51bn between end-2014 and end-2016 whereas they declined in the other three TARGET2 debtor countries.

Finally, the NIIP of other sectors in the debtor countries also continued to improve, increasing by EUR 253bn, thanks to an increase in their gross foreign assets by EUR 383bn. The fact that the pace of accumulation of net foreign assets by other sectors exceeded the cumulative current account surplus of TARGET2 debtor countries amounting to EUR 104bn over 2015 and 2016 suggests that portfolio rebalancing towards foreign financial

assets might have also contributed to the widening in their TARGET2 balances. [163]

Gross foreign liabilities of the government sector thus changed differently in the largest TARGET2 creditor countries (where they declined substantially) and in the TARGET2 debtor countries (where they increased somewhat) between end-2014 and end-2016.

Graph V.4: **Outstanding stocks of sovereign debt securities**
(bn Euro)
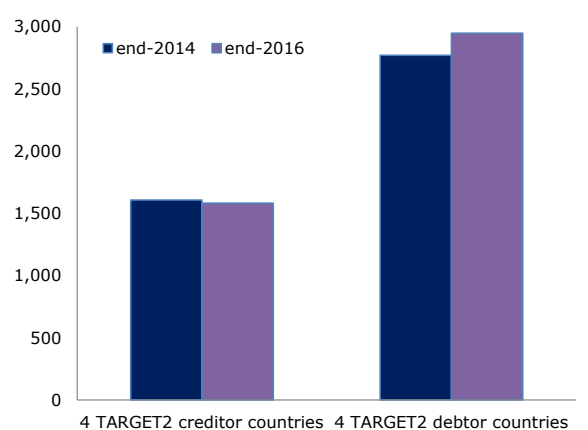
Source: Bloomberg and Commission services' calculations

This likely also reflected the fact that the amounts of outstanding sovereign debt securities changed differently for these two groups of countries over this time period. While the total outstanding stock declined by some EUR 25bn in the four TARGET2 creditor countries, it increased by almost EUR 180bn in the four largest TARGET2 debtor countries. As a result, the share of foreign ownership of general government gross debt declined from 69% by end-2014 to 59% by end-2016 for the TARGET2 creditor countries and from 49% to 47% for the TARGET2 debtor countries.

V.3. Conclusions

The implementation of the EAPP throughout 2015 and 2016 resulted in the Eurosystem buying over EUR 1½ trillion (i.e. about 14% of euro-area GDP) of euro-denominated debt securities (84% of which were originated by the public sector). The launch of the EAPP coincided with the renewed

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[163] As also indicated by the ECB Occasional Paper No 196.

divergence of TARGET2 balances. The accumulation of TARGET2 claims in few countries (most notably DE, NL, LU, FI) was mirrored by the accumulation of TARGET2 liabilities by other countries (in particular, IT, ES, EL, PT). As a result, the positive balance of TARGET2 creditor countries increased to above EUR 1 trillion by end-2016 (from around EUR 600 million at end-2014).

However, the improvement in the NIIP of NCBs in the main TARGET2 creditor countries between end-2014 and end-2016 was substantially lower than the overall increase in their TARGET2 claims over this time period. This was due to the fact that their liabilities to non-euro-area residents and to other euro-area residents as well as their intra-Eurosystem liabilities also increased considerably. At the same time, total gross foreign liabilities of government sectors in the main TARGET2 creditor countries declined significantly, inducing an improvement in their NIIP. On the other hand, foreign asset holdings of their banking sector (MFIs excluding NCBs) also declined substantially and thus to a large extent offset the improvement in the NIIP of their NCBs. Finally, the NIIP of other sectors continued to follow its long-term upward trend, reflecting to a large extent the aggregate current account surplus of these countries. As far as TARGET2 debtor countries are concerned, the NIIP of their NCBs declined between end-2014 and end-2016, although to a smaller extent than the overall increase in their TARGET2 liabilities.

This was due to the fact that their foreign asset holdings also increased, mainly as a result of higher intra-Eurosystem claims as well as larger holdings of foreign securities.

While their general government's NIIP remained broadly unchanged, their banking sector (excluding NCBs) reduced sharply its foreign liabilities and thus improved its NIIP, likely to some extent also thanks to sizeable injections of liquidity into the euro-area banking system through the EAPP. Finally, other sectors increased their foreign asset holdings well in excess of the cumulated current account surplus of these countries.

Taken together these developments suggest that portfolio rebalancing towards foreign financial assets by the private non-banking sector in the main TARGET2 debtor countries likely contributed to the recent divergence in TARGET2 balances. This divergence might have also reflected repayments of gross foreign liabilities by their banking sector (excluding NCBs). The improved NIIP of the private sector in the TARGET2 debtor countries should make it more resilient to a possible future tightening of global financing conditions.

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