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Comparisons and contrasts of the impact of the crisis on euro area labour markets

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AD HOC TEAM OF THE EUROPEAN SYSTEM OF CENTRAL BANKS

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ABSTRACT

The global financial and economic crisis – including two euro area recessions in 2008-2009 and 2011-2013 – has had a heavy impact on euro area labour markets. A notable feature throughout the crisis has been the considerable degree of cross-country heterogeneity of labour market adjustments – with some economies emerging relatively unscathed, while others have seen steep and persisting increases in unemployment. This paper analyses the impacts of the crisis on euro area labour markets, paying particular attention to the differential impact of the two euro area recessions of the crisis and the interplay of sectoral and institutional features driving labour market outcomes.

Despite ongoing structural reforms in some euro area countries, progress has been partial and uneven across the euro area. Further reductions in labour market rigidities are necessary to increase and accelerate the adjustment capacity of euro area labour markets and help reduce the current high levels of structural unemployment.

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EXECUTIVE SUMMARY

The global financial and economic crisis, which began in the late 2000s, had a heavy impact on euro area labour markets, with a loss of around 4 million jobs following the onset of the Great Recession of 2008-09 and wiping out the gains from almost ten years of strong job creation. Following a short-lived stabilisation and initial signs of recovery around the turn of the decade, the emergence of sovereign debt concerns and wider structural imbalances (often related to issues of international competitiveness) in some euro area economies, as well as fears of contagion, led to the onset of a second euro area recession and the loss of a further 1.8 million jobs across the euro area.

A notable feature throughout the crisis has been the considerable degree of cross-country heterogeneity of labour market adjustments across the euro area – with some economies emerging relatively unscathed, while others have seen steep and persisting increases in unemployment. Several groups have been disproportionately affected – the young, the unskilled, those on temporary contracts and those displaced from strongly downsized sectors. Youth and long-term unemployment have risen substantially. Since adequate policy responses to the crisis require a detailed understanding of the nature and sources of job destruction, this report:

- describes the main labour market developments over the course of the crisis;

- assesses the extent to which the two recessions differed and the extent to which earlier trends were reinforced or reversed over the two phases of the crisis;

- analyses the role of different factors shaping labour market developments across the euro area economies;

- assesses some policy issues regarding these developments.

The report distinguishes two distinct phases of the crisis: the first phase covering the Great Recession (which lasted for the euro area from the second quarter of 2008 to the second quarter of 2009) and its aftermath; the second phase covering the period surrounding the onset of the second euro area recession (which lasted between the final quarter of 2011 and the first quarter of 2013). The two phases were somewhat distinct in their impact. The first phase reflected the global credit contraction and the subsequent downturn in global trade. Employment losses were heavily concentrated in the construction sector and those sectors particularly open to global trade, such as manufacturing and transport. To a certain extent, all euro area economies were affected – albeit to varying degrees, reflecting cross-country differences in sectoral composition, labour market institutions and varying policy responses (such as the reliance in some euro area economies on short-time working schemes). By contrast, the labour market impact of the second euro area recession during the crisis was strongly concentrated in programme countries and those with excessive imbalances as defined by the Macroeconomic Imbalance Procedure (i.e, Cyprus, Greece, Ireland, Italy, Portugal, Slovenia and Spain, which are referred to collectively as the "stressed" economies throughout this paper, while the rest of the euro area economies are referred to as the "other euro area countries"), where pre-crisis imbalances were accentuated, and where rigidities embodied in the institutional features of their economies exacerbated the labour adjustment in those countries during the crisis.

LABOUR MARKET DEVELOPMENTS OVER THE CRISIS

Section 1 of this report sets out the goals and provides an overview of the report. Section 2 reviews the impact of the crisis on euro area labour markets and highlights the high degree of cross-country heterogeneity observed before looking in more detail at the sources of those differences. Despite strong shocks to GDP in many euro area countries – at least in the initial phase of the crisis – some economies emerged relatively unscathed from the crisis with little overall impact on domestic unemployment rates (particularly, Germany, where unemployment barely increased as a consequence of the Great Recession and has since declined to below pre-crisis levels, but also Austria, Belgium, Finland, Luxembourg and Malta), while others (in particular, Greece and Spain, as well as Cyprus, Ireland, Latvia, and Portugal) saw marked increases in their respective unemployment rates. In addition, there have been notable differences across the countries in the evolution of unemployment over the course of the crisis – with several economies having initially shown significant increases in unemployment rates, but marked declines from peak rates of unemployment in the meantime (particularly, Estonia, Ireland and Latvia, while Germany experienced only a modest increase in unemployment as a consequence of the Great Recession), while Cyprus, Greece, Italy and Spain have seen further rises in unemployment after the Great Recession and/or have remained stubbornly stuck at markedly higher unemployment rates. To some extent, these different evolutions reflect differences in the degree or nature of the shocks encountered, although even accounting for differences in the degree of GDP declines, strong cross-country differences remain.

Analysis of employment losses by worker characteristics reveals a disproportionate burden on certain groups – the young, the unskilled, those on temporary contracts. These trends tended to be reinforced during the second phase of the crisis, but with a more focused concentration of employment losses in the "stressed" economies. The report highlights the evolution of youth unemployment (15-24 years old), which has increased considerably over the course of the crisis, traces part of the increase to the lower protection offered to young workers due to their higher propensity to be employed on temporary contracts. Despite the reduced prospects, however, young people who are not in education, employment or training (NEET) nevertheless remain attached to the labour market (as the rise in the NEET rate during the crisis is explained by a rise in the number of unemployed rather than by an increase in inactivity). Meanwhile, employment of older workers, those with permanent contracts and those employed in the less directly impacted segments of the services sector remained somewhat less affected. An analysis of micro data over the period 2006-12 suggests that the strong increase in the participation and employment rates of older workers did not result in a substitution away from younger workers (the "lump of labour fallacy"); instead additional youth employment is for some demographic groups a complement to the additional employment of older workers in local labour markets.

An analysis of labour market flows shows that job destruction rates increased sharply as a consequence of the Great Recession, particularly strongly (and rapidly) in those countries most affected by strong declines in construction activity. Moreover, it is the declines in the job-finding probabilities which have tended to drive the unemployment heterogeneity across countries, with sharp falls in job-finding rates intensifying further in the stressed economies in the second part of the crisis, whilst remaining relatively stable in the other euro area economies. More generally, exits from employment (job losses) rose particularly strongly among those holding temporary contracts – a tendency which intensified further in the second phase of the crisis, – while job losses from permanent employment (although showing marked increases following the onset of the crisis) remained relatively contained.

Aside from the strong increases in unemployment rates seen over the crisis, there has been a further dimension of underutilisation of the euro area workforce – namely, a substantial increase in underemployment. An analysis of underemployment (those working part time, but who would like to work full time) shows that the share of the underemployed has increased considerably in those countries that experienced acute financial pressures in the second phase of the crisis. Similarly, the number and share of discouraged workers (i.e. those who give up job search and exit the labour market in the face of subdued job-finding prospects) increased considerably in these countries. This suggests that labour market slack in the euro area remains significantly higher than indicated by the official unemployment figures – particularly in the stressed economies. The implications going forward are that increases in labour demand may at first have rather subdued impacts on employment and unemployment as higher demand may initially tend to be translated into increases in hours worked and higher labour market participation.

Labour force growth has decelerated significantly across the euro area since the beginning of the crisis – both as a result of a slowdown in population growth and as a result of a marked deceleration in participation growth, particularly in the stressed countries, where some discouragement appears to be emerging. To some extent, ongoing increases in participation rates across euro area economies might not have been expected, but the aggregate developments maskedmarked differences between age, gender and skill groups. In particular, labour force participation continued to rise among older, female and skilled workers, but has declined over the course of the crisis among males, young and lower skilled workers. Turning to migration trends, immigration growth started to decline in 2008 and turned negative in the stressed countries from 2010, having contributed significantly to overall population growth in the years prior to the crisis. By contrast, immigration growth has remained positive in the other euro area countries throughout the crisis, thereby helping to alleviate demographic pressures (from declining national populations) and occupational bottlenecks in some segments of the economy. The growth in the immigrant population in the other euro area countries reflects increased flows from outside the EU as well intra-EU immigration and has been concentrated among high and medium-skilled workers.

The strong rise in long-term unemployment across most euro area labour markets has been one of the striking consequences of the crisis. Section 3 shows that, by the end of 2013, the stock of long-term unemployed accounted for over 6% of the total euro area labour force – more than double its pre-crisis level – with the stressed countries suffering stronger increases in long-term unemployment despite having entered the crisis with a relatively lower long-term unemployment share than other euro area countries.

Estimates from international institutions point to high levels of structural unemployment for the euro area coming into the crisis (around 9%), followed by a sharp rise in structural unemployment during the crisis, accounting for around one third of the rise in unemployment during the crisis in the euro area (although some of the stressed countries experienced significantly higher increases in the share of structural relative to cyclical unemployment). By contrast, structural unemployment rates for some economies (Germany, Belgium, Austria and Finland) are estimated to have declined. A Beveridge curve analysis carried out for the euro area aggregate and the constituent economies suggests that these rises are most likely due to increasing structural mismatches between worker categories and labour demand. An alternative analysis looking at developments in skill mismatch indices on the basis of microeconomic data also finds a marked increase in skill mismatch across the euro area and within the euro area countries, with increases particularly strong at regional level. These results suggest that at the euro area level, skill mismatch could be reduced by encouraging greater labour market mobility – both within national labour markets and across the euro area countries.

Section 4 of the report analyses recent trends in wage developments and finds evidence of increased wage moderation as the crisis continued. The results suggest tentative evidence of downward wage rigidities in the euro area (i.e. a lower responsiveness of wages with respect to unemployment in downturns – although this result applies to all downturns and not just to the crisis period). However, this may also be due to the upward impact of employment composition effects on aggregate wages (namely that mostly low-skilled and low-wage workers lose their jobs in downturns, particularly during the current crisis). More recently, these downward wage rigidities seem to have become somewhat weaker, with wages becoming more responsive to unemployment as the crisis became more prolonged. This may be partly due to structural reforms in labour markets across a number of euro area countries, and/or public sector pay restraint associated with fiscal consolidation, but may also be related to other factors. Consistent with these results, microeconomic data show that wage flexibility is stronger in the euro area than suggested by aggregate data, once the upward impact of the aforementioned employment composition effects on wages is taken into account.

POLICY ISSUES[1]

Given the above findings of the paper, the following labour market policy issues deserve attention:

In the presence of high unemployment, a flexible response of wages to labour market conditions is essential, so as to facilitate the necessary sectoral reallocation and rebalancing efforts necessary to encourage job creation, particularly in the context of high and growing mismatch in some euro area labour markets. Higher wage differentiation offers an important signalling mechanism regarding different types of workers and sectors, which can help accelerate the reallocation process and ensure a more efficient matching between labour supply and demand.

Labour market dualities prevailing at the start of the crisis amplified the employment adjustment in response to negative shocks and placed a disproportionate burden of the rebalancing process on certain groups of workers such as temporary workers, the young and the less-skilled. A greater emphasis on reducing labour market segmentation is required, both to improve firms' flexibility to respond to changing demand conditions and to provide increased access to work and training for the young, who have been particularly adversely affected by the crisis. The focus should be on lowering the average labour adjustment costs so as to reduce the dualities and distortions which have grown in advance of the crisis and thus address the core problems associated with labour market rigidities.

The crisis led to a strong increase in long-term unemployment in some countries. Countering this will require a better focusing of active labour market policies (ALMPs), including targeted retraining measures. ALMPs would help to prevent hysteresis effects and reduce the risk that persistent unemployment translates into further rises in structural unemployment. Measures should focus in particular on the young and the less-skilled to provide the necessary retraining to prepare these groups for new employment opportunities, thus helping to decrease the structural mismatch between skills demanded and supplied, especially in those economies most affected by the large, and seemingly permanent, downsizing of some sectors. At the same time, enhanced efforts aimed at increasing inter-regional and inter-country labour mobility across the euro area economies (particularly for the low-skilled), so as to tackle directly the effects of high localised unemployment levels and alleviate emerging labour market bottlenecks in stronger growing euro area economies, are required. Both national and pan-European reform efforts are required to enhance labour

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1 Some labour market reform recommendations for euro area countries were outlined in Mr. Draghi's speech at the 2014 Economic Policy Symposium at Jackson Hole, entitled "Unemployment in the euro area".

mobility. The ongoing labour market reforms in countries such as Greece, Ireland, Portugal, Spain, Italy and Cyprus include important measures to decrease excessive employment protection and to increase wage flexibility. These efforts notwithstanding, progress in labour market reform remains partial and uneven across the euro area.

While the impact of reforms that have already been undertaken may take some time to produce their fuller effects, more needs to be done across the euro area countries in order to achieve the greater degree of labour market flexibility compatible with membership of monetary union. The considerable increase in unemployment observed during the crisis was particularly concentrated in the stressed countries characterised by labour market institutions and rigidities, where the necessary and abrupt adjustment of imbalances initially resulted in strong falls in output and employment rather than wage adjustment. Further reforms to collective bargaining and tax and benefits systems, so as to enable firm-level agreements to better reflect local labour market conditions, whilst increasing the economic incentives to work, are necessary across the euro area economies. Further reductions in employment adjustment rigidities and labour market dualities would also help to speed up the reallocation of resources and employment to more productive sectors. In combination with active labour market programmes, these reforms will also help to reduce structural unemployment and reduce the risk of temporary displacements translating into further increases in structural unemployment.

Countering the strong rise in long-term unemployment will require greater emphasis on (re-) activation policies – via a reprioritisation of active labour market policies given the constraints on public sector budgets – so as to enhance the employability of those displaced from permanently downsized sectors. However, while active labour market policies can help reintegrate young people and the unemployed into employment and provide access to productivity-enhancing training and experience, they are no substitute for the necessary wider efforts to encourage more flexible labour markets.

Overall, reforms which deliver greater flexibility in employment and wages will reduce adjustment costs associated with idiosyncratic shocks and enhance the efficiency and effectiveness of the monetary policy transmission mechanism. However, in order to fully reap the benefits of labour market reforms, they must be accompanied by increased competition and significant reforms in product markets, which are crucial to enabling euro area economies (and the euro area as a whole) to respond optimally and rapidly to shocks and thus avoid the higher costs of lost output and higher unemployment associated with slower and more protracted adjustments.

I INTRODUCTION[2]

The crisis has had a heavy impact on euro area labour markets. By the middle of 2013, the euro area unemployment rate had risen from a pre-crisis low of 7.3% to a peak of 12.0% (Chart 1) reflecting over 5½ million people who have lost their jobs over the course of the crisis. Despite modest improvements to labour markets across most euro area economies in the first half of 2014, euro area employment remains some 4% below its pre-crisis peak (see Chart 2). In terms of hours worked, these declines have been stronger still – at around 6%. Moreover, the decline in employment seen over the course of the crisis has been both proportionately stronger and has persisted for far longer than has been seen in other recessions since the 1980s (see Chart 3). In part, this reflects the particularly strong GDP contraction seen over the course of the crisis, to the extent that GDP has still not yet regained its pre-crisis level. It also reflects the systemic nature of the crisis, whereby financial crises typically lead to

Chart 1 Unemployment developments over the course of EMU

(percentage of labour force; quarter-on-quarter percentage point changes)
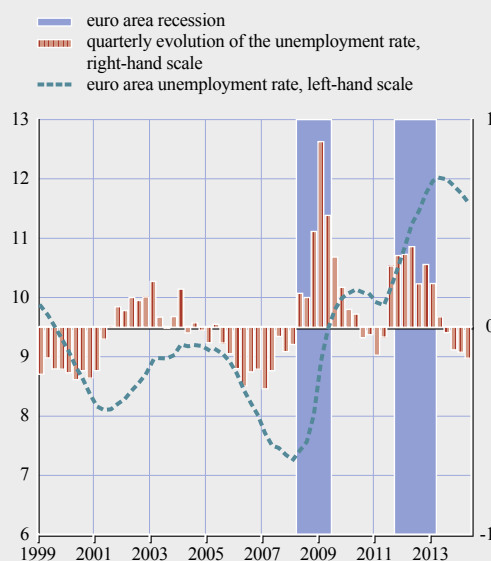
Sources: Eurostat and ESCB calculations.
Note: Blue bars indicate euro area recessions during the crisis, defined in terms of negative quarter-on-quarter GDP growth.

Chart 2 Euro area GDP, employment and hours worked over the crisis

(index: 2008Q1 = 100)
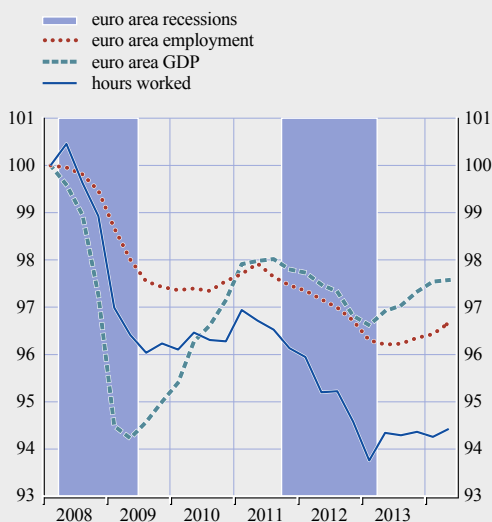
Sources: Eurostat and ESCB calculations.

Chart 3 Euro area employment across recessions

(index, T=100, represents local peak in GDP; intervals are quarters)
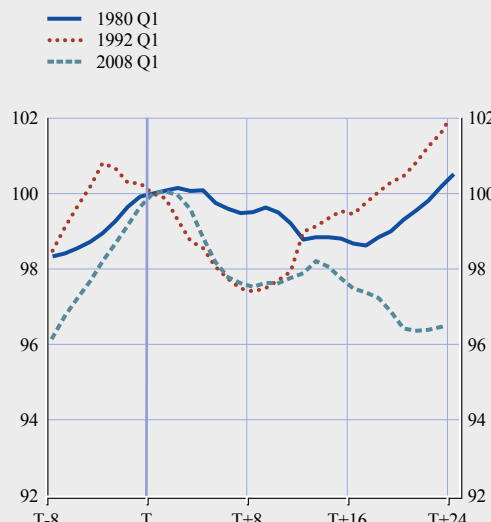
Sources: Eurostat and ESCB calculations.

2   Prepared by Valerie Jarvis.

a much stronger and longer-lasting impact than non-financial recessions.[3] Yet even in the aftermath of the recessions which followed the two strong oil price shocks in the 1970s or the strong financial crises seen in some euro area countries at the beginning of the 1990s, euro area labour markets had rebounded to a far greater degree after around 16 quarters than has been seen over the recent crisis.

In addition to the strong and persistent nature of the job losses seen over the course of the crisis, euro area labour markets have also displayed considerable heterogeneity, reflecting modest and relatively short-lived effects in some euro area economies, but a severe and long-lasting impact in others. To a great extent, this reflects the differential nature of the crisis on the euro area economies, which was in fact composed of two distinct "phases". The first, a deep and sharp, global downturn in activity and trade, referred to, in retrospect, as the five-quarter "Great Recession" of 2008-09, emphasises the broad and international synchronisation of its impact. The second concentrated and persisting phase (resulting in a euro area recession lasting for six quarters between the end of 2011 and the beginning of 2013) reflected the emergence of sovereign debt concerns as a result of long-standing imbalances in programme countries – Cyprus, Greece, Ireland, Italy, Portugal, Slovenia and Spain, (referred to as the "stressed" economies).

The brunt of the job losses seen as a consequence of the Great Recession had been heavily concentrated – sectorally, demographically and country-wise. Over this period and its aftermath, the euro area lost some 4 million jobs. The young and the unskilled were disproportionately affected, as were those previously employed in the construction and, to a lesser extent, industrial sectors. Several economies saw their unemployment rates soar – most notably, Spain. Yet initially, the impact of the crisis had appeared to have been relatively quickly contained, as employment losses slowed notably from the end of 2009 and unemployment peaked in the second quarter of 2010, before beginning to fall temporarily. However, these small improvements were short-lived, as the emergence of sovereign debt concerns in some euro area countries led to the second euro area recession. Euro area employment fell again, adding a further 1.8 million to the jobless totals and resulting in an unemployment rate of 12.0% by the middle of 2013.

Against this background, the principal aims of this paper are four-fold:

- to describe the main labour market developments seen over the full course of the crisis (i.e. the two phases of the crisis defined so as to include: first – the Great Recession of 2008-09 and the "second dip" – the recession of 2011-13);

- to assess the extent to which the two recessions differed – in terms of the burdens of labour market developments – and the extent to which earlier trends were reinforced or reversed over the second phase of the crisis and under what circumstances;

- to analyse the role of different factors shaping the different labour market developments seen across the euro area economies;

- to assess the euro area labour market policy implications of these developments.

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3   See also C.M. Reinhart and K.S. Rogoff, (2008), This Time Is Different: Eight Centuries of Financial Folly (Princeton UP) and more recently, "Recovery from financial crises: evidence from 100 episodes", NBER Working Papers, No 19823, National Bureau of Economic Research, January 2014; T. Boeri, P. Garibaldi and E.R.Moen, "The Labor Market Consequences of. Adverse Financial Shocks", IZA Discussion Paper No. 6826, August 2012.

Section 2 presents an overview of labour market developments across the course of the crisis, comparing and contrasting developments across the two recession phases. Special attention is paid to the strong rise in youth unemployment, as well as to the extent to which headline unemployment levels may understate the degree of labour market slack across the euro area. A box assesses the extent to which high youth unemployment might be driven by a rationing of jobs in favour of older workers, finding little evidence to support this contention – the so-called "lump of labour fallacy". A further box examines changes in migration patterns over the course of the crisis and finds that immigration growth started to decline in 2008 and turned negative in the stressed countries from 2010, while remaining positive in the other euro area countries throughout the crisis, thereby helping to alleviate demographic pressures (from declining national populations) and occupational bottlenecks in some segments of the economy. In addition to the evidence presented on headline developments in employment, unemployment and labour supply, Section 2 includes a detailed analysis of labour market flows over the crisis, using recently-released microeconomic data from the EU Labour Force Survey.

Section 3 is principally concerned with the underlying structural features of euro area labour markets, which have become increasingly apparent over the course of the crisis, focusing on the strong rise in long-term unemployment, its drivers and determinants. Aside from an elaboration of broader estimates of structural unemployment, a Beveridge curve analysis finds evidence of growing labour market mismatch across a range of economies particularly affected. This is confirmed by microeconomic data which show strong evidence of a sharp increase in the skill mismatch between labour supply and demand across several euro area economies over the course of the crisis.

Section 4 examines wage developments over the different phases of the crisis and provides evidence that wage moderation has increased as the crisis continued. Structural wage equations show that the response of wages to unemployment has increased as the crisis became more prolonged, although downward wage rigidities still seem to be at play. However estimates based on microeconomic data, which allow for changing workforce compositions over time, suggest that euro area wage adjustments based on aggregate wage data may somewhat underestimate the full degree of wage moderation seen (these elements are examined in detail in a Box in this section).

2 LABOUR MARKET DYNAMICS AND UNEMPLOYMENT OVER THE CRISIS

This chapter gives an overview of labour market developments in the euro area over the crisis. The objective is twofold: first, this chapter focuses on cross-country divergences in terms of response to the crisis and second, it compares labour market developments during the crisis over the first and the second euro area recessions. Special attention is paid to the strong rise in youth unemployment, as well as to the extent to which headline unemployment levels may understate the degree of labour market slack across the euro area. Box 1 assesses the extent to which high youth unemployment might be driven by a rationing of jobs in favour of older workers – the so-called "lump of labour fallacy". Box 2 examines Spanish labour market flow data between traditional and supplementary labour market indicators. Developments in labour supply over the course of the crisis, supplemented by Box 3 on changes in migration patterns, are examined along with a detailed analysis of labour market flows using recently-released microeconomic data from the EU Labour Force Survey.

2.1 EMPLOYMENT AND UNEMPLOYMENT DEVELOPMENTS[4]

This section describes employment and unemployment developments over the crisis and shows that, in the first phase of the crisis (the Great Recession from 2008Q2-2009Q2), employment losses were heavily concentrated in the construction sector (which was particularly heavily affected by the global credit crunch) and those sectors particularly open to global trade, such as manufacturing and transport. To an extent, all euro area economies were affected – albeit to varying degrees, reflecting cross-country differences in sectoral composition and varying policy responses (such as the heavy reliance in some euro area economies on short-time working schemes). By contrast, the labour market impact during the second euro area recession from 2011Q4 to 2013Q1 was strongly concentrated in the stressed economies. Analysis of employment losses by worker characteristics reveals a disproportionate burden of employment losses on certain groups – the young, the unskilled, those on temporary contracts. These trends tended to be reinforced during the second phase of the crisis, but with a more focused concentration of employment declines in the stressed economies.

Following a decade of strong employment growth and a protracted period of declining unemployment, the onset of the crisis – which began for the euro area as a whole in the second quarter of 2008 – had a strong and immediate impact on euro area labour markets.[5] Over this period, euro area GDP fell by 5.8% peak to trough. Initially, euro area employment contracted somewhat less than the decline in GDP – by 2.5% – since much of the adjustment

Chart 4 Employment, hours and GDP growth since 1999

(annual percentage changes)
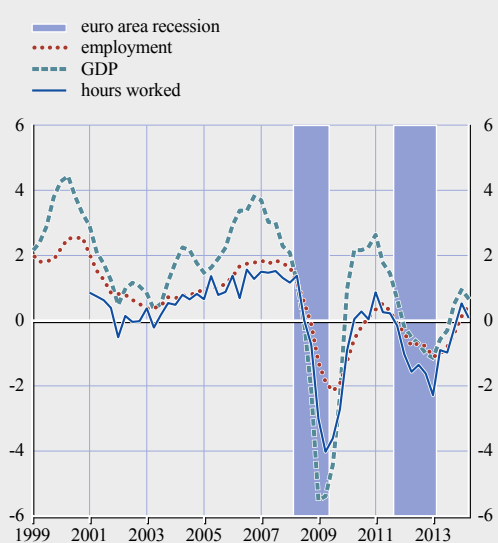
Sources: Eurostat and ESCB calculations.
Note: Blue bars indicate euro area recessions during the crisis, defined in terms of negative quarter-on-quarter GDP growth.

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4   Prepared by Valerie Jarvis, Marek Micuch and Mathilde Périnet.
5   See also the 2012 Structural Issues Report entitled "Euro area labour markets and the crisis," ECB, September 2012 (Occasional Paper no. 138) or the summary article of the same name in the ECB Monthly Bulletin, October 2012.

took place through a strong moderation in hours worked per person (Chart 4). Partly, this reflected the typical pattern seen at the start of declines in activity, when firms which are uncertain as to how long a downturn will last prefer to "hoard" labour so as not to face re-hiring difficulties once activity improves. However, over the course of the Great Recession, it also reflected the use of public sector financed "short time working" and "partial employment" schemes, adopted by a number of euro area countries as part of their national "crisis" measures during the Great Recession. Although operating for only a short period in some countries, at their peak such schemes accounted for around 4% of employees in Germany and Italy.[6] Partly as a consequence of these measures, potential increases in unemployment were initially avoided in these countries, despite above-average declines in GDP.[7] In the aftermath of the Great Recession, unemployment increased by 1.9pp in Italy (to 9.3%) and 0.3pp in Germany (to 7.9%). Over the same period in Spain, GDP fell by slightly less than the euro area average (by 5.0%), yet unemployment soared, reaching almost 20.0% by the end of 2009, and subsequently rising to a peak of 26.3% in the first quarter of 2013. This was partly as a consequence of the ongoing downsizing of a hitherto overheated construction sector, which had been particularly hard hit by the credit squeeze (see also Section 2.2), and partly reflecting an abrupt reversal in the large number of temporary contracts, which had been used extensively (accounting, at their peak, for around one third of total contracts) in that country since the 1990s.

Over the Great Recession, the euro area unemployment rate rose from its record low of 7.3% in the first quarter of 2008 (the quarter preceding the crisis) to 10.2% by the second quarter of 2010 – effectively wiping out the cumulated improvements over the entire course of EMU (see again Chart 2). However, following a brief stabilisation in quarterly employment losses (and even signs of a slight recovery in employment growth from the fourth quarter of 2010), the unfolding market stress which marked the onset of the sovereign debt crises led the euro area back into recession – the "double dip" – from the final quarter of 2011.

Chart 5 Country-based unemployment reactions to the crisis

(unemployment rate as a percentage of the labour force; percentage point increases)

x-axis: unemployment rate (2008Q1)
y-axis: change in the unemployment rate between 2008Q1 and 2014Q2, in percentage point
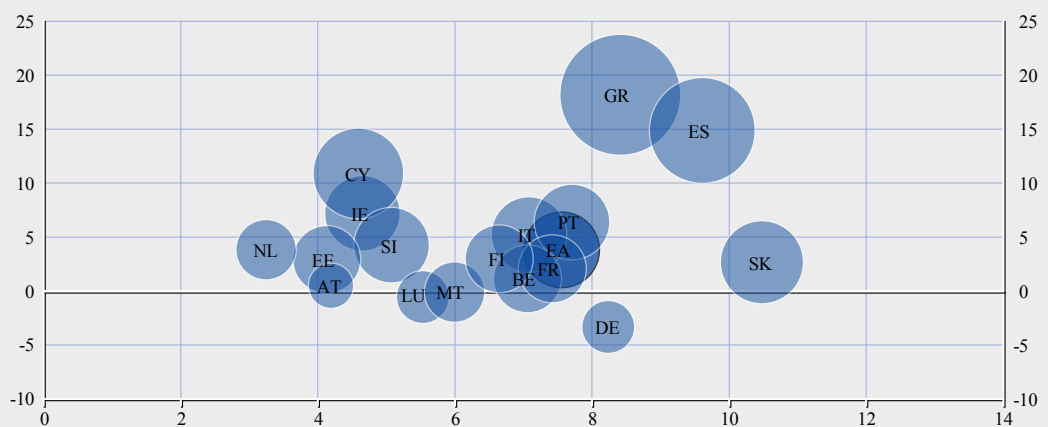
Sources: Eurostat and ESCB calculations.
Notes: The size of the bubbles is proportional to the unemployment rate in 2014Q2. Data for Luxembourg begin in 2008Q3. Latvia not shown as it is obscured by the euro area aggregate.

6   See IMF, World Economic outlook, Chapter 3, "Unemployment Dynamics during Recessions and Recoveries: Okun's Law and Beyond", 2010.
7   The peak-to-trough fall in GDP was 6.8% in Germany and 7.2% in Italy.

Chart 6 Unemployment elasticities over the crisis and its two phases* by country

(percentage point change in unemployment rate with respect to peak-to-trough fall in GDP)

■ crisis period (total)
▓ crisis period (first phase)
▬ crisis period (second phase)
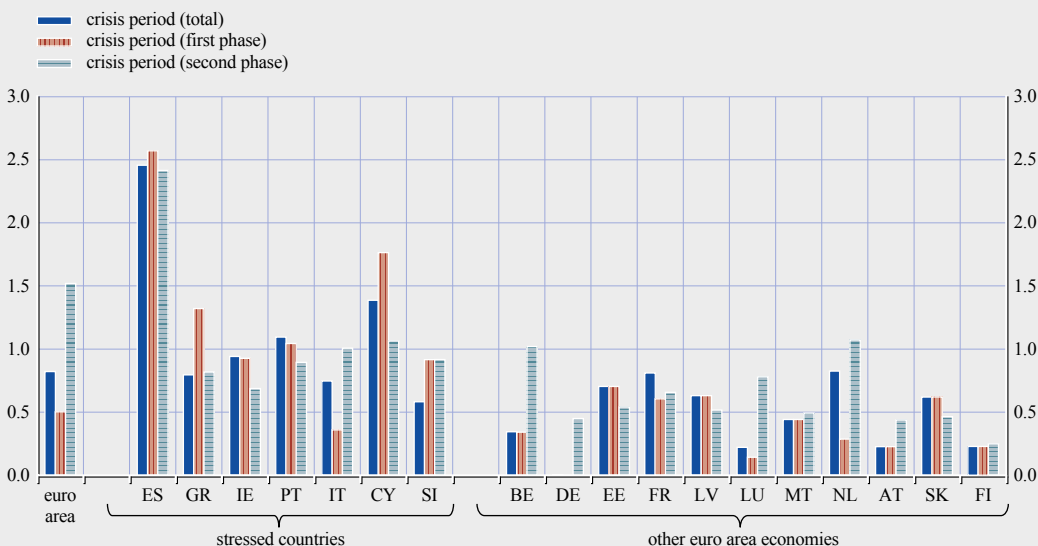
Sources: Eurostat and ESCB calculations.
Notes: * Phases relate to (i) the Great Recession and its aftermath (roughly 2008Q1-2010Q2, though country-specific peaks and troughs may differ); (ii) the period surrounding the second euro area recession (2011Q4-2013Q1). Since labour market variables typically react with some lag to GDP developments, peak-to-trough developments may not coincide. Peak-totrough/ trough-to-peak periods vary between variables so as to capture lagged effects. Where no "local peak" appears – due to a country being continually in recession since the onset of the crisis – the interim value is computed to 2010Q2.

Chart 7 Employment elasticities over the crisis and its two phases [1] by country (peak-to-trough percentage declines)

(peak-to-trough percentage declines)

■ crisis period (total)
▓ crisis period (first phase)
▬ crisis period (second phase)
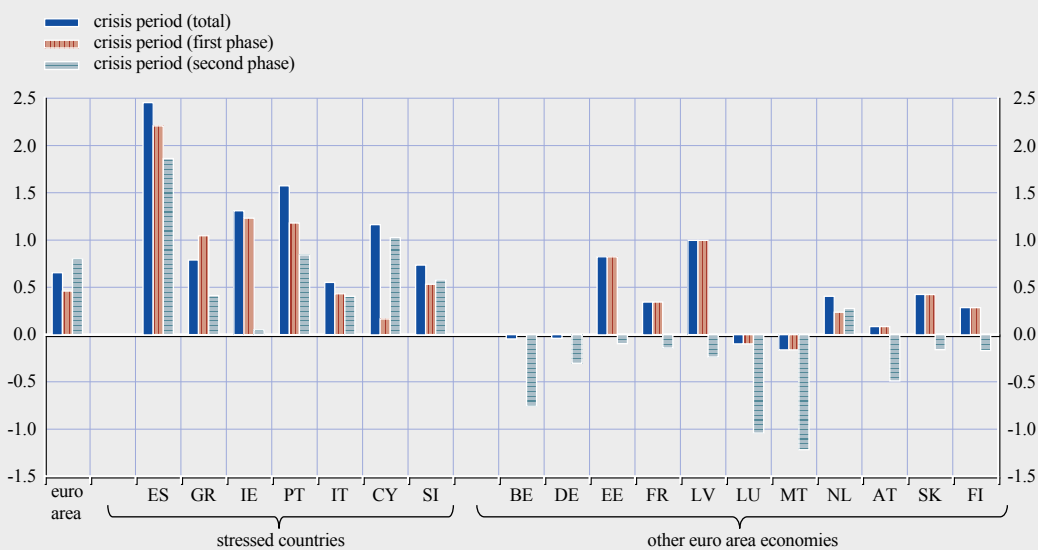
Sources: Eurostat and ESCB calculations.
Notes: 1) Phases relate to (i) the Great Recession and its aftermath (roughly 2008Q1-2010Q2, though country-specific peaks and troughs may differ); (ii)the period surrounding the second euro area recession (2011Q4-2013Q1). Since labour market variables typically react with some lag to GDP developments, peak-to-trough developments may not coincide. Peak-totrough/ trough-to-peak periods vary between variables so as to capture lagged effects. Where no "local peak" appears – due to a country being continually in recession since the onset of the crisis – the interim value is computed to 2010Q2.

By the end of this second euro area recession, a further 1.8 million jobs had been lost, raising the unemployment rate to 12.0% by the middle of 2013 and representing almost 19 million unemployed persons across the euro area. As Chart 5 demonstrates, however, the overall increases in unemployment were far from proportionally distributed across the countries. As a consequence of the onset of the Great Recession, all countries saw some degradation in their unemployment rates, with the worst national increases ranging from only 0.2 pp in Germany (albeit with some lag) to 9.8 pp in Latvia.

Six years on, the outcome is more marked still. By the second quarter of 2014, the euro area unemployment rate had increased by almost 4 percentage points, the increases were typically much stronger in the stressed economies. At the extremes, unemployment rates increased over the crisis by 18pp in Greece and 15 pp in Spain, translating to the levels of 27% in Greece and 25% in Spain – more than a quarter of their respective labour forces. The stressed countries stand out as having seen particularly large increases – or particularly high unemployment rates. This result holds regardless of whether one looks at unemployment rises or employment losses, and even allowing for differences in the magnitudes of the GDP shocks encountered (see Chart 6 and Chart 7 showing country-based unemployment and employment elasticities with respect to peak-to-trough declines in GDP).

2.2 THE CONCENTRATION OF EMPLOYMENT LOSSES

The two recessions which make up the crisis resulted in some marked differences in labour market reactions. While the first recession affected virtually all euro area economies to a certain extent, the job losses of the second recession were heavily concentrated in the stressed economies. In these stressed economies, employment declined at a similar rate in both the first and second recessions, while it remained largely unaffected in other economies over the "double dip" (Chart 8). The first

Chart 8 Euro area employment evolution: stressed countries and other countries

(index – 2008Q1=100)

- euro area recession
- euro area
- stressed countries
- other countries
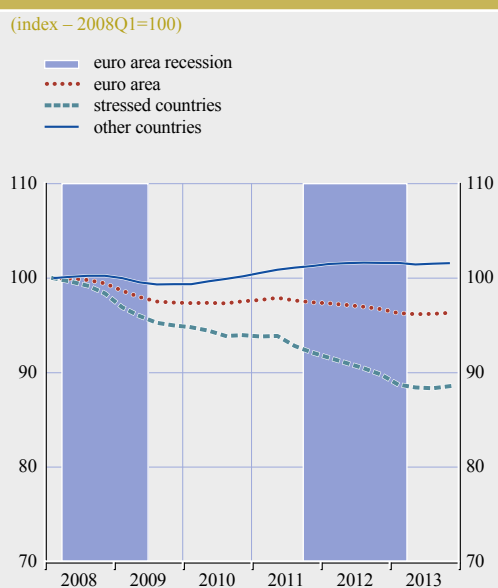
Sources: Eurostat and ESCB calculations.

Chart 9 Euro area employment evolution by sector

(index – 2008Q1=100)

- euro area recession
- euro area total
- industry
- services
- construction
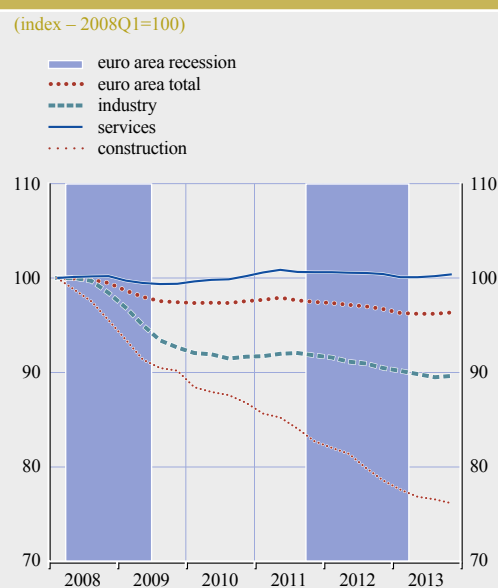
Sources: Eurostat and ESCB calculations.

Chart 10 Euro area employment evolution by sector: stressed vs other countries

(index – 2008Q1=100)

——— euro area
· · · · · stressed
- - - others

a) Manufacturing

b) Construction

c) Market services

d) Non-market services

Sources: Eurostat and ESCB calculations.

recession was also marked by a strong sectoral dimension (Chart 9), with a high concentration of (both GDP and) employment losses resulting from marked contractions in the manufacturing and, particularly, construction sectors.

Employment losses at country level tended to reflect differences in sectoral specialisation, with all countries initially hit to a relatively similar degree by a strong downturn in global trade, impacting employment in manufacturing and market services and affecting all economies more or less proportionally. While the bursting of the construction bubble hit some countries particularly hard, this in part reflected an overreliance on the sector – and often some considerable overheating – in these economies in advance of the crisis (Chart 10).[8]

8   For country-level adjustments, please see Annex A.

2.2.1 EMPLOYMENT DEVELOPMENTS: DISAGGREGATED RESULTS[9]

Over the course of the Great Recession, employment losses had been disproportionately concentrated in the industrial, construction and trade and transport sectors.[10] During the second recession, however, a new trend emerged. Employment losses were more proportionately spread across the various economic sectors, including the public sector. Indeed, whereas non-market services – comprising public administration, predominantly publicly provided activities (such as education and healthcare), as well as services to households – continued to contribute positively to employment developments during the first phase of the crisis in all countries (except Greece, Latvia, and to a minor extent, Italy), fiscal consolidation in many of the stressed economies led to a strong downturn in public sector employment across a number of the economies under severe market stress (Chart 11).

Chart 11 Employment reaction to the crisis by sector during both phases of the crisis

(percentage changes and sectoral percentage point contributions)

- finance, insurance and real estate
- non-market services
- ICT services
- construction
- agriculture
- other services
- professional, business and support services
- trade, transport, accommodation and food services
- industry excluding construction
- ♦ total economy

a) 2008Q2 – 2011Q2
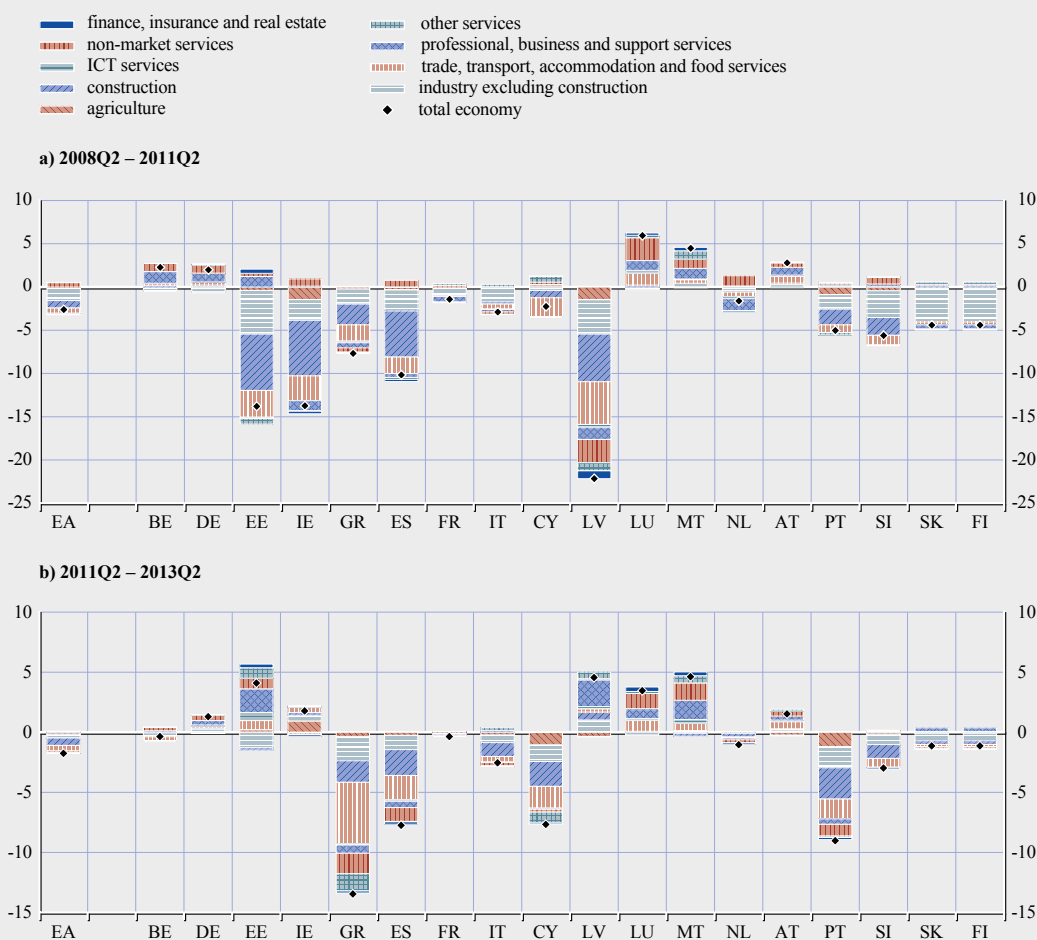
b) 2011Q2 – 2013Q2

Sources: Eurostat and ESCB calculations.
Notes: Employment growth from peak to through. Peak-to-trough periods are country specific and selected within 2008Q2-2011Q2 for the first phase of the crisis and within 2011Q2-2013Q2 for the second phase.

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9 Prepared by Mathilde Périnet and Marek Micuch.
10 For an analysis of how differential movements in the components of GDP affected unemployment developments during the Great Recession, see Anderton, Aranki, Bonthuis and Jarvis (2014) "Disaggregating Okun's law: decomposing the impact of the expenditure components of GDP on unemployment", ECB Working Paper, No. 1747.

EU Labour Force Survey data allow further breakdowns of employment and unemployment developments by education level, professional status and types of contract, age group and unemployment duration (Chart 12).[11] The first and the second phases of the crisis reveal similar patterns in terms of employment developments across gender and educational levels. Males were in general hit harder by the crisis than women, probably because males are more active in the sectors

Chart 12 Employment developments in the euro area: disaggregated results

Employment breakdown by gender

1 EA	6 BE	11 SK	16 PT
2 LU	7 FR	12 IT	17 ES
3 MT	8 CY	13 EE	18 LV
4 DE	9 NL	14 SI	19 GR
5 AT	10 FI	15 IE	

Employment breakdown by age group

1 EA	6 BE	11 SK	16 PT
2 LU	7 FR	12 IT	17 LV
3 MT	8 CY	13 EE	18 ES
4 DE	9 NL	14 SI	19 GR
5 AT	10 FI	15 IE	
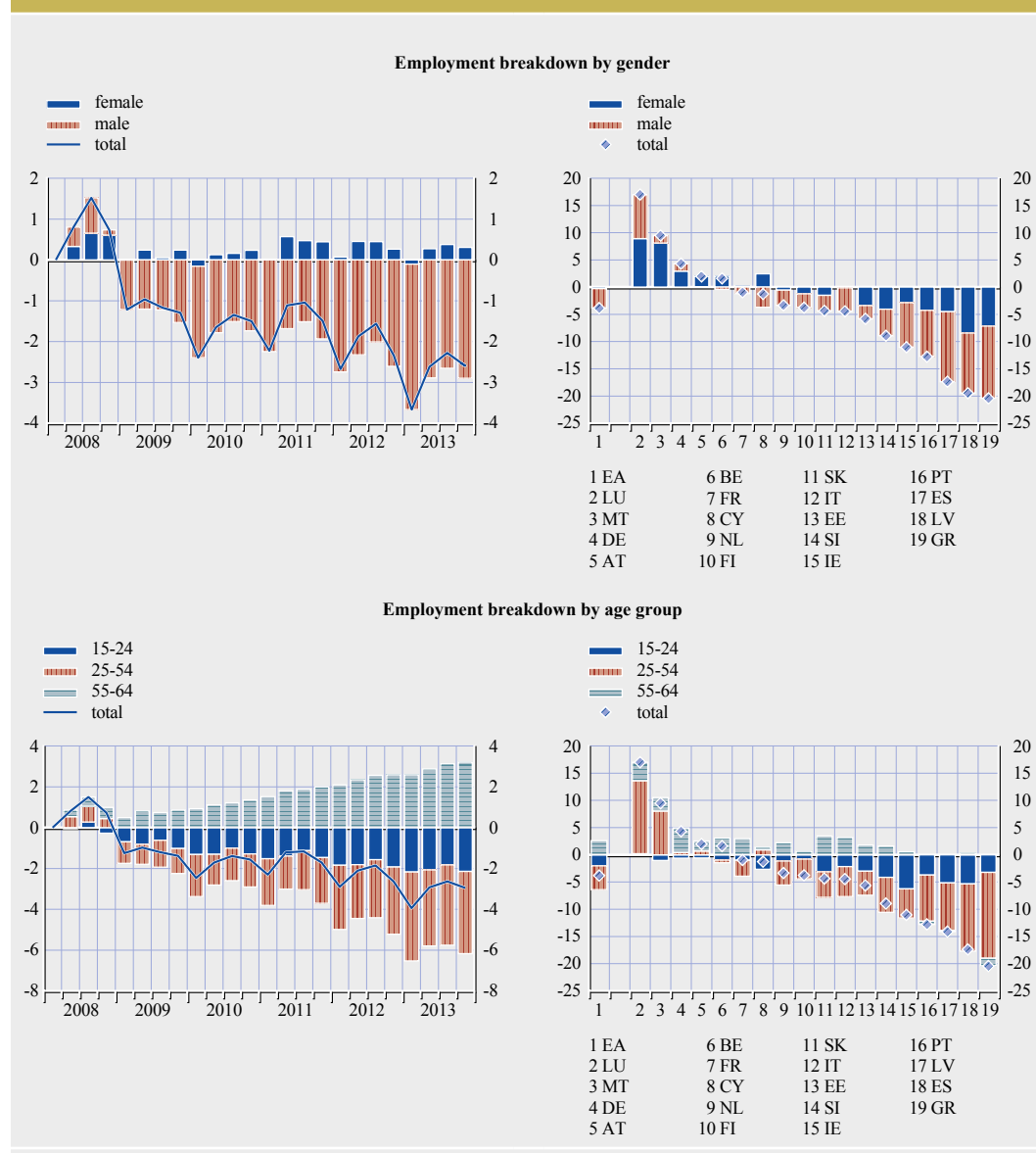
11 Labour force survey data for Luxembourg have to be interpreted with caution for several reasons. First, LFS data do not include cross-border workers who account for more than 40% of total employment. Cross-border workers were particularly hit by the crisis, and this is the only employment component which has experienced a decrease during the crisis. As a result, employment growth may be overestimated during this period. Secondly, (quarterly) LFS data for Luxembourg are highly volatile (because of the small sample size) and less reliable. Finally, a structural break in 2009 introduced a shift in the series level and thus an upward bias.

Employment breakdown by professional status and type of contract

self-employed
temporary employees
permanent employees
total

self-employed
temporary employees
permanent employees
total

1 EA	6 BE	11 SK	16 PT
2 LU	7 FR	12 IT	17 ES
3 MT	8 CY	13 EE	18 LV
4 DE	9 NL	14 SI	19 GR
5 AT	10 FI	15 IE	
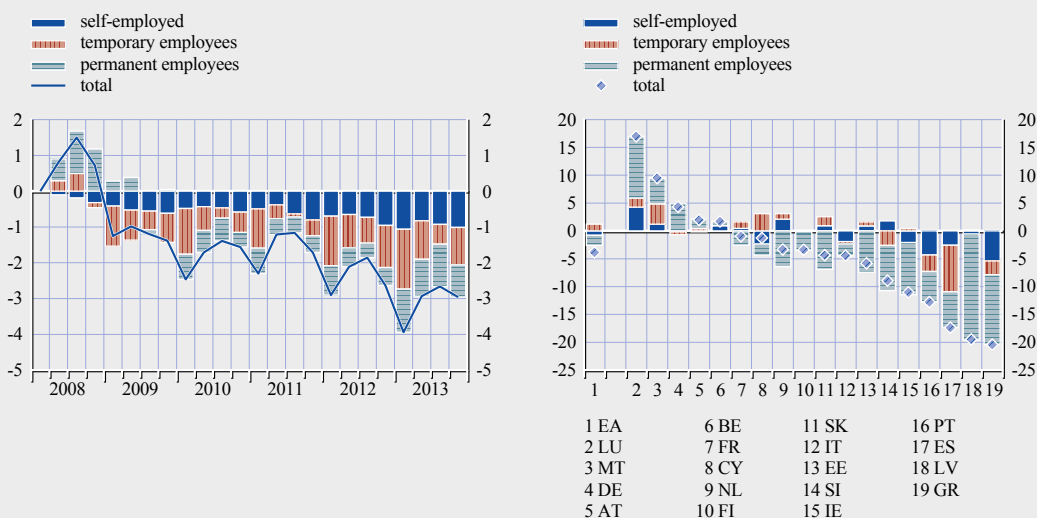
Employment breakdown by educational level

low
medium
high
total

low
medium
high
total

1 EA	6 BE	11 SK	16 PT
2 LU	7 FR	12 IT	17 LV
3 MT	8 CY	13 EE	18 ES
4 DE	9 NL	14 SI	19 GR
5 AT	10 FI	15 IE	
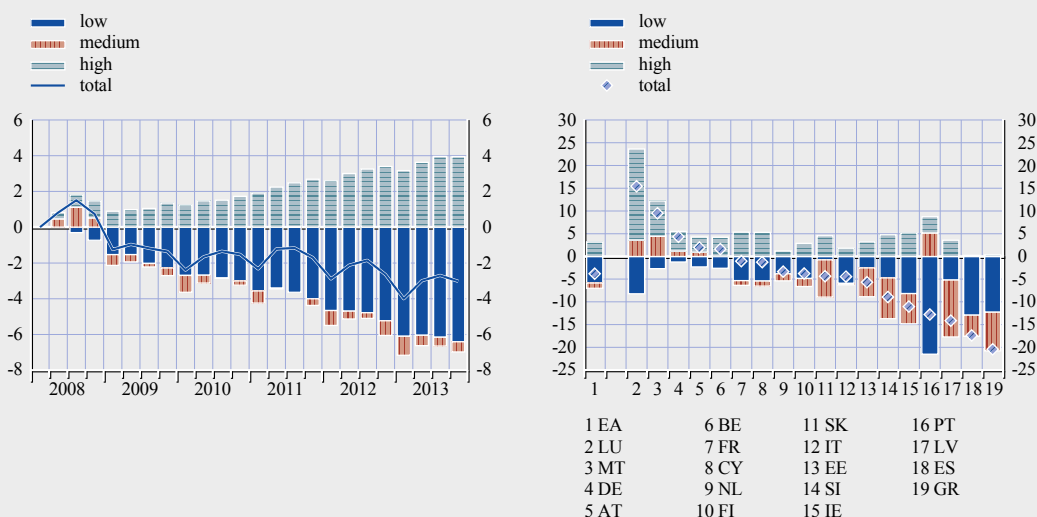
Sources: Eurostat and ESCB calculations.
Notes: Charts on the left show the euro area aggregate (cumulative percentage changes in employment) and charts on the right represent euro area countries (percentage changes in employment between 2013Q1-Q4 with respect to 2008Q1-Q4 and contributions). Countries are ordered according to their change in employment over the period.

that were most sensitive to the crisis. Meanwhile, low-skilled workers have been severely hit in both phases, whereas the employment of high-skilled workers has kept increasing. Medium-skilled workers – i.e. those with completed secondary level education or equivalent trade certification – benefited to a greater extent from the short recovery interval (between mid-2009 and late 2011), whereas the low-skilled saw ongoing employment losses. This divergent evolution of employment by skill level appears to have been particularly acute in the stressed countries, where job losses among the low-skilled accounted for a substantial part of the decrease in employment.

Disaggregating employment reactions to the two phases of the crisis by professional status and contract type also reveals similar patterns over both phases of the crisis – albeit, once again, with a stronger reaction visible in the stressed economies. As would be expected in response to a shock, the brunt of the adjustment seems to have fallen primarily on workers with fixed-term contracts. These were the first ones to lose their jobs, but also during the short period of recovery, the first to benefit, as firms – uncertain about either the magnitude or pace of the recovery – began to re-hire workers on temporary contracts. Again, during the second period of the crisis, the adjustment was initially made through temporary workers and then permanent ones. While the second phase of the crisis in many ways reinforced the trends first observed in response to the Great Recession, the impact tended to be longer-lived and more strongly geographically-concentrated over the second phase.

The breakdown of employment developments by age presents again very similar results in both phases. Older workers (55-64 years) appear to be less affected whereas prime-age workers (25-54 years) were severely hit in both phases. Young workers have also been negatively affected during both phases of the crisis, although slightly less during the second phase. In part, this may reflect the simpler "outside option" of younger workers, who can more easily stay in education in times of weak labour demand. Euro area countries seem to have similar patterns. Indeed, in countries where an overall decrease in employment was observed, roughly two thirds of the decrease can be attributed to prime-age workers and one third to younger workers.

2.2.2 UNEMPLOYMENT DEVELOPMENTS ACROSS THE TWO PHASES OF THE CRISIS[12]

As outlined above, unemployment developments reflect considerable cross-country heterogeneity, with a heavy concentration of job losses in the stressed economies, particularly since the onset of the second phase of the crisis. While all countries saw increases (at least, initially) in their unemployment rates as a consequence of the Great Recession, during the second phase of the crisis, four countries – Estonia, Germany, Ireland and Latvia – saw their unemployment rates fall (Chart 13). In Germany, these declines are likely to reflect ongoing improvements to labour market flexibility as a consequence of comprehensive reforms (Hartz I-IV) introduced in advance of the crisis and the longer-term

Chart 13 Evolution of the unemployment rate in the euro area

(percentage of the labour force)
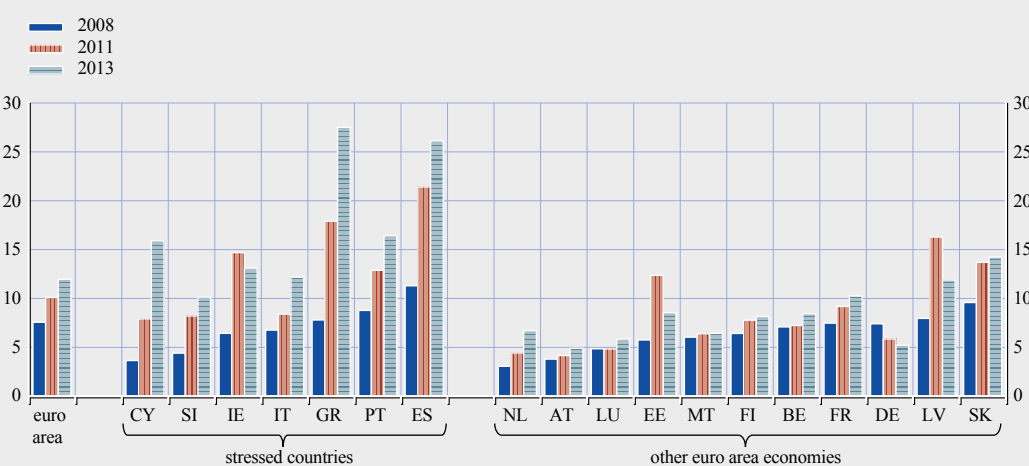
Note: Within groups, countries are ordered according to their unemployment rate level in 2008.

12 Prepared by Mathilde Périnet and Marek Micuch.

features of German labour market institutions.[13] In Estonia, Ireland and Latvia, they reflect swift and comprehensive efforts introduced to counter the effects of the crisis, and an early start of the adjustment process.

A salient feature of the crisis has been the strong gender divide in labour market developments, with the rise in unemployment lower among women compared to men (Chart 14) in particular during the first phase of the crisis. In part, this reflects the strong sectoral concentration of job losses in sectors where men are typically heavily represented (such as construction, transport, etc.). In terms of age, all groups registered a rise in unemployment rates, but young workers were particularly affected (see next section and Box 1).

Chart 14 Unemployment rate for males and females in the euro area

(in percent of the respective labour force)

- euro area recessions
- euro area-male
- euro area-female
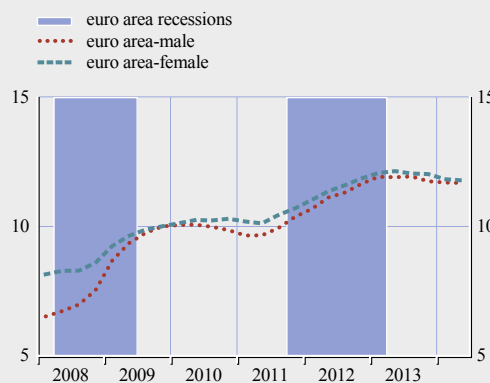
Source: Eurostat.

2.3 THE RISE IN YOUTH UNEMPLOYMENT [14]

This part focuses on youth unemployment which has increased considerably over the course of the crisis. With the exception of higher-skilled younger workers, whose employment has been somewhat more resilient particularly during the second part of the crisis, young people have been severely affected by the shocks to activity, partly due to the high preponderance of temporary contracts among this group of workers. Similar to the broader working population, the increase in long-term unemployment appears to be a rising issue among youths. However, young people who are not in education, employment or training (NEET) nevertheless remain attached to the labour market (as the rise in the NEET rate during the crisis is explained by a rise in the number of unemployed rather than by an increase in inactivity). Meanwhile, an analysis of microeconomic

Chart 15 Unemployment rates and unemployment ratios for youth (15-24) in 2013

(in percent of the youth labour force; in percent of the youth population)

- unemployment rate
- unemployment ratio
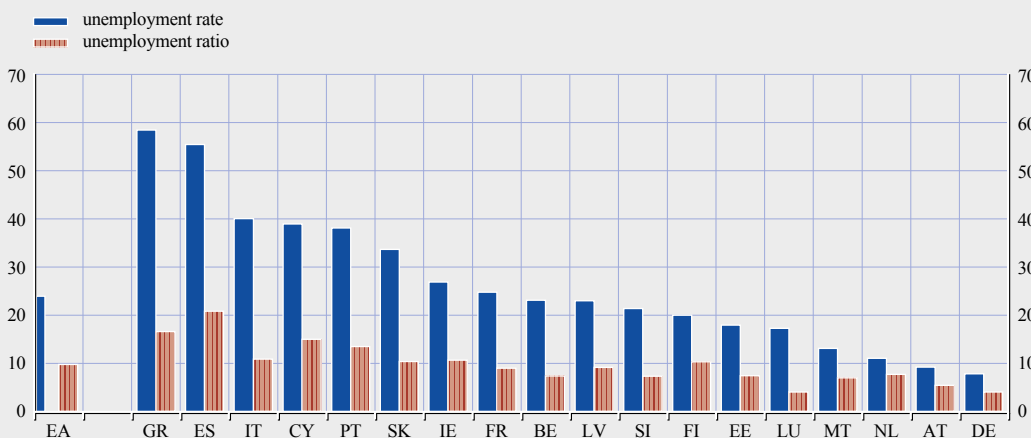
Sources: Eurostat and LFS.

13 See, for instance, Dustmann, Fitzenberger, Schoberg and Splitz-Oener (2014).
14 Prepared by Mathilde Périnet.

data (Box 1) suggests that the strong increases in participation and employment rates of older workers during the crisis did not result in a substitution away from younger workers (as suggested by the "lump of labour fallacy").

Youth labour markets – usually defined as comprising young people from 15-24 years – merge two distinct age categories with very different characteristics: the first (15-19 years old) include a large number who are still at school or in training; the second (20-24 years old) are less likely to be still studying and more likely to have entered the labour market. Consequently, the first sub-group usually has a lower participation rate (19.9% in 2012 in the euro area) than the second sub-group (64.2%).[15] Typically, the under 25s have a substantially lower participation rate than "prime age" workers (41.7% for youths compared to 78.1% for prime age workers for the euro area in 2012). This makes it hard to compare unemployment rates across age groups since the youth unemployment rate tends to be biased upwards due to the low participation rate for youths. An alternative and complementary measure to the youth unemployment rate is the unemployment ratio, computed as the unemployed as a share of the total population of this cohort.

Although the unemployment ratio gives a less striking picture of slack in the youth labour market (see Chart 15), youth unemployment is an important issue as it substantially increased over the crisis, jumping from 15.4% in 2008 to 24% in 2013 (see Chart 16). Even though youth unemployment rates are typically higher than total unemployment rates, the ratio of youth over the total unemployment rate only increased in the stressed countries, whereas it remained stable in the euro area as a whole and in the non-stressed countries. This strong rise in youth unemployment, and particularly the divergence between youth and total unemployment rates, raises the question of whether older workers crowd out younger ones (as suggested by the "lump of labour" argument, which is investigated in Box 1).[16]

During downturns, firms tend to retain highly skilled workers and to lay off the lower-skilled workforce. For the youth cohort, all skill categories of workers have been severely hit by the crisis. However, in both phases of the crisis, and particularly during the second recession, higher-skilled young workers have been somewhat more resilient to the shock (Chart 17).

Chart 16 Total unemployment rate and youth unemployment rate in the euro area, stressed and other countries

(in percent of the youth labour force)

- euro area – total
- stressed countries – youth
- euro area – youth
- other countries – youth
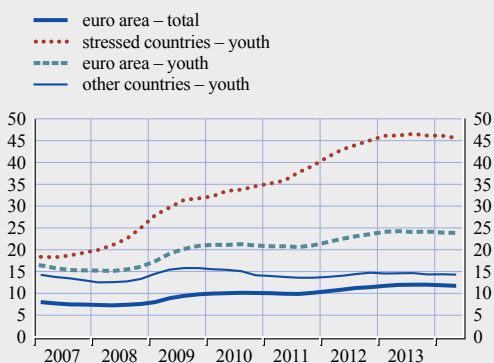
Sources: Eurostat and LFS.

Chart 17 Employment development in the euro area, breakdown by educational attainment of the young cohort (20-24)

(annual percentage change)

- low
- medium
- high
- total
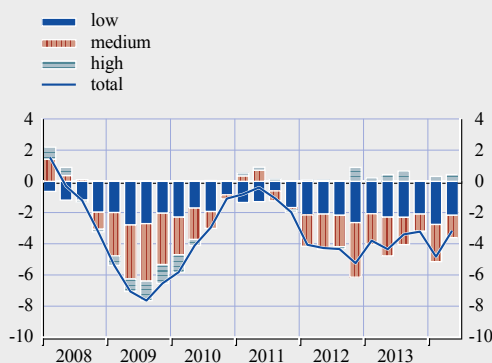
Sources: Eurostat and ESCB calculations

15 The differential is similar in boom times (i.e. 23.7% against 64.2% in 2007).
16 Note that Box 1 looks at slightly different age groups (ie, primarily those aged between 25-34, but also 20-24 years old).

(annual percentage change)

- temporary employees
- permanent employees
- total

Sources: Eurostat and ESCB calculations.

The very rapid response of youth employment to the crisis can be partly explained by their high representation among temporary workers, who are more vulnerable to cyclicality than permanent workers. Both phases of the crisis seem to confirm this pattern: the fall in the number of employees regardless of the age cohort has been initially explained by a fall in the number of temporary workers and was then gradually followed by a fall in the number of permanent jobs (Chart 18). Interestingly, youth employment continued to decline despite the period of economic upturn starting from mid-2009 (during which employers' uncertainty about the potential future recovery could have pushed hires with temporary contracts up).

Moreover, common to many euro area labour markets is the growing trend of long-term unemployment among the young unemployed (Chart 19) rising from around 8.0pp of the youth unemployment rate in advance of the crisis in 2007, to 12.9pp in 2013. In other words, around 54% of unemployed youths in 2013 had been looking for a job for more than one year. This development in long-term unemployment among youths should be monitored carefully since long unemployment spells can lead to scarring[17] effects thereby increasing the risk of structural unemployment

Chart 19 Youth unemployment rate, contributions by unemployment duration

(in percent of the youth labour force)

- 6 m or less
- 6-11 m
- 12-23 m
- 2 + years
- total
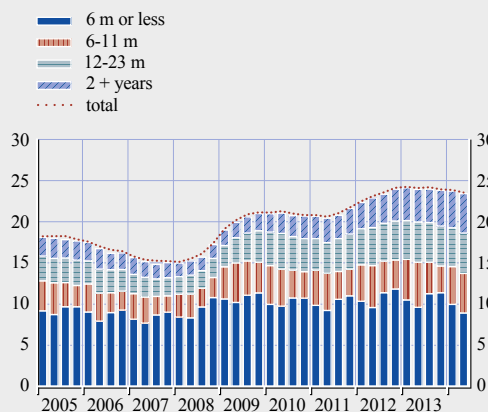
Sources: Eurostat and ESCB calculations.

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17 See W. Arulampalam (2011), "Is unemployment really scarring? Effects of Unemployment experience on wages," *Economic Journal*, who finds "permanent scars" in terms of both wage penalties and re-employment probabilities from protracted unemployment spells early in careers.

Chart 20 Share of youths (15-24) neither in employment nor in education or training (NEET), 2007 and 2013 compared

(in percent of the youth population)

Sources: Eurostat and ESCB calculations.
Notes: Left-hand bars represent 2007 averages and right-hand bars 2013 averages.

for these individuals. The large drop in youth employment and the large rise in (long-term) unemployment warrant a further examination of what those not in work are doing. In particular, the share of youths neither in employment and not in education and training, the so-called NEETS, covers those who are the most likely to be discouraged workers.

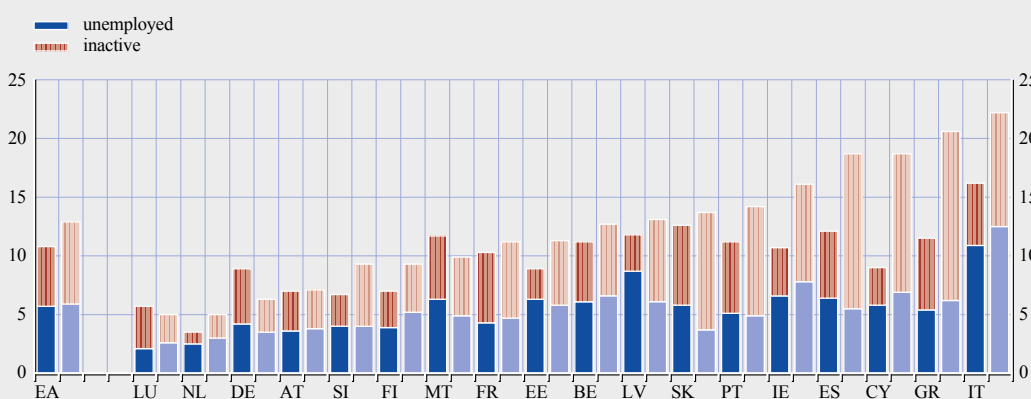The share of NEETs in the youth cohort (15-24) increased in all euro area countries during the crisis, with the exceptions of Germany, Malta and Austria. However, for most of these countries, the large increase in the NEET rate is mainly explained by a rise in the number of unemployed rather than by the number of inactive, which remained fairly stable in most euro area countries (see Chart 20). This means that youths who exited from employment during the crisis, without starting training, mainly became unemployed rather than inactive. This is a somewhat positive development since it suggests that discouragement effects are not so strong among youths and they remain attached to the labour market and keep looking for jobs.

Box 1

THE LUMP OF LABOUR FALLACY: A REASSESMENT FOR THE EURO AREA[1]

Against the background of reforms in many euro area countries aimed at raising the retirement age, assessing whether older workers may displace younger people (also called the "lump of labour" argument) is really a fallacy in Europe becomes increasingly relevant. The fear that the increase in labour force participation of older workers may displace younger people, depriving youngsters of jobs, is widely held. As shown in OECD (2011)[2] on the basis of Eurobarometer data, this view is held especially by women, older people, the less educated, and among citizens from some low-employment countries such as Hungary, Italy and Slovak Republic.

1 Prepared by Pietro Tommasino and Roberta Zizza.
2 OECD (2011), "Helping Older Workers Find and Retain Jobs", *Pensions at a Glance 2011: Retirement-income Systems in OECD and G20 Countries*, OECD Publishing.

Typically, cross-country (Boldrin et al., 1999; OECD, 2011)[3] and time series (Gruber and Wise, 2010)[4] analyses do not find empirical support for the lump-of-labour argument. However, these papers fail to address some relevant empirical issues such as reverse causality and possible omitted variables. The current contribution seeks to solve some of these econometric problems by using data on individuals from EU Labour Force Surveys. This box examines the relationship between the employment and unemployment probabilities[5] for younger workers (aged between 25 and 34[6]) and the *aggregate* employment rate for senior workers (those aged between 55 and 64; AERSW, hereafter) *in the same local labour market*[7].

These microeconomic data allow better controls for the econometric analysis to account for possible changes in the composition of the workforce and to avoid reverse causality issues (e.g. while youth employment can indeed affect the employment status of older workers, the latter is exogenous with respect to the behaviour of an individual). Moreover, as both the employment of youths and older workers could simultaneously react to shifts in labour demand at the local level, the aggregate employment rate of prime age persons (between 40 and 49; AER40-49, hereafter) is considered as a regressor. As the dataset includes several euro area countries[8] across two discrete periods between 2006 and 2012[9], besides controlling for standard individual characteristics, account is also taken of the possible influences of time-invariant region and country-specific characteristics (including region and country dummies) and short-run business-cycle fluctuations (including year dummies); interactions between country and year dummies are also included to account for cross-country differences in business cycles. Hence the following is estimated:

$$y_{i,c,n,t} = \alpha + \beta AERSW_{n,t} + \gamma AER40\text{-}49_{n,t} + \delta X_{i,t} + \mu_c + \mu_n + \mu_t + \mu_c * \mu_t + e_{i,c,n,t}$$

where y is a dummy equal to 1 if the individual (younger worker) is alternatively employed or unemployed and 0 elsewhere; μ's indicate fixed effects (i is the individual, c is the country, n is the local labour market, t is the year), X is a vector of individual characteristics. The coefficient of interest is β.

Pooled cross-country time-series regressions, estimated over about 1.9 million observations, show the absence of a trade-off between the aggregate employment rate among senior workers and the probability of younger workers holding a job (or of being unemployed). Splitting the sample according to different demographic groups (e.g. by gender or education) or into pre-crisis and the crisis periods, still offers no evidence in support of the lump of labour hypothesis. Instead, for males the results suggest a weak complementarity between the employment status of the two age groups (Table A).

The specification can be further elaborated to assess whether the probability of younger workers entering or exiting from employment depends on *changes* in AERSW. Interestingly, these results

3 M. Boldrin, J.J. Dolado, J.F. Jimeno and F. Peracchi (1999) "The future of pensions in Europe", *Economic Policy*, CEPR & CES & MSH, vol. 14(29), pages 287-320.
4 J. Gruber and D.A. Wise (2010) "The relationship to youth employment", NBER Conference Report.
5 This box shows results for linear probability models. Probit regressions (not shown) provide similar results.
6 This age limit has been considered to allow for the completion of a tertiary level of education. Nevertheless, the results of the analysis are qualitatively the same for 15-24 year olds (i.e. the traditional age definition of younger workers).
7 In the absence of either provinces or conceptualisation of the territory, such as the Italian labour market systems, regions (i.e. NUTS2 level) are taken to proxy for local labour markets.
8 The analysis is limited to Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, namely the countries who joined the euro area prior to 2006. Ireland is excluded from the estimates on entry and exit due to the lack of information on the labour market condition at time t-1.
9 Two sub-periods are considered: 2006-2008 (pre-crisis) and 2009-2012 (crisis).

Table

DEPENDENT VARIABLE	Coefficient of the Aggregate Employment Rate of Senior workers (AERSW)						
	Full sample	Man	Woman	Low-skilled	High-skilled	2006-2008(a)	2009-2012(a)
Probability of							
being employed for a person aged between 25 and 34 years	0.00976	0.0906*	-0.06	-0.0112	0.0474	0.0356	-0.0219
being unemployed for a person aged between 25 and 34 years	-0.0446	-0.0759*	-0.0177	-0.0401	-0.0422	-0.0361	-0.0321
being employed for a person aged between 20 and 24 years	0.017	0.0495	-0.00823	0.0232	0.0608	-0.167	0.0549
being unemployed for a person aged between 20 and 24 years	-0.0751*	-0.0581	-0.0887	-0.0783	-0.0333	0.110	-0.117*

DEPENDENT VARIABLE	Coefficient of the change in AERSW						
	Full sample	Man	Woman	Low-skilled	High-skilled	2006-2008(a)	2009-2012(a)
entry in the labour market for a person aged between 25 and 34 years	0.0593**	0.0634*	0.0514	0.0404	0.103**	0.0884**	0.0273
exit from the labour market for a person aged between 25 and 34 years	-0.0138	-0.0106	-0.0172	-0.00172	-0.0354**	-0.0579***	0.0209
entry in the labour market for a person aged between 20 and 24 years	0.0393	-0.00568	0.0813	0.0448	0.0118	-0.0136	0.109**
exit from the labour market for a person aged between 20 and 24 years	0.0258	0.0236	0.0287	0.0274	0.0157	0.0505	9.74E-05

Source: Eurostat (EU LFS data).
Notes: Besides AERSW, the other regressors are sex, age, education AER40-49 (change in AER40-49 for entry/exit), constant, fixed effects: region, year, country, year*country. (a) all kinds of workers are included, irrespective of gender and skill levels. [*, **, *** indicates statistically significant at 10%, 5%, 1% level respectively].

suggest that an *increase* in the employment rate of senior workers has a beneficial effect on the probability of acquiring a job for males, for the high-skilled and, in the pre-crisis sample, for all workers; similar results hold also for a more restrictive definition of young people (those aged between 20 and 24 years; table A).

2.4 UNDEREMPLOYMENT AND DISCOURAGED WORKERS[18]

This section assesses the extent to which the standard unemployment rate may underestimate the degree of slack in euro area labour markets by taking into account underemployment and discouragement effects. Underemployment (i.e. such as involuntary part-time workers who would like to work more hours) increased in virtually all euro area countries during the crisis, but this increase was more pronounced in the stressed countries. Meanwhile, the share of discouraged workers (i.e. those who give up job hunting) increased in the stressed countries, while it stagnated in the other euro area economies. This implies that in the stressed countries, labour market conditions deteriorated even more, particularly for male workers, and slack might be even larger than suggested by the rise in the actual unemployment rate. The implications going forward are that increases in labour demand may at first have rather subdued impacts on employment and unemployment as higher demand may initially tend to be translated into increases in hours worked and higher labour market participation.

In addition to the strong increases observed in unemployment rates over the crisis, it is likely that considerable underemployment was also present. This section first assesses the degree of underemployment among those currently working part-time, but who would like to work full

18 Prepared by Béla Szörfi.

time, followed by an assessment of the degree to which lacklustre labour market prospects have led to labour force discouragement resulting in some exiting from the labour force (at least until employment prospects improve).

2.4.1 UNDEREMPLOYMENT

The share of part-time workers has been rising in the euro area in past decades.[19] This is partly a structural phenomenon, reflecting increased participation effects (especially among women) over the course of EMU and the secular decline in average working hours among both men and women. However, a proportion of part-time workers are underemployed, meaning that they are willing to work more hours. These are involuntary "underemployed" workers, who would readily work more if labour demand was higher.

Data from the EU Labour Force Survey suggest that, at the aggregate euro area level, part-time employment increased from 17.9% of the labour force in 2008 to 19.5% in 2013. Although part-time employment rose in all countries, there are clear differences between the euro area countries regarding the extent to which this reflects changes in involuntary underemployment. In the euro area, the ratio of involuntary underemployed part-timers in the labour force rose by 0.9 percentage points between 2008 and 2013. The same ratio increased considerably more in the stressed countries along with a marked decline in the share of voluntary part-timers. At the same time, with the exception of Belgium and France, involuntary underemployment in the other euro area countries increased by less. In Germany, both the unemployment rate and the ratio of underemployed part-timers decreased (Chart 21).

The share of part-time workers increased more among males than females (despite the fact that women account for three quarters of all part-time workers). In the stressed countries, among

Chart 21 Change in the share of part-time workers in the labour force, 2008-2013, percentage point, 15-74 age group

(percentage point, 15-74 age group)
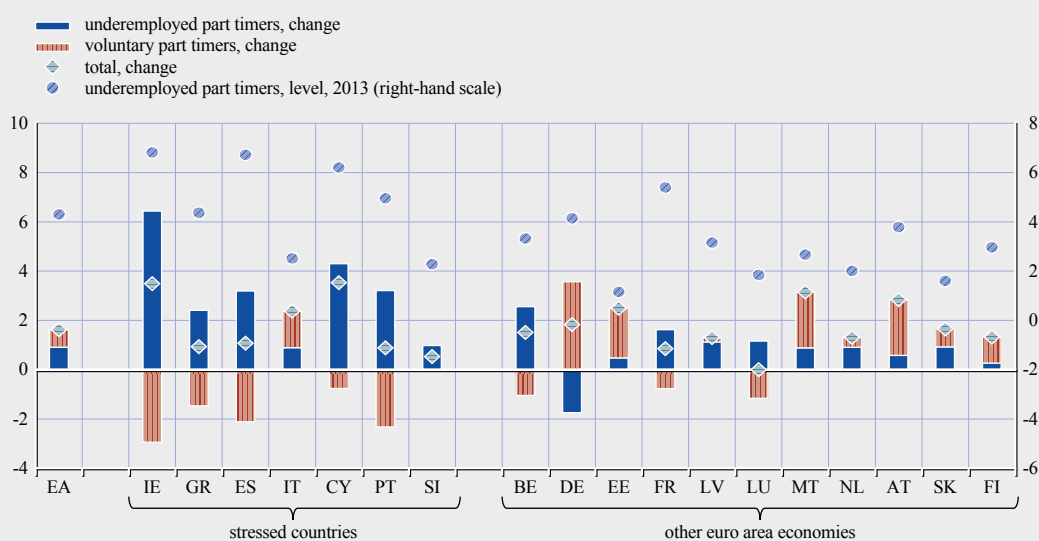
Source: Eurostat.

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[19] See e.g. ECB (2005): 'Trend and Patterns in Working Time Across Euro Area Countries 1970-2004. Causes and Consequences'. ECB Occasional Paper No. 41, December 2005

females, the rise in involuntary part timers was compensated by the fall of voluntary part-time workers; while amongst males, the rise in part-time workers was almost exclusively due to the rise in involuntary part timers. In the non-stressed countries, however, involuntary underemployment increased only marginally among females, while among males, the rise in part-time workers was driven by the rise in voluntary part-time employment.

At the aggregate euro area level, developments in the share of part-time employment are rather similar for youths (15-24 age group) as for the whole population. Nevertheless, in the stressed countries – particularly in Ireland, Spain, Cyprus, Greece and Portugal – underemployment increased considerably more for youths. Available data show that youth underemployment also increased in the other euro area economies, Germany being the only exception.

The analysis reveals that aside from the excess supply of labour measured by the standard unemployment rate, underemployment in the stressed countries also increased during the crisis in terms of working hours among the employed. Before the crisis, the already higher share of female part-time workers increased faster than that of males. This has reversed since the onset of the crisis, with both part-time employment and underemployment increasing more among male workers.

It is therefore likely that some full-time male workers involuntarily moved to part-time jobs. Flow data on Spain support this idea (see Box 2). This implies that a recovery in labour demand may partly result in higher employment (i.e. number of individuals employed), but may also result in additional working hours for part-timers. Hence, employment increases in a recovery may be somewhat initially subdued relative to standard relationships with GDP growth, with employment possibly taking longer to respond to a recovery compared to previous cycles.

Box 2

SPAIN: ASSESSING THE EXTENT OF UNDEREMPLOYMENT AND DISCOURAGEMENT USING LABOUR FLOW DATA

This Box analyses labour flow data for Spain to assess the extent of underemployment and discouragement in the Spanish labour market. In particular, the analysis distinguishes between the flows from full-time employment into involuntary part-time "underemployment", as well as flows out of the labour force (the latter measuring discouragement). The analysis uses quarterly micro data taken from the Labour Force Survey, covering the period 2005Q1 to 2013Q2.

As shown in section 1.4.1, aggregate data suggest that for the euro area as a whole, a salient consequence of the crisis was the growing number of workers whose weekly hours were cut to the extent that they became involuntarily part-time workers (see Chart 21 of main text). Chart A suggests that, over the crisis, the probability of these transitions increased considerably in Spain. In the run-up to the crisis, between 2005Q1 and 2008Q1, the probability of moving from full time employment to underemployment gradually declined to reach 0.6% by 2007 (i.e. in one quarter, 0.6% of full time employees became involuntary part-timers). After the onset of the crisis, this probability increased to above 1% in 2009 and stayed there until end-2010. As the second phase of the crisis unfolded in 2011, the probability of becoming underemployed increased significantly, rising to 1.5% in mid-2012. In parallel with these developments, the probability

(left-hand scale: percentage of full-time employed; right-hand scale: percentage of (involuntarily) underemployed part-timers)

— full time to underemployed part time (left-hand scale)
····· underemployed part time to full time (right-hand scale)

(left-hand scale: percentage of unemployed; right hand scale: percentage of employed)

— unemployed to discouraged (left-hand scale)
····· employed to discouraged (right-hand scale)
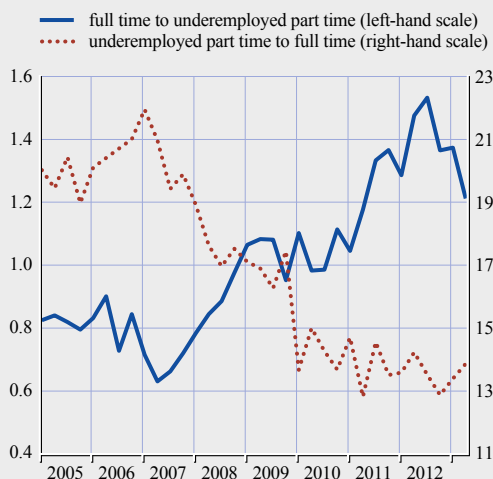
Source: Authors' calculations based on the Labour Force Survey.
Notes: Underemployed are those working part-time for economic reasons, but willing to work more hours. Data are seasonally-adjusted using the Tramo-Seats method.
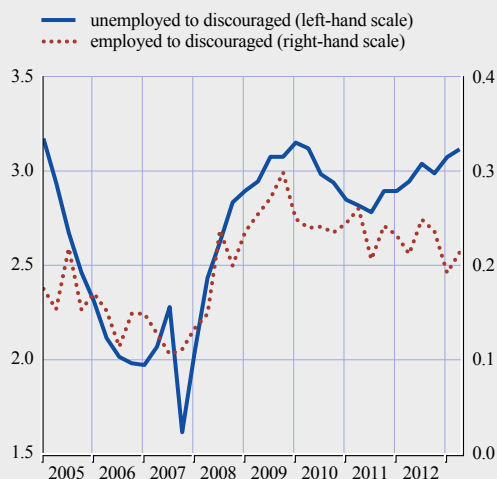
Source: Authors' calculations based on the Labour Force Survey.
Notes: Discouraged workers are inactive persons available to work but not seeking. Data are seasonally-adjusted using the Tramo-Seats method.

of moving to full-time employment from underemployment declined sharply in the first phase of the crisis from about 20% to 17%, before stabilising temporarily until late 2010, and then declining further to around 14% by 2013Q2. Developments in 2013 suggest that the likelihood of becoming underemployed started to decline; however, there was still no improvement in moving to full-time employment from underemployment. This is similar to developments in unemployment, where the decline in the unemployment rate in 2013 was driven by decreasing inflows into unemployment.

The marked declines in Spanish labour market prospects over the crisis are also evident in the statistics on discouragement (Chart B). In advance of the crisis, the unemployed in Spain were increasingly less likely to give up job search, mostly because they were able to find jobs due to the pre-crisis economic boom. However, this changed at the onset of the crisis, as the probability to give up job search increased considerably, from about 2% to 3% (meaning that by 2010, in every quarter, 3% of the unemployment stock gave up looking for a job and became inactive, i.e. discouraged). This eased somewhat over 2010, but worsened again in the second phase of the crisis. At the same time, the share of those who give up job search directly after losing their job also increased, from about 0.1% of the employed to 0.3%.

Overall, flow data suggest that the slack in the Spanish labour market might be larger than indicated by the unemployment rate due to cyclical developments in the flow between full time and involuntary part-time employment, as well as discouragement effects.

2.4.2 DISCOURAGED WORKERS

Before the onset of the financial crisis, the euro area labour force had been growing, above 1% per year. With the onset of the crisis this growth came to a halt, with only some limited rebound in 2011-2012. One reason for this slow-down is the increasing number of people giving up job search and exiting the labour market.
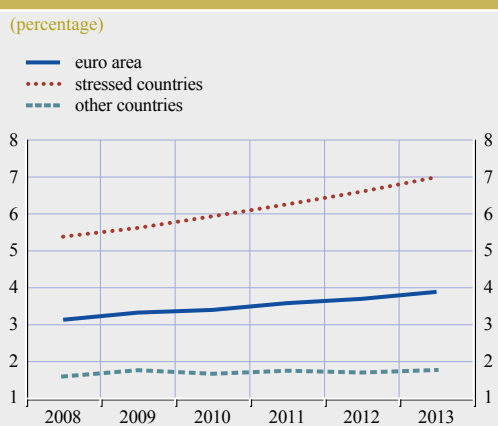
Part of those available to work, but not actively seeking a job can be regarded as "discouraged" workers (i.e. those who drop out of the labour force believing that they would not be able to find a job in the current labour market situation).[20] In the statistics, these people are counted as inactive, so if a person becomes discouraged, this will *ceteris paribus* decrease the unemployment rate. However, these

Chart 22 Discouraged workers as a share of the labour force (15-74 group)

(percentage)

- euro area
- stressed countries
- other countries

Sources: Labour Force Survey and authors' calculations.

discouraged workers are marginally attached to the labour market and might be expected to re-enter the labour market when conditions improve. Accordingly, when they re-enter the labour market but are not able to find a job immediately, this can increase the unemployment rate in the short run, hence unemployment may not decline as much as one might expect when GDP recovers.

Since the onset of the crisis, discouraged workers in the euro area have grown from 3.1% to 3.9% of the extended 15-74 labour force.[21] However, the rise has been particularly strong in stressed countries. By contrast, the ratio has hardly changed in other euro area countries (Chart 22).

Augmenting the standard unemployment rate by adding on the implied effects of discouraged workers provides us with an "extended" unemployment rate. At the euro area level, age group 15-74, the "extended" unemployment rate has increased by 5.0 percentage points between 2008 and 2013 (from 10.5% to 15.5%). Out of that, 4.5 percentage points is due to an increase in the unemployment rate, and 0.5 percentage points is due to an increase in the number of discouraged workers (Chart 23), with both increases mostly accounted for by males.

Both underemployment and discouragement suggest considerable labour market slack across the euro area over and above the recorded unemployment rate.[22] As discussed above, people who have recently given up seeking for a job are still marginally attached to the labour market. Accordingly, it can be expected that when the economic outlook becomes more favourable, these persons will again start seeking for work. Especially in countries where male discouragement has increased considerably, this might lead to a situation where the unemployment rate shows a subdued response during a recovery, hence the likely rebound in labour market participation may provide a more positive signal of labour market developments.

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20 There are other reasons for not seeking for a job, such as personal or family circumstances. However, as this analysis focuses on the changes since the onset of the recent financial crisis, it is more likely that the increases in those not seeking a job were influenced by the severe economic downturn. For this reason, the inactive who are available to work but not seeking are labelled as "discouraged". Including the discouraged workers in the labour force (i.e. adding them to both the number of unemployed and the number of active) provides an "extended" unemployment rate and extended participation rate.

21 When examining ratios of discouraged workers, they are included both in the nominator and the denominator (i.e. the labour force).

22 For a somewhat different methodology for assessing how labour market slack may differ to the official unemployment rate see Box 4 "Alternative measures of labour underutilisation for euro area countries" in ECB Occasional Paper no. 138 "Euro area labour markets and the crisis".

- underemployed part timers, change
- voluntary part timers, change
- total, change

stressed countries — EA | IE GR ES IT CY PT SI | BE DE EE FR LV LU MT NL AT SK FI — other euro area countries

Source: Eurostat.
Note: The extended unemployment rate is the sum of the unemployed and the persons available for work but not seeking, in percent of the labour force.

2.5 LABOUR SUPPLY DYNAMICS AND UNEMPLOYMENT OVER THE CRISIS

Labour force growth in the euro area decelerated significantly since the beginning of the crisis as a result of a slowdown in the growth of both population and participation, with the latter slowdown particularly evident in stressed countries suggesting some discouraged worker effects. Meanwhile, marked differences appear between age, gender and skill groups, with the labour force of older, female and skilled workers growing over the crisis, while that of males, young and less-skilled workers fell. As for migration (Box 3), immigration growth started to decline in 2008 and turned negative in the stressed countries from 2010, having contributed significantly to overall population growth in the years prior to the crisis. In contrast, immigration growth has remained positive during the crisis in other euro area countries, thereby helping to ease demographic pressures from declining national populations, as well as helping to relieve labour market pressures. The growth in the immigrant population in these countries reflects increased flows from outside the EU as well intra-EU immigration and has been concentrated among high and medium-skilled workers.

The euro area labour force has seen a significant deceleration in growth rates since the onset of the financial crisis in 2008 mainly on account of declining population growth and a flattening of the growth in the participation rate. Although the labour force started to grow again in the interim period between the two phases of the crisis (when GDP growth turned positive), this was short-lived as the effects of the second recession resulted in labour force growth returning to its downward trend (see Chart 24).

Chart 24 Labour force and population annual growth, and participation rate (euro area)

(annual growth rates for the population and the labour force)

- labour force (left-hand scale)
- population (left-hand scale)
- participation rate (right-hand scale)
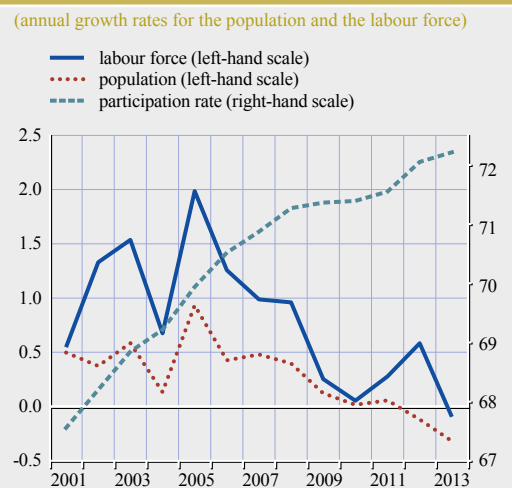
Sources: Eurostat and ECB staff calculations.

Changes in the labour force originate from two factors, namely, changes in the population and changes in the participation rates. While population growth tends to be fairly stable and determined (in part) by exogenous factors during normal cyclical patterns, a severe and protracted economic downturn may have adverse effects (see Box 3 on migration). Participation rates reflect individuals' choices on whether to enter the labour market and are more responsive to the economic cycle.

2.5.1   LABOUR FORCE AND PARTICIPATION RATE DEVELOPMENTS [23]

Labour force growth, driven by growth in the participation rate, tends to move in tandem with GDP developments – albeit with some lag (see Chart 25). Thus the two periods of decline in GDP growth during the crisis have subsequently translated into decreases in labour force growth, registering an actual fall in the labour force of 0.4% in the third quarter

Chart 25 Annual growth of GDP, labour force and participation (euro area)

(annual growth rates)

Sources: Eurostat and ECB staff calculations.

of 2013. During the pre-crisis period (2005-2008), the euro area labour force grew at an average annual rate of 1.3%. It slowed substantially to 0.2% in the aftermath of the Great Recession, and remained subdued at 0.3% during the second recession (2011-13). After growing by around 0.5% annually before the crisis, population growth also declined with the onset of the financial crisis, and remained flat until 2011 before turning negative from the first quarter of 2012 onwards.

Chart 26 Contribution of population growth and the participation rate to labour force growth in euro area countries

(percentage changes; annual average growth)

Sources: Eurostat and ESCB calculations.
Notes: Period 1=2001Q2-2008Q1; period 2=period surrounding Great Recession (2008Q2- 2011Q2); and period 3= period surrounding second recession (2011Q3-2013Q3).

23 Prepared by Pavlos Petroulas and Mathilde Périnet.

Taking a closer look at the participation rate developments in the euro area, it increased by almost 3.7 percentage points in the pre-crisis period (from 67.6% in 2001 to 71.3% in 2008), and then stagnated over the Great Recession before rising marginally to stand at 72.1% by 2013. From a country perspective there is clear cross-country heterogeneity in terms of participation rate developments as well as population growth during the crisis periods (Chart 26). In particular, the growth rate of participation slowed down significantly in stressed countries, suggesting some discouraged worker effects, while other countries remained more stable. All stressed countries (except Cyprus) have also experienced negative population growth during the second recession, particularly Ireland, Spain and Portugal, in line with outward migration effects possibly linked to negative employment developments in those countries (see Box 3 on migration).

Despite similarities in labour force and participation developments during the two crisis periods, there are strong differences across gender and age groups. Even though female labour force growth has decelerated, it has contributed positively throughout both phases, while the male labour force has contracted over the entire period, with the exception of 2012 (Table 1). While this difference in growth rates is partially explained by a catching up effect of the female share of the population in the labour force,[24] it also reflects the strong increase in the skill level of the female population which

Table 1 Growth in euro area labour force, population and participation rate by gender, age and skill groups

EA18	2006	2007	2008	2009	2010	2011	2012	2013
Labour Force	**1.3**	**0.9**	**1.0**	**0.3**	**0.1**	**0.3**	**0.6**	**-0.1**
Male	0.9	0.6	0.6	-0.3	-0.3	-0.1	0.2	-0.4
Female	1.9	1.4	1.5	0.9	0.5	0.8	1.1	0.3
Young (15-24)	-0.4	-0.1	-0.8	-2.8	-3.9	-1.6	-2.0	-2.2
Prime age (25-54)	1.2	0.6	0.8	0.1	0.0	-0.3	0.1	-0.6
Older (55-64)	4.3	4.7	3.8	4.3	4.0	5.0	5.3	4.4
Low skilled	0.1	-1.9	-1.5	-1.5	-1.7	-2.4	-1.8	-4.4
Medium skilled	1.6	1.5	1.0	0.0	0.4	0.2	0.3	0.4
Highly skilled	2.1	2.9	3.9	3.4	2.0	3.1	3.5	2.7
Population	**0.5**	**0.4**	**0.4**	**0.1**	**0.0**	**0.1**	**-0.1**	**-0.3**
Male	0.6	0.4	0.4	0.1	0.0	0.0	-0.1	-0.3
Female	0.4	0.5	0.4	0.2	0.1	0.1	-0.1	-0.3
Young (15-24)	-0.3	-0.5	-0.8	-0.9	-1.3	-0.9	-0.8	-1.2
Prime age (25-54)	0.5	0.3	0.4	0.0	-0.2	-0.3	-0.3	-0.5
Older (55-64)	1.4	1.9	1.7	1.4	2.0	2.1	1.1	1.0
Low skilled	-0.8	-1.9	-2.0	-1.3	-1.7	-2.5	-2.7	-4.2
Medium skilled	0.9	1.3	0.7	-0.1	0.6	0.4	-0.1	0.4
Highly skilled	1.8	2.7	3.7	3.3	2.1	3.0	3.1	2.7
Participation rate	**0.8**	**0.5**	**0.6**	**0.1**	**0.0**	**0.2**	**0.7**	**0.2**
Male	0.3	0.2	0.2	-0.4	-0.3	-0.2	0.3	-0.1
Female	1.4	0.9	1.0	0.8	0.4	0.7	1.2	0.6
Young (15-24)	-0.1	0.4	0.0	-1.9	-2.7	-0.7	-1.2	-1.0
Prime age (25-54)	0.7	0.3	0.4	0.0	0.1	0.0	0.4	-0.2
Older (55-64)	2.8	2.7	2.1	2.9	2.0	2.8	4.1	3.3
Low skilled	0.9	0.1	0.4	-0.2	0.0	0.1	0.9	-0.3
Medium skilled	0.7	0.2	0.3	0.0	-0.2	-0.2	0.4	0.0
Highly skilled	0.3	0.3	0.2	0.1	-0.1	0.2	0.3	0.0

Sources: Eurostat and ESCB calculations.

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24 The female labour force as a share of female population in the euro area is still significantly lower – at 66% – than the male share – at 78%

contributes positively through their decision to enter the labour force.[25] At the same time, the rise in female participation rates during the crisis may be linked to added-worker effects (i.e. women entering the labour force in order to replace the lost income when the male of the same household loses his job).

Apart from gender differences, there is also a strong heterogeneity in labour supply across different age groups. The labour force of older workers has continued to grow over both phases of the crisis at an unabated pace in all countries. To a large extent this is likely to reflect past reforms aimed at raising the retirement age, as well as the more limited opportunities for older workers to withdraw from the labour force given fewer opportunities of early retirement schemes and adverse wealth effects from the recessionary impacts of the crisis.[26]

In contrast to the developments for older workers, both prime age workers and in particular young workers have shown a negative reaction in their labour supply to the crisis. While the main driver of the former seems to be a declining population, the reduction in the labour supply of young workers comes mainly through their active choice with regard to their participation decision (see Chart 27 and Chart 28). Youth participation decisions seem to react more strongly to cyclical developments compared to other groups, and particularly in stressed countries such as Ireland, Spain, Slovenia, and Portugal where youth participation has decreased significantly, probably driven by discouraged worker effects due to falling youth employment (see Section 2.4.2). Decreases in youth participation can however imply prolonged education. This is mostly evident in Spain, but also in Slovakia, where there has been significant increases in the share of education and training for the young that do not participate in the labour force.

Chart 27 Euro area participation rate by age

(annual growth rates)

total
15-24
25-54
55-64
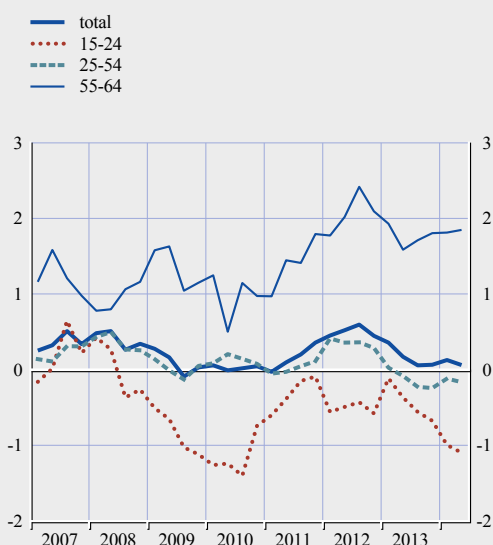
Sources: Eurostat and ESCB calculations. Labour force age: 15-64.

Chart 28 GDP growth, labour force growth and participation growth, for (25-64 year olds) and (15-24)

(annual growth rates)

participation rate
labour force
participation rate (youth)
labour force (youth)
GDP (t-1)
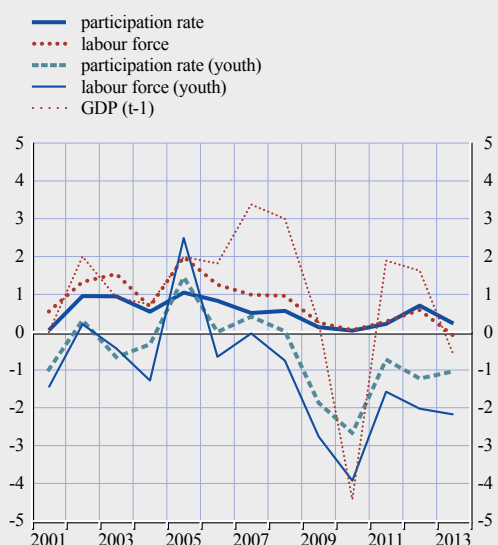
Sources: Eurostat and ESCB calculations.

25 The share of high-skilled females in the euro area has increased to 28% of the female population, up by 10pp since 2000, surpassing the share of high-skilled males standing at 20% of the male population
26 See OECD Economic Outlook Volume 2011, Issue 1.

Strong heterogeneity in labour force developments are also observed across different skill levels. In particular, the growth in the low-skilled labour force has been negative since 2007 and increasingly so since 2011. By contrast, over the same period, medium-skilled labour force growth remained fairly stable, whereas the highly skilled labour force increased considerably. As growth in participation rates for these three groups has remained fairly stable since 2006, the different labour force developments across skill categories reflect an ongoing change in the population towards a higher share of highly skilled people and smaller share of low skilled (reflecting necessary supply responses to an increase in the relative demand for skilled workers) that seems to have accelerated during the crisis periods.

MIGRATION TRENDS OVER THE CRISIS[1]

This box provides an overview of recent migration trends in Europe, focusing in particular at developments over the crisis period and seeking to differentiate developments seen around the the first (2008-2010) and second (2011-2013) phases of the crisis. The main results point to divergent trends in immigration growth in the most strongly-affected stressed countries compared to the other euro area countries since the onset of the first phase of the crisis.[2] In particular, immigration growth started to decline in 2008 and turned negative in the stressed countries from 2010, having contributed significantly to overall population growth in the years prior to the crisis. In contrast, immigration growth has remained positive during the crisis in other countries, thereby helping to ease demographic pressures where national populations are declining, as well as labour market pressures in those counties. The growth in the immigrant population in other countries reflects increased flows from outside the EU as well intra-EU immigration and has been concentrated among high and medium-skilled workers, while less-skilled workers are far less internationally mobile.

The two phases of the crisis provide an interesting background for analysing labour immigration in the euro area. Of particular interest is to see whether intra-EU immigration is more responsive than non-EU immigration, in particular after the EU enlargement between 2004 and 2007. The data used are quarterly LFS data covering the 20-64 year old population, broken down by nationality (EU 15, NMS 12 (new EU member states), non EU 27 immigrants and nationals), skill level (High, Medium and Low skilled), activity (Employed, Unemployed, Inactive) and with a sectoral breakdown of employment.[3]

The importance of immigration

Across euro area labour markets, non-nationals have progressively increased as a share of the total working age population from approximately 7.8% in the pre-crisis period to approximately 9.7%

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1 Drafted by Pavlos Petroulas and Thomas Conefrey.
2 This box uses a slightly different definition of stressed economies to the remainder of this report, by regrouping only the countries which have been recipients of international financial aid. Economies not in receipt of international financial assistance are included in the group of "other" countries.
3 The data measure the "stock" of non-nationals and nationals within the labour force. However, each year some of these individuals fall out of the age bracket 20-64 as they age. Thus differences over time do not entirely equate to the "flow" of new non-nationals. In addition, while the data give a broad definition of the country of origin like "Non EU 27", "EU 15", etc. – through nationality – it does not provide an exact origin country.

Chart A Population share of non-nationals

(percentages)

- non EU
- NMS 12
- EU 15

1) 2005 Q1-2008 Q1
2) 2008 Q2-2011 Q2
3) 2011 Q3-2013 Q3
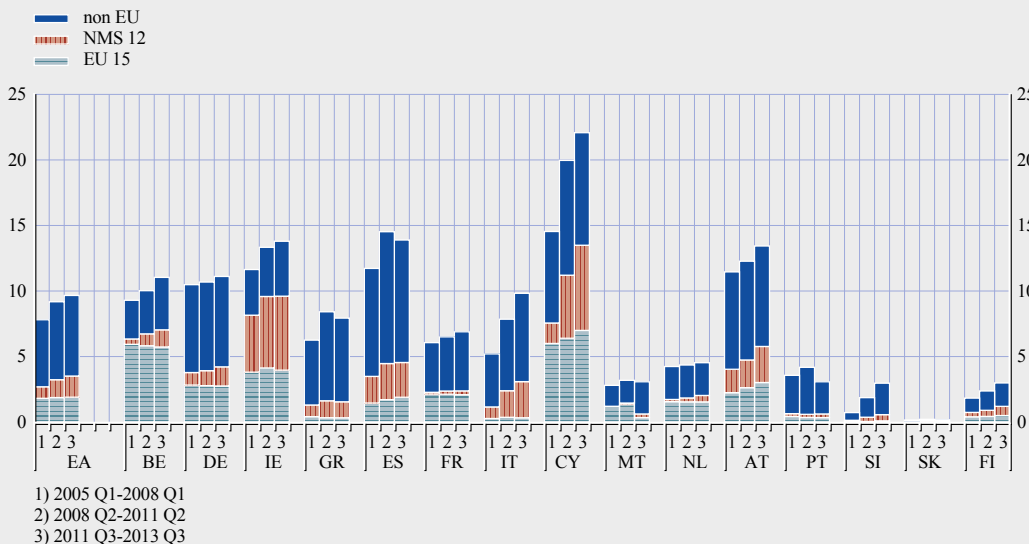
Sources: Eurostat and ESCB calculations.
Note: Latvia and Luxembourg are excluded due to data limitations.

in 2013, with significant cross-country differences (Chart A).[4] Despite these disparities between countries in the share of immigrants in the working age population, immigrants have been the predominant driver in population growth across the euro area as a whole (see Chart B).

Chart B Contribution to population growth

(percentages)

- contribution of immigrants
- contribution of nationals
- population growth

1) 2005 Q1-2008 Q1
2) 2008 Q2-2011 Q2
3) 2011 Q3-2013 Q3
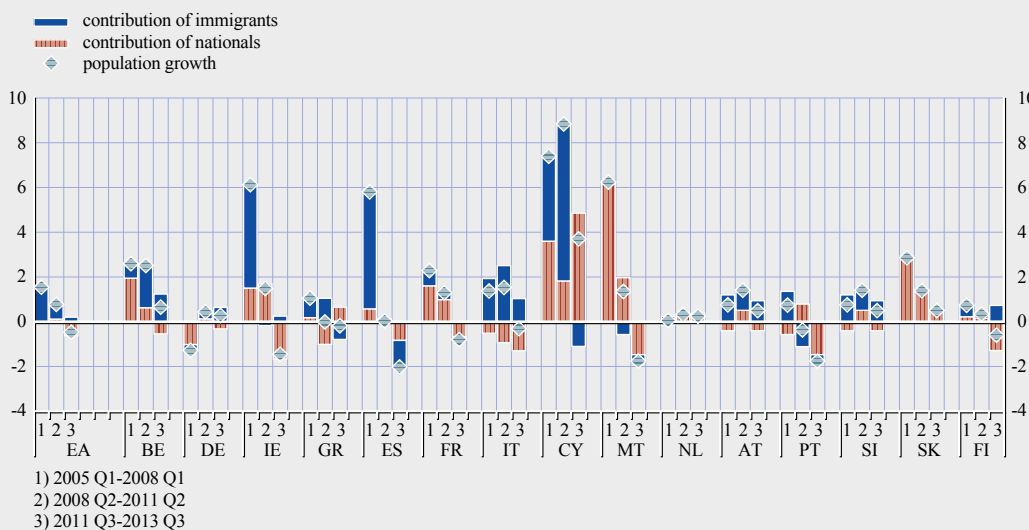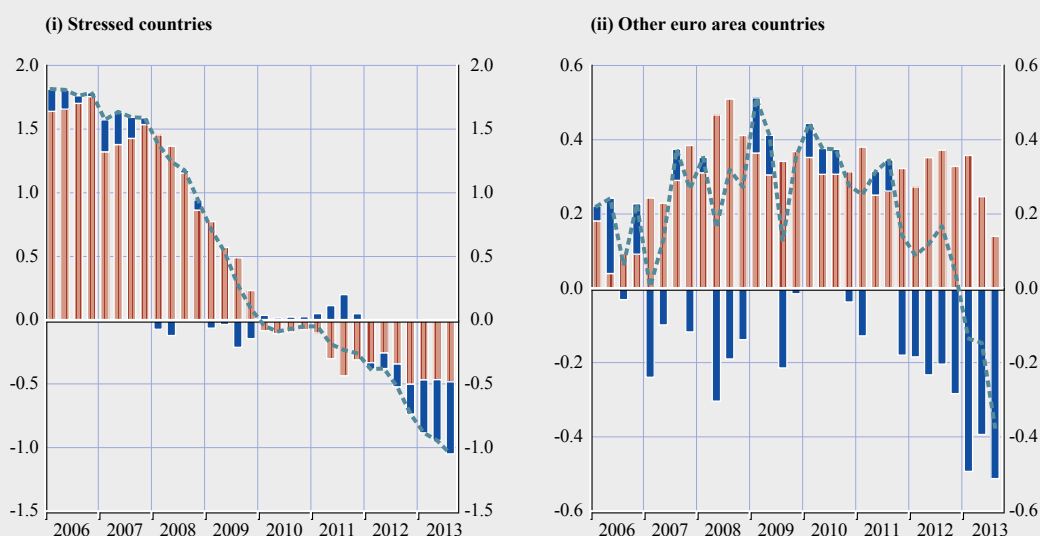
Sources: Eurostat and ESCB calculations.
Notes: Latvia and Luxembourg are excluded due to data limitations.

4 On balance, non-EU nationals comprise the largest share of non-nationals in the euro area, while the largest increase from the onset of the crisis has been from the NMS.

Chart C Population growth and contributions

(annual percentage growth)

- nationals growth
- immigration growth
- population growth

(i) Stressed countries

(ii) Other euro area countries

Sources: Eurostat and ESCB calculations.
Note: Stressed countries in this box refer to CY, GR, IE, ES and PT.

However, immigration growth in the stressed countries started to decline rapidly in 2008, becoming slightly negative in 2010. The onset of the second recession pushed the growth of immigrants sharply into negative territory in the second quarter of 2011 (Chart C). In terms of skill levels, both low and medium-skilled immigrants have seen a sharp reduction in their population levels, while the high-skilled population has remained flat. In terms of nationality, the negative contribution of declining immigration comes almost solely from non-EU nationals, while the population of EU-15 and immigrants of the NMS has remained flat.

By contrast, immigration growth in the other countries has continued unabated throughout both crisis periods, counterbalancing somewhat the negative growth in the national populations (see Chart Cii). Even so there are significant differences across both skill levels and nationalities to the immigration patterns in the other euro area countries (see Charts Di – Dii). The immigration patterns of high-skilled people to the group of other euro area countries seem to be more reactive to economic developments. There is a clear increase in the growth rate of the high-skilled immigrant population in both crisis periods, with annual growth reaching 12% during the Great Recession and 10% during the sovereign debt crisis, with immigration from other EU countries having a larger bearing during the second phase. For the medium-skilled population only the global financial crisis provided an impetus for increased immigration, while for the low-skilled population the increase in immigration growth was only seen in 2009, lagging behind in terms of response to the reactions of the high and medium-skilled population. These outcomes are in line with Zimmermann and Zaiceva (2011), who show that labour mobility is higher among young, high-skilled workers.

Chart D Other euro area countries

(percentages)

(i) Annual growth of medium-skilled immigrant population, contributions

- non EU MS contribution
- NMS MS contribution
- EU 15 MS contribution
- immigrant MS growth
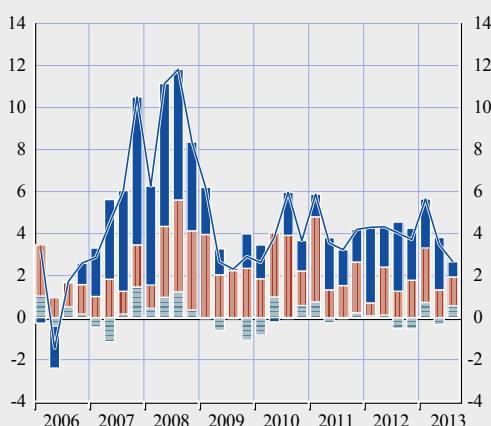
(ii) Annual growth of high-skilled immigrant population, contributions

- non EU HS contribution
- NMS12 HS contribution
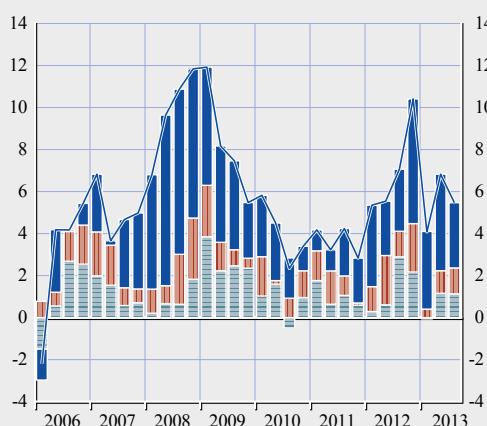- EU 15 HS contribution
- immigrant HS growth

Sources: Eurostat and ESCB calculations.

IMMIGRATION GROWTH AND EMPLOYMENT.

Table A examines the employment rates of each skill and nationality group and shows that high-skilled EU 15 immigrants exhibit very similar rates of employment to nationals and the increase in high-skilled immigration has not resulted in a worsening of employment prospects. For the high-skilled immigrants of the NMSs there is a drop in the employment rate during 2010 and 2011 which rebounds strongly thereafter, implying a very limited and temporary negative effect of immigration on employment. For the medium-skilled group the EU 15 immigrants exhibit on balance similar employment rates as the nationals with the NMS immigrants converging strongly. For the low-skilled group, the employment rate of both the EU 15 and NMS immigrants is significantly above that of nationals. By contrast

Table A Employment rates by skill and nationality

Year	High skilled				Medium skilled				Low skilled			
	Nat.	EU 15	NMS	Non EU	Nat.	EU 15	NMS	Non EU	Nat.	EU15	NMS	Non EU
2005	82	79	67	59	71	71	66	60	54	62	54	47
2006	83	80	67	62	72	72	67	62	55	62	60	49
2007	84	80	70	63	73	71	71	63	55	64	59	50
2008	84	81	74	64	73	73	71	66	55	64	61	52
2009	84	82	76	64	73	69	71	63	54	62	62	50
2010	84	81	72	64	72	71	72	65	53	64	63	52
2011	84	81	73	63	73	73	72	63	53	65	63	50
2012	84	82	76	64	73	73	72	64	53	64	63	51
2013	84	81	76	63	72	73	72	63	53	64	62	50

Sources: Eurostat and ESCB calculations.
Note: Employment rates are calculated as a share of each skill and nationality population.

non-EU nationals, despite some increases in employment shares over time, continue to exhibit significantly lower employment shares than nationals at all skill levels.

In terms of sectors,[5] in the case of the high-skilled EU 15 immigrants (the only skill group which grew over the crisis), the sectors of retail and wholesale and other services have seen significant increases in employment as well as, to a lesser extent, the construction sector. In the case of the non-EU immigrants, employment growth has been mostly evident in the service sectors (healthcare and social work; other services) and to a lesser extent in manufacturing. Finally, in the case of the NMS immigrants, all sectors except "other manufacturing" saw significant increases in employment, for all skill groups. Even so, a disproportionate increase was observed for the high skilled in the healthcare and social work sector, suggesting that immigration also acts as to cover shortfalls in skills among the domestic workforce.[6]

5 The revision of the NACE classifications in 2008 implies that several two-digit sectors are not comparable over time. Thus we have constructed a very broad "reclassification" which is comparable over time. The sectors and their average workforce weights for the non-programme countries for the period 2005-2013 are: Construction (11.5%), manufacturing (19.7%), retail and wholesale trade (11.9%), healthcare and social work (7%), other services (47%) an other manufacturing, which comprises agriculture and mining and quarrying (2.8%). Employment growth for the non-nationals is compared over time (pre and post crisis), as well as to the employment growth of nationals.
6 High-skilled employment of NMS immigrants in the health care and social work sector increased from about 23,000 in 2007 to 55,000 in 2013 in the non-programme countries, which can be compared with the increase in the high-skilled NMS immigrants in the manufacturing sector (which is almost three times as large in terms of workforce but less skill intensive) from 25,000 to 43,000.

2.6 ANALYSIS OF LABOUR MARKET FLOWS[27]

This section analyses labour market flows since the onset of the crisis, distinguishing its first and second phases. It appears that both recessions led to a rise in job destruction, indicated by an increase in job exit probabilities, but impacted more heavily on stressed countries, particularly those most affected by the downturn in construction activity. Whereas exits from permanent employment have been roughly contained over the period, movements out of temporary employment have been increasing in response to both recessions. For both types of contract, the exit rates in the second phase remained at high levels similar to the first phase despite the relatively more limited fall in GDP in the second phase of the crisis. However, it is the declines in the job-finding probabilities which have tended to drive the unemployment increase and heterogeneity across countries, with sharp falls in job-finding rates intensifying further in the stressed economies in the second part of the crisis, whilst remaining relatively stable in other euro area countries. Finally, this section shows that exit rate probabilities from unemployment to employment for the long-term unemployed almost halved during the crisis (from around 35% to just below 20%), pointing to potential hysteresis effects for euro area unemployment given that the incidence of long-term unemployment has increased markedly in recent years.

The evolution of gross worker flows in euro area countries provides additional insights about the evolution of euro area labour markets during the two phases of the crisis. As in the 2012 Structural Issues Report[28], this paper uses quarterly LFS micro-data which are available for only 12 euro area countries (ES, PT, FI, SI, IT, AT, FR, IE, NL, EE, and GR) covering the period up to (at least) the end of 2012. These data allow changes in the labour market status of individuals to be tracked during the consecutive quarters they remain in the LFS. With this information, changes in the

27 Prepared by Mario Izquierdo.
28 See ECB Occasional Paper no. 138 (2012) "Euro area labour markets and the crisis".

Chart 29 Total exits from employment (job exit rate probabilities)

- 2005 Q1-2008 Q1
- 2008 Q2-2011 Q2
- 2011 Q3-2013 Q1

Sources: Eurostat and ESCB calculations.
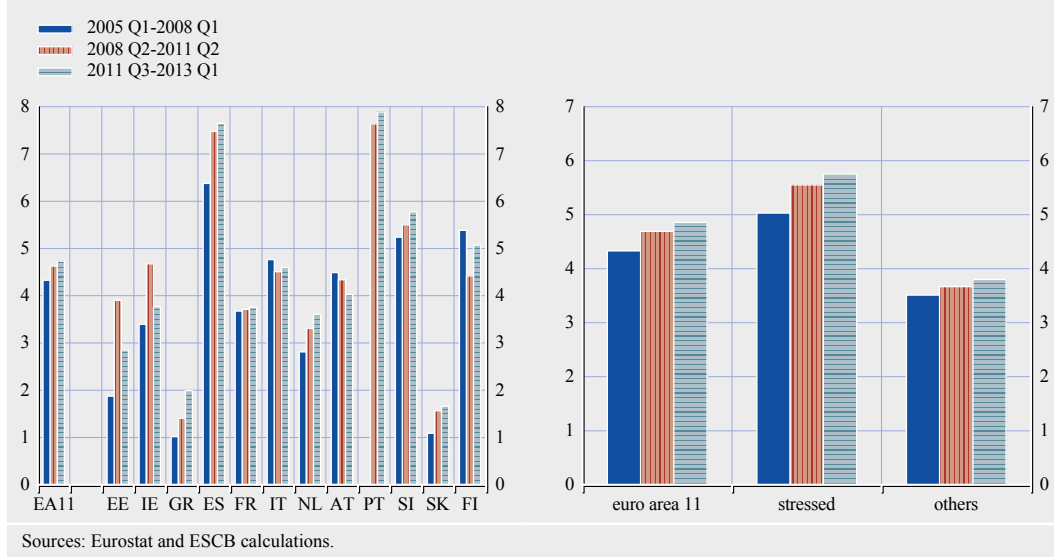
labour market status of individuals interviewed in the LFS (i.e. movements between employment, unemployment and inactivity) are computed.[29] Moreover, a large set of information available in the LFS microeconomic data about worker characteristics and job characteristics can be used to analyse the main determinants of these worker flows.

Starting with movements out of employment, the left hand panel of Chart 29 shows the relative size of worker flows exiting from employment for the EA11[30] as a whole (worker flows are measured as percentage of the group of origin and can be interpreted as job exit rate probabilities). To assess the impact of the different phases of the crisis, the average size of these flows over the pre-crisis period (2005Q1-2008Q1) are compared with the subsequent two phases of the crisis. The right hand panel of Chart 29 shows that the impact of the first phase of the crisis on employment outflows was quite large, with employment exits increasing from 4.3% of total employment to 4.7% between 2008Q2-2011Q2. Although the second phase of the crisis resulted in only a marginal increase of job destruction flows during 2011Q3-2013Q1, the rate of job destruction remained persistently high. Chart 29 also presents the evolution of job destruction rates for stressed euro area economies (ES, IE, GR, PT, SI, and IT), and the rest of the euro area countries included in this analysis (FR, AT, SK, FI, EE and NL). The initial increase in employment outflows was already more intense in the stressed countries, compared to other euro area countries, in the initial phase of the crisis (Chart 29, right hand panel). Turning to the second phase of the crisis, both group of countries show a further mild increase in job destruction rates, albeit a marginally smaller increase in the non-stressed countries.

However, differences across euro area countries are notable, and they are not only related to the impact of the sovereign debt concerns. The initial increase in job destruction flows in euro area countries was concentrated in Spain, Ireland and Estonia, where the construction bust had a larger impact on the labour market, and to a lower extent in Greece, Slovakia and Slovenia (left hand panel of Chart 29). Regarding the evolution of these flows in the second phase of the

29 This analysis focuses on flows between employment and unemployment.
30 Portugal is not included in these aggregates since flows series have only been available since 2011Q2.
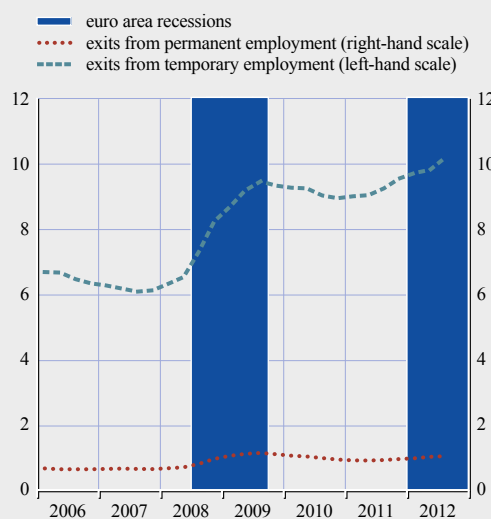
crisis, the intensity of job destruction flows increased in some euro area stressed countries, such as ES, PT, SI, and GR (while IE showed a marked decrease). Meanwhile, FI, NL and SK also showed increased job destruction rates in the second phase. Finally, employment exits show a much lower cyclical sensitivity in some euro area countries like Italy and France.

Among other factors, including personal characteristics (age, skills) and job-related characteristics (sector of activity, for instance), the type of contract plays a key role in explaining the recent evolution of job destruction flows. At the start of the crisis in 2008, rapidly increased job destruction flows for temporary workers in euro area countries accounted for around 11% of total temporary employment per quarter (Chart 30). In this respect, it is noticeable that these movements out of temporary employment have basically remained at similar levels since then, with just some seasonal variations. Indeed, there is a recent additional increase in the exit rate from temporary contracts in 2012, which has elevated the job destruction rate to above 12%. By contrast, exits from permanent employment are much less frequent in euro area countries and have remained roughly contained since the start of the crisis. They increased up to 1.4% in 2009 but decreased afterwards and, despite, some increase in 2011 and 2012, these exit rates amounted to 1.2% of total permanent employment in euro area

countries at the end of the sample period and remain ten times smaller than exit rates from temporary employment. However, the exit rates for both types of contract are fairly similar to the first phase, despite the more limited fall in GDP in the second phase of the crisis.

Turning to movements out of unemployment, movements to employment is analysed to assess the recent evolution of job creation rates. In particular, Chart 31 shows that, for the euro area as a whole, in every quarter around 25% of unemployed individuals found a job in the period prior to the crisis. However, since the onset of the crisis, this job finding probability showed a clear decrease, and has continued to decline further over the two phases of the crisis. In other words, the share of the unemployed exiting from unemployment to employment has been declining. In terms of individual countries, this downward trend has occurred across

Chart 30 Exits from permanent employment to unemployment in euro area 11

(moving averages; 4 periods)

- euro area recessions
- ⋯⋯ exits from permanent employment (right-hand scale)
- --- exits from temporary employment (left-hand scale)

Sources: Eurostat and ESCB calculations.

Chart 31 Exits from unemployment to employment

- 2005 Q1-2008 Q1
- 2008 Q2-2011 Q2
- 2011 Q3-2013 Q1
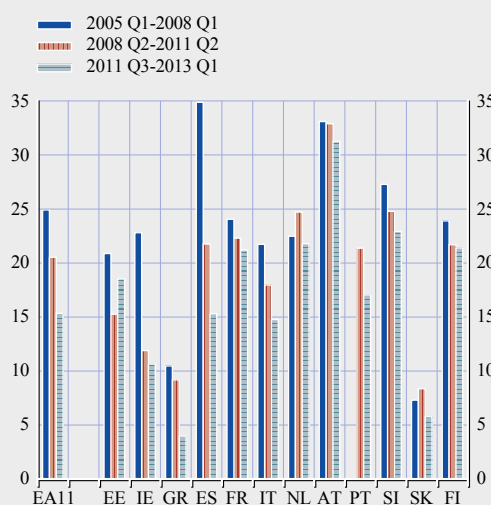
Sources: Eurostat and ESCB calculations.

virtually all of the euro area labour markets in our sample, although there are signs of a cyclical recovery in job creation rates in Estonia. Among the countries more affected by the crisis, the probability of exiting from unemployment to employment has decreased drastically over the crisis in Spain (from almost 35% to 15%), but has also fallen significantly in Ireland, Italy, Greece and Slovakia.

The evolution of unemployment duration is a key factor regarding the potential risks of hysteresis effects leading to a persistent decline in the exit rate from unemployment. Chart 32 shows exit rate probabilities from unemployment to employment by unemployment duration, distinguishing between those unemployed for less than a year, and those looking for work for more than a year. First, there is a clear duration dependence of unemployment, and the exit rate is much higher for those unemployed with lower unemployment duration. With respect to the impact of the different phases of the crisis, the exit rate probability of the short-term unemployed was initially more affected by the crisis, with a marked reduction between 2008 and 2009. This higher initial effect of the crisis on short-term unemployed indicates the large fall in labour demand in this phase of the crisis. Meanwhile, the impact on the exit rate for the long-term unemployed was lower in this initial phase of the crisis, but over the crisis this exit probability has gradually declined to very low levels at the end of 2012, pointing to potential hysteresis effects in the euro area unemployment rate since the incidence of long-term unemployment has increased markedly over the past years. By individual countries, the general pattern applies with higher initial reduction in exit rates for the short-term unemployed, although it should be also noted that some recovery in exit rates is already apparent for some euro area countries (Ireland, Estonia, Finland), which again has been more marked among the short-term unemployed.

Chart 32 Exits from unemployment by unemployment duration

(exit rate probabilities)

— unemployed for less than one year
···· unemployed for one year or more

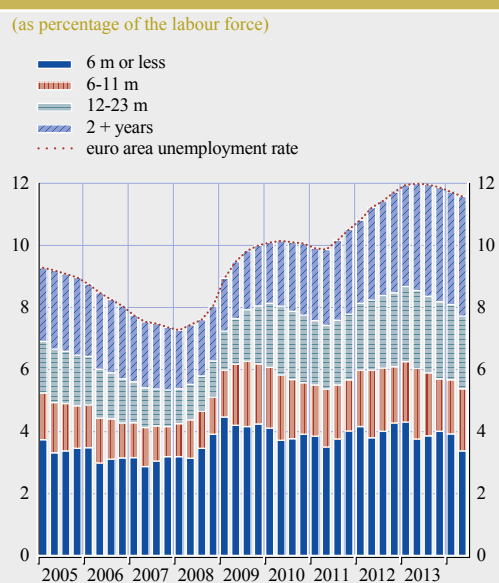Sources: Eurostat and ESCB calculations.

3 EVIDENCE OF STRUCTURAL LABOUR MARKET CHANGES OVER THE COURSE OF THE CRISIS[31]

This chapter focuses on the longer term consequences of the crisis and the structural changes to the euro area labour markets. The strong rise in long-term unemployment across most euro area labour markets has been one of the striking consequences of the crisis. Estimates from international institutions point to a strong rise in structural unemployment – particularly marked in those countries which experienced the strongest financial market stress. A Beveridge curve analysis carried out for the euro area aggregate and the constituent economies suggests that the rises are most likely due to increasing structural mismatches between worker categories and labour demand. An alternative analysis looking at developments in skill mismatch indices on the basis of micro data also finds a marked increase in skill mismatch across the euro area and within the euro area countries, with increases particularly strong at regional level. Box 4 traces the progress in labour market reforms before and during the crisis, and highlights where further labour market reforms could help to reduce structural unemployment and to reduce the risk of persistent unemployment translating into further increases in structural unemployment.

3.1 THE RISE IN LONG-TERM UNEMPLOYMENT SINCE THE ONSET OF THE CRISIS

The strong rise in long-term unemployment (LTU, defined here as those unemployed for 12 months or more) across most euro area labour markets has been one of the striking consequences of the crisis, thus reversing much of the reductions seen in average unemployment spells since the mid-2000s. Initially the rise in the euro area unemployment rate was driven by increases in short-term unemployment (Chart 33), as is typical during the initial job-shedding phases of recessions. However, as the crisis took hold, unemployment spells increased – even during the short-lived recovery in euro area GDP – as flows out of unemployment declined,[32] increasing both the unemployment rate and the share of long-term unemployed. Chart 34 traces the contemporaneous evolutions of both the euro area unemployment rate and the share of long-term unemployment. With the onset of the second phase of the crisis, both metrics deteriorated further, with the long-term unemployment share rising from around 45% (in line with the pre-crisis average) to around 52% of the total number of unemployed across the euro area, while the unemployment rate rose a further two percentage points. As a consequence, by the end of 2013, the stock of long-term unemployed alone accounted for over 6% of the total euro area labour force – more than double their pre-crisis level. Here too, aggregate area-wide developments mask substantial cross-country heterogeneity.

Chart 33 Euro area unemployment rate and unemployment duration, 2005-13

(as percentage of the labour force)

- 6 m or less
- 6-11 m
- 12-23 m
- 2 + years
- euro area unemployment rate

Sources: Eurostat and ESCB calculations.
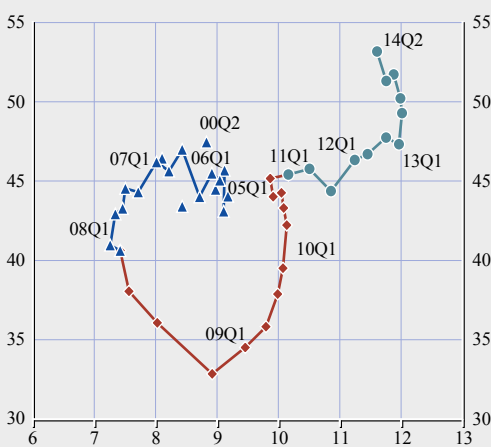Notes: Long-term unemployment defined as those without jobs for 12 months or more.

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31 Prepared by Valerie Jarvis, Mathilde Périnet, Peter Nellermann and Cindy Veiga.
32 See section 1.1.2 on worker flows adjustment in euro area labour markets during the crisis in ECB Occasional Paper no. 138 *"Euro area labour markets and the crisis"*, as well as the update in Section 2.5 of Labour market flows in this report.

Chart 34 Evolution of euro area unemployment rate and share of long-term unemployment

(as percentage labour force; share of total unemployment)

x-axis: unemployment rate
y-axis: long-term unemployment as a share of total unemployed

Sources: Eurostat and ESCB calculations.
Notes: Long-term unemployment defined as those without jobs for 12 months or more. Blue lines from 2000Q2 to 2008Q1 (pre-crisis), red lines are quarters surrounding the first phase of the crisis from 2008Q2 to 2011Q1, while the green lines represent the second phase of the crisis and the subsequent recovery.

Chart 35 Evolution of unemployment rate and LTU share: Germany and Spain compared

x-axis: unemployment rate
y-axis: long-term unemployed as a share of total unemployment
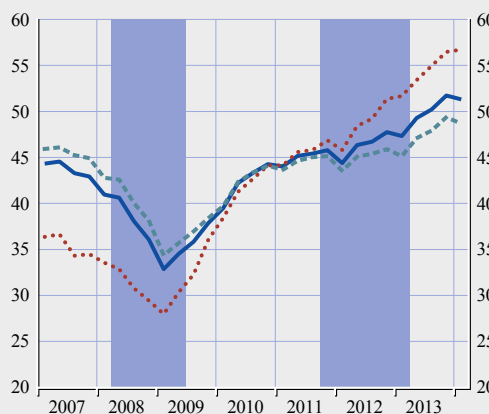
— DE
— ES

Sources: Eurostat and ESCB calculations.
Notes: Long-term unemployment defined as those without jobs for 12 months or more.

Chart 36 Long-term unemployment in stressed and non-stressed countries

(as a percentage of total unemployment)

— euro area
····· stressed economies
‒‒‒ other euro area countries

Sources: Eurostat and ESCB calculations.
Notes: Long-term unemployment defined as those without jobs for 12 months or more. Shaded areas represent the two recessions of the crisis.

Chart 35 illustrates the range of differing developments using two of the largest euro area economies. In Germany, both the unemployment rate and the long-term unemployment share have been trending downwards since the mid-2000s – resulting in a counter-clockwise pattern in the unemployment-LTU space – reflecting, in part, the relatively short-lived impact of the crisis on the German labour market and, in part, the successful impact of earlier structural reforms in helping to reduce the unemployment spells among those remaining. This counterclockwise pattern is common also to Austria, Estonia, Finland, Malta and Slovakia and is often interpreted as an indication that unemployment developments over a recession follow typical cyclical dynamics. Meanwhile in Spain (which entered the crisis with an unemployment rate at a comparable level to that of Germany, but with a rather lower share of long-term unemployed), the unemployment rate has increased more than fourfold, while the share of long-term

unemployment has risen from less than one in five to over half of all unemployed. Similar patterns – albeit to a lesser degree – are common to all of the stressed economies and are suggestive of considerable handicaps to re-employment in these economies. Overall, the stressed economies have suffered much sharper increases in long-term unemployment than the other euro area countries (see Chart 36) – despite better initial conditions. While part of the explanation undoubtedly lies in the subdued labour demand conditions still prevalent in many of these countries, part may also result from underlying structural weaknesses – in particular, a structural mismatch between the labour market characteristics of those unemployed and the skill needs of potential employers. These issues are investigated further in the following sections.
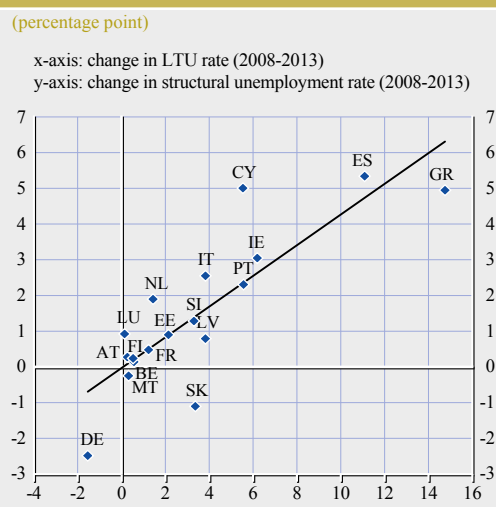
3.2 ESTIMATES OF STRUCTURAL UNEMPLOYMENT[33]

The strong rises seen in long-term unemployment suggest a marked increase in structural unemployment in the euro area. Long-term unemployment risks might become structural for a number of reasons. For instance, losses in human capital, skills and "employability" are likely to increase as unemployment spells increase and may lead to discouragement. Employment protection legislation may further disadvantage those displaced from downsized sectors, if it hinders job creation. Chart 37 shows the strong link between long-term and structural unemployment developments.[34]

3.2.1 ESTIMATES OF STRUCTURAL UNEMPLOYMENT

From a theoretical perspective, the natural or structural unemployment rate is the unemployment rate the economy would settle at in the absence of shocks. In practice, however, structural unemployment estimates differ considerably according to the concepts and methods adopted by the various institutions. International institutions generally estimate the structural unemployment rate with Phillips-curve based filtering techniques; however, the price or wage indicator differs widely across the estimates by different institutions. At the bottom line, the estimated structural unemployment can be understood as a non-accelerating inflation (or wage) rate of unemployment.

This section compares developments in structural unemployment based on the estimates provided by the European Commission, the OECD and the IMF. Estimates provided by these three institutions suggest that while the measured unemployment rate increased by almost five percentage points between 2008 and 2013, structural unemployment increased by only 1.6 percentage points on average (Chart 38). Accordingly, around two thirds of the rise in unemployment during the crisis seems to be cyclical, while around one third seems to be structural. However, there are substantial differences across the euro area economies,

Chart 37 Link between long-term and structural unemployment developments

(percentage point)

x-axis: change in LTU rate (2008-2013)
y-axis: change in structural unemployment rate (2008-2013)

Sources: Eurostat, European Commission estimates and ESCB calculations.

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33 Prepared by Peter Nellermann.
34 Moreover, the decomposition of structural unemployment by age groups shows that, while representing a relatively small group on the labour market, 15 to 24-year olds contribute substantially to the increase in the structural unemployment rate.

Chart 38 Structural unemployment in the euro area

EC
IMF
OECD
actual unemployment rate
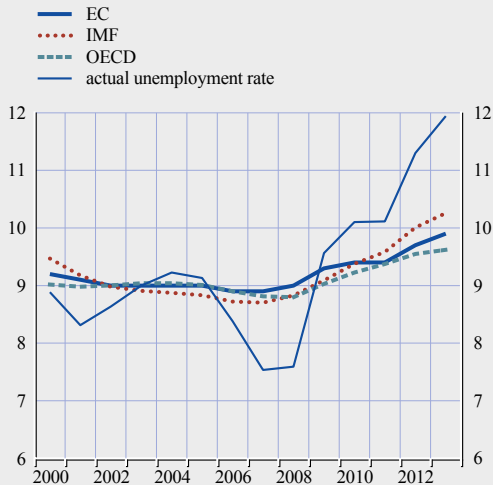
Sources: EC, Eurostat, IMF, OECD and ESCB calculations.

Chart 39 Dispersion of structural unemployment between countries

EC
IMF
OECD
unemployment rate
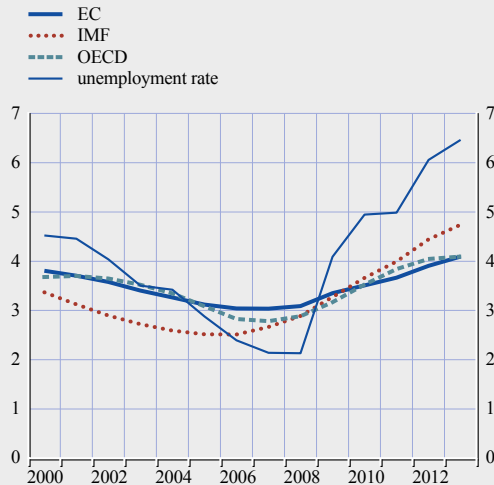
Sources: EC, Eurostat, IMF, OECD and ESCB calculations.
Notes: The series are an aggregation of each institutional organisation. Dispersion is calculated as the standard deviation of differences between country-level structural unemployment estimates and the euro area average. For a discussion on dispersion indices see Martin (1997).

with some countries experiencing significantly larger estimated increases in structural relative to cyclical unemployment. Moreover, as illustrated in Chart 38, across all three organisations, structural unemployment estimates rose substantially with the onset of the Great Recession, from 8.8%

Chart 40 Changes in structural unemployment before and over the crisis according to estimates of international institutions.

EC
IMF
OECD

(i) Pre-crisis (2000-2007)

(ii) Crisis period (2007-2013)

1 DE	4 BE	7 LU	10 LV	13 PT	16 GR
2 SK	5 FI	8 FR	11 IT	14 EE	17 IE
3 MT	6 AT	9 NL	12 SI	15 CY	18 ES
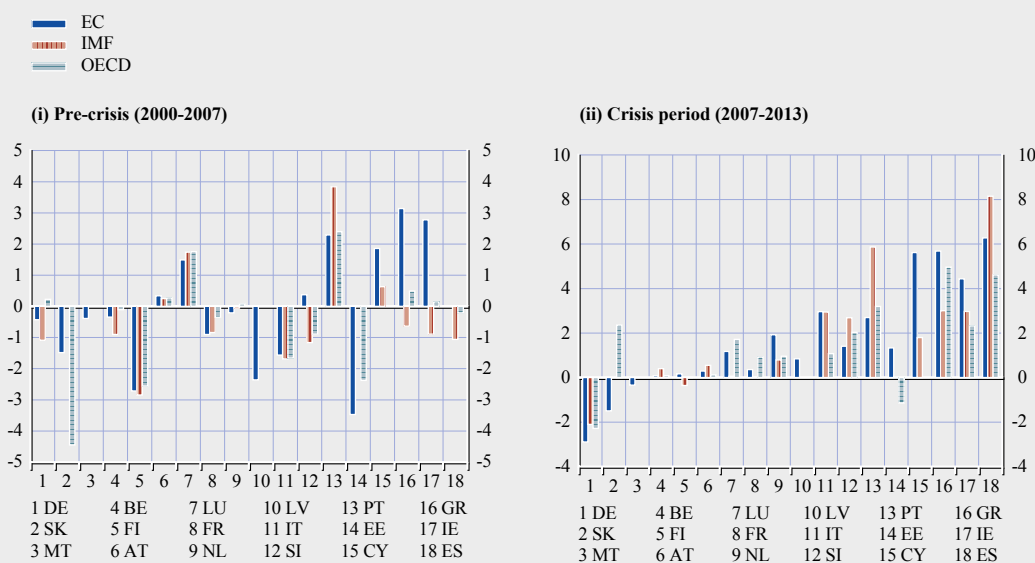
Sources: EC, IMF, OECD and ESCB calculations.
Notes: Countries are ordered by the changes in structural unemployment rate over the period 2007-11 according to the EC estimates, which covers all countries. See Chart 2 in Annex A.

in 2008 to 9.4% in 2010 in the euro area, following generally downward tendencies over much of the pre-crisis period. More recently, however, and following the onset of the second recession of 2011-13, estimates have risen further, averaging around 10.3% by 2013.

In addition to the strong rise in structural unemployment estimates for the euro area, the crisis has seen also a strong rise in cross-country dispersion (see Chart 39), reflecting large differences in structural unemployment developments across euro area countries. This heterogeneity is illustrated in Chart 40, which compares estimates of structural unemployment rates in individual euro area countries for the pre-crisis years (2000-07) with the period 2007-13.[35] Before the crisis, estimates of structural unemployment had been decreasing. While over the course of the crisis, structural unemployment estimates increased in most countries, significant cross-country differences remain regarding the magnitude of those increases. Marked increases are evident in those countries most strongly affected by the crisis – e.g. Spain, Greece, Ireland and Portugal – while Germany, Belgium, Austria and Finland show stable or slightly declining structural estimates. This cross-country divergence has become stronger still since the advent of the sovereign debt crisis.[36]

3.2.2 UNCERTAINTY RELATED TO THE ESTIMATION OF THE STRUCTURAL UNEMPLOYMENT RATE

Estimates of structural unemployment vary by institution, by methodology and over time and are surrounded by considerable uncertainty – given the largely unobserved nature of many of their inputs. Chart 41 illustrates the heterogeneity of structural unemployment rates for individual euro

Chart 41 (a) Range of estimates of euro area structural unemployment made in 2014 (b) Range of estimates and vintages

1 AT	7 BE	13 IE
2 LU	8 FR	14 SK
3 NL	9 SI	15 CY
4 DE	10 IT	16 PT
5 MT	11 EE	17 GR
6 FI	12 LV	18 ES
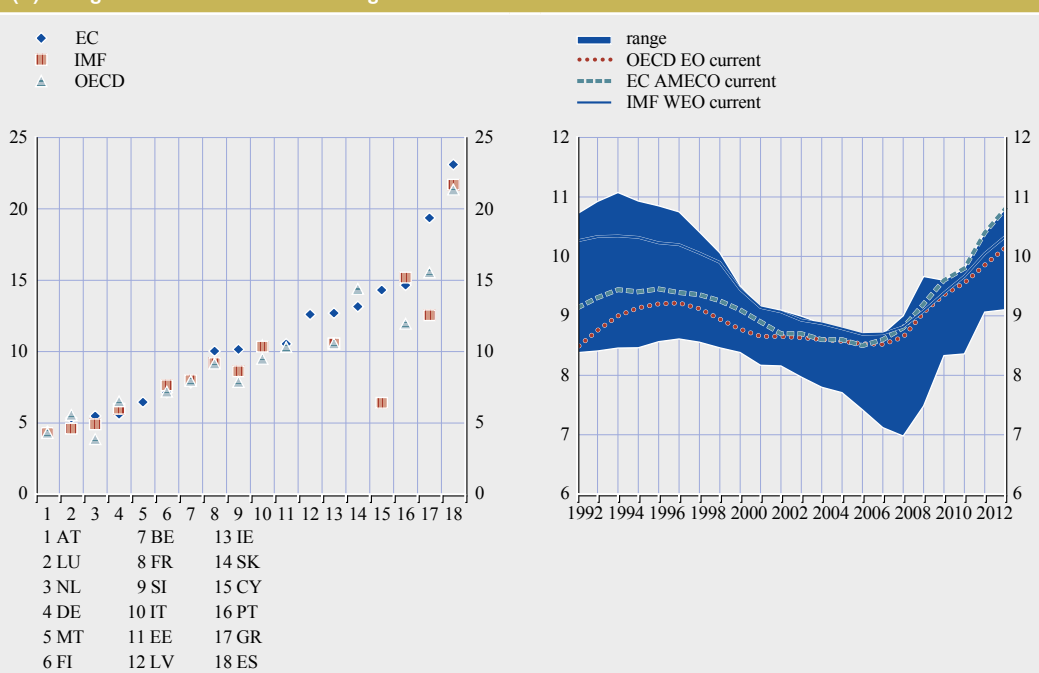
Sources: European Commission, IMF, OECD and ESCB calculations.
Notes: In the chart to the left countries are ordered by the European Commission estimates of structural unemployment. In the chart to the right the lines show the latest estimates of structural unemployment for each institutional organisation. The range covers the highest and the lowest estimate of the structural unemployment that any of the institutional organisations have estimated between 1992 and 2013.

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35 Structural unemployment developments over the two phases of the crisis are given in Chart 2 of Annex A.
36 Even though dispersion across the euro area countries has increased, within-country dispersion – i.e. between regions within most of the countries – has remained virtually unchanged.

area countries, as estimated by three international institutions. The vertical distance in the estimates for each country highlights the uncertainty surrounding these estimates. Although relatively modest in most countries, sizeable differences exist for several of the stressed economies – e.g. Cyprus, Portugal, Greece and Spain.

The uncertainty surrounding the estimates of structural unemployment for the euro area is further illustrated in Chart 41 showing the range of estimates and vintages. Estimates of structural unemployment rates for the period just before and after the crisis (2005-13) have been successively revised up – to the extent that the latest vintages remain at the top of the range of estimates.

3.2.3 POTENTIAL EXPLANATIONS FOR HIGH STRUCTURAL UNEMPLOYMENT

There are several factors behind the elevated structural unemployment. The main reason behind the strong increase of the structural unemployment estimates, in particular in the stressed countries, might be wage-setting institutions which inhibit the wage adjustment mechanism.[37] At the same time, high levels of structural unemployment are likely to be related to other, various institutional features of the individual countries, including: labour market institutions (including employment protection legislation, unionisation, labour market duality, etc) limiting the free functioning of local labour markets[38]; as well as the signals from the wider tax and benefit systems, which may distort (negatively or positively) the decision-making processes from both labour demand and labour supply perspectives.[39] In addition, at the present juncture, ongoing uncertainty (relating to the strength of the recovery) may slow the rate at which workers are rehired, augmenting further the risks that those currently displaced may become less employable, disaffected or marginally attached to the labour market. Aside from these institutional features and temporary uncertainties influencing structural unemployment estimates at the present time, there may be additional structural features which help to explain the rise in long-term unemployment across the euro area labour market – namely, a structural mismatch between worker attributes and job requirements. These aspects are examined in detail below, while Box 4 documents the progress in structural reforms in euro area countries, necessary for combatting structural unemployment.

37 If nominal or real wages are rigid the adjustment to demand shocks partly takes place in terms of unemployment.
38 The European Commission (2013) argues that the estimated NAWRU, which is the unemployment rate that allows inflation to be kept constant, diverges from structural unemployment only depending on structural factors such as institutions.
39 Some support to the findings of the importance of labour market institutions is found in the literature investigating the link between actual unemployment and labour market structural indicators e.g. Nickell (1997), Bassanini and Duval (2006) and Elmeskov et al. (1998).

Box 4

LABOUR MARKET REFORMS BEFORE AND DURING THE CRISIS[1]

The favourable developments in euro area labour markets over the decade prior to the global financial crisis partly reflect previous structural reforms. Tax wedges were reduced in the majority of euro area countries while unemployment benefit administration was reformed in some euro area countries by tightening work availability or eligibility conditions and/or shortening the duration of benefits. Several reforms aimed at reducing early retirement, with increases in the statutory retirement age and lowering of the financial incentives to retire earlier. On average, these measures seem to have stimulated labour supply, particularly for older workers.

1 Prepared by Robert Anderton and other contributors.

The labour market reforms introduced in Germany in the early 2000s (the Hartz reforms) appear to constitute a good example of successful reforms contributing to a better labour market performance in the current crisis. The reform strategy included improving employment services and redesigning active labour market policy measures so as to activate the unemployed, reduce unemployment benefit duration and stimulate labour demand by deregulating segments of the labour market and promoting low paid part-time employment ("mini jobs"). As part of the reforms to unemployment benefits, eligibility criteria became stricter and sanctions for refusing a job offer were increased. The follow-on unemployment assistance programme, which provided means tested benefits, potentially indefinitely, was merged with the less generous social welfare programme. As a result, the reservation wage fell and the search intensity of the unemployed increased. Moreover, some institutional restrictions concerning temporary employment agencies and temporary work contracts were loosened. Finally, the reforms also helped to improve the matching of unemployed and vacancies thereby contributing to a reduction in unemployment. In addition, the increased use of working time accounts, in conjunction with publicly sponsored short-term work measures ("Kurzarbeit") were also factors which limited the fall in employment in Germany during the Great Recession in the first phase of the crisis.

More broadly across the euro area countries, following the start of the crisis in 2008, policy measures initially focused on supporting aggregate demand and boosting employment. To mitigate the impact of the crisis on employment, measures encouraging flexible working time arrangements also emerged. As the crisis evolved, policy reactions changed in more fundamental ways, especially in those euro area countries more affected by the crisis where the need for substantial labour market reform became increasingly more evident.

During the crisis, labour market reforms have been implemented particularly in the stressed countries (i.e. particularly Greece, Ireland, Portugal, Spain, Italy and Cyprus). In the case of labour market institutions, these reforms in Greece included the change of the minimum wage from a bargained (between social partners) to a statutory minimum wage set by the government in consultation with the social partners; the introduction of sub-minimum wages for youth; a shift away from sectoral-level collective agreements to firm-level agreements; introduction of the possibility for firms to opt out of the sectoral-level agreement; introduction of rationalisation of severance payments and firing procedures (reduction in notice times). The need to immediately restore competitiveness also prompted a reduction in the level of the minimum wage. In Ireland, sectoral wage agreements are being reformed to ensure that they are more flexible and responsive to economic conditions, while labour market activation and training policies have also been strengthened. In Portugal, a significant reduction of severance payments was implemented, together with an increase in the flexibility of working time, reduction of overtime pay, easing of the definition of individual dismissals (based on economic reasons and lack of competences), and a larger scope for collective bargaining at firm level. In addition, the unemployment insurance system has been revised by reducing benefit replacement rates and the maximum duration of benefits. These reforms were accompanied by a strong package of active labour market policies, covering both youth and long-term unemployed.

Spain has also recently implemented labour market reforms. The main aims of these reforms were to increase the internal flexibility of firms, paving the way for companies to be able to modify certain aspects of their working conditions relative to the provisions of sectoral-level collective bargaining agreements, and to reduce employment volatility by increasing the incentives for permanent contracts. The collective bargaining system was also modified to allow
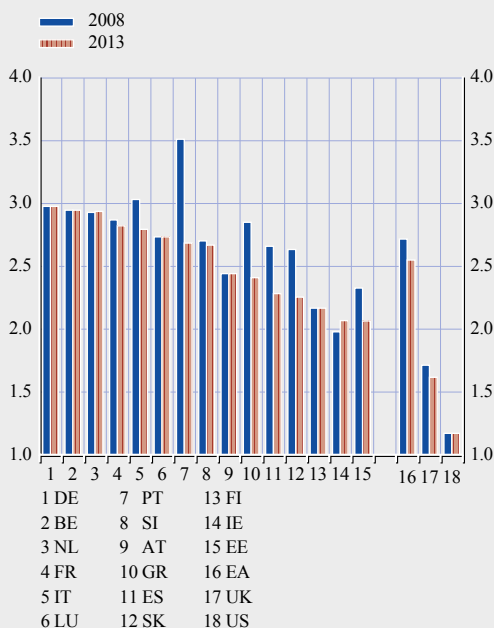
firm-level collective agreements to prevail over upstream ones and, in February 2012, a labour market reform was implemented with additional measures to significantly increase wage bargaining decentralisation and reduce employment protection legislation (EPL) for permanent workers.

In Italy, the 2012 reform aims to reduce dualism, relaxing the discipline for individual dismissals for permanent workers and slightly increasing social security contributions for temporary workers (followed by the so-called 'Jobs Act' (2014) which also addresses dualism as well as a further revision of the regulation on dismissals).[2] In June 2011 the "Accordo Interconfederale" stated that national contracts may define the areas in which firm-level contracts can derogate from national provisions if signed by the majority of employees.[3] In 2014 Social Partners agreed upon a "Consolidated Act on Representation" in order to reduce uncertainties in bargaining rounds by providing effective enforceability for industry-wide and company level

Chart A Employment protection legislation

(OECD indicators for individual and collective dismissals-regular contracts)

Sources: OECD and ESCB calculations.

agreements. Nevertheless, the impacts of these labour market reforms remain uncertain. Cyprus suspended the application of wage indexation during the crisis and its system of wage indexation is being reformed, while unemployment benefits and social assistance schemes are currently being reviewed in order to be means tested and to improve the incentives to take up work. In 2013, France introduced the national inter-professional agreement with the aim of giving more flexibility to employers to respond to changing economic conditions whilst at the same time introducing new rights for employees.[4]

These efforts notwithstanding, progress in labour market reform remains partial and uneven across the euro area. While the impact of reforms that have already been undertaken may take some time to produce their fuller effects, more is required across the euro area countries to achieve the degree of labour market flexibility compatible with membership of a monetary union. For example, many euro area countries need to make substantial reforms in the area of employment protection regulation if they are to reach higher levels of flexibility prevailing in other OECD countries such as the UK and USA (Chart A). The need for more encompassing

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2 It also revised the unemployment insurance system and the wage supplementation fund by expanding coverage and making instruments more effective. Other interventions aimed at making it easier to undo economic and normative provisions of nationally bargained contracts at the local level.

3 Article 8 of the government's austerity package from August 2011 also widened the areas in which firm-level agreements can derogate both to the national contract and the law.

4 Some of the main measures include the possibility for companies, in the face of a downturn, to negotiate a temporary reduction of working hours and/or wages, as well as a simplification of both collective and individual dismissal procedures.

(as a percentage of the labour force)
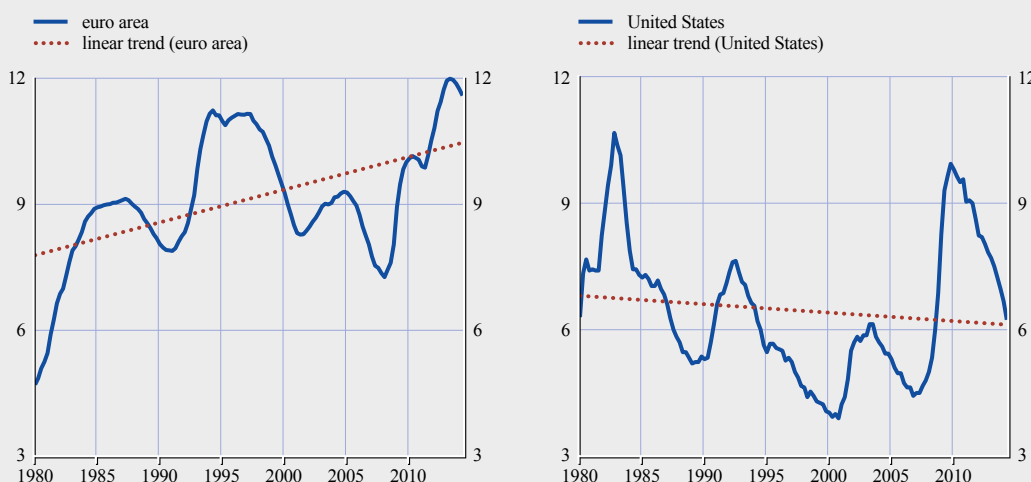
Sources: OECD and ESCB calculations.

measures to enhance the flexibility of euro area labour markets is revealed by a longer-term comparison of unemployment rates in the euro area and the United States (Chart B).

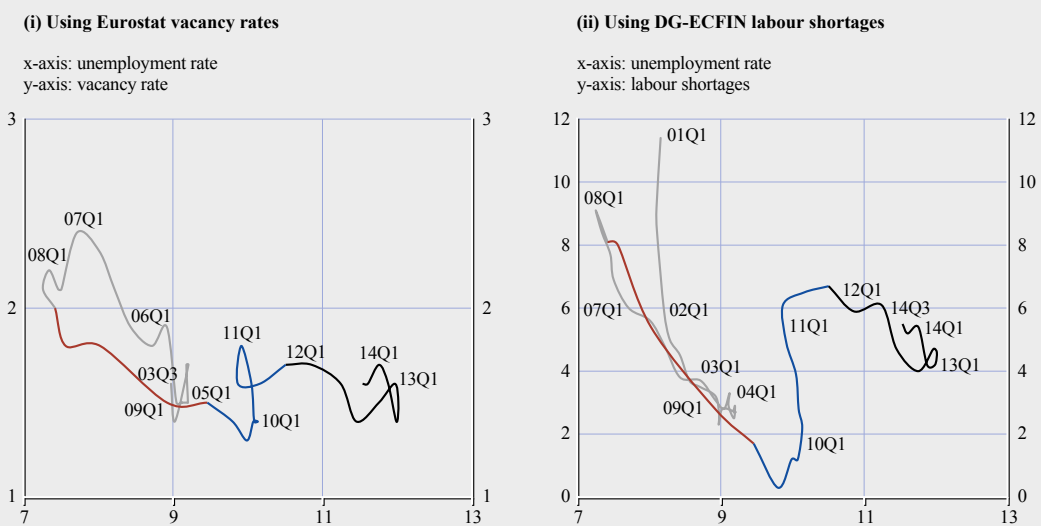We see a trend rise in the euro area unemployment rate since the 1980s, whereby upward shocks to unemployment (such as the oil price shocks of the early 1980s, etc.) tend to persist, which may be due in part to labour market rigidities. By contrast, over the same period, there is no trend increase in the unemployment rate in the United States, suggesting that upward shocks to unemployment are reversed, which seems consistent with the more flexible characteristics of the US labour market.

Flexible labour markets, combined with less rigid product markets, are crucial for euro area countries to respond optimally and rapidly to shocks and to avoid the higher costs of lost output and higher unemployment associated with the slower and more protracted adjustment of rigid economies. Indeed, the considerable increase in unemployment during the crisis in some euro area countries suggest that some labour market rigidities were particularly binding in the face of large shocks and the necessary adjustment of imbalances initially resulted in strong falls in output and employment rather than wage adjustment. Further labour market reform is necessary across the euro area economies and will help to reduce structural unemployment, and to reduce the risk of cyclical unemployment translating into further increases in structural unemployment.

3.3 BEVERIDGE CURVE DEVELOPMENTS

This section analyses developments in euro area Beveridge curves before and during the crisis. The visual inspection of the Beveridge curves suggests an outward shift in the euro area aggregated Beveridge curve, albeit with considerable heterogeneity across countries (including an inward shift of the German Beveridge curve). An econometric estimation confirms these shifts, suggesting an entrenched labour market mismatch in some euro area countries.

Chart 42 Movements in the euro area Beveridge curve, 2003Q1 (left-hand scale) and 1999Q1 (right-hand scale) to the latest observation[1)]

(i) Using Eurostat vacancy rates

x-axis: unemployment rate
y-axis: vacancy rate

(ii) Using DG-ECFIN labour shortages

x-axis: unemployment rate
y-axis: labour shortages

Sources: Eurostat, DG-ECFIN and ESCB calculations.
1) Light grey lines from 2006Q1* (left-hand scale) / 1999Q1 (right-hand scale) to 2008Q1 (pre-crisis), red lines represent the Great Recession period from 2008Q2 to 2009Q2; dark blue lines the subsequent recovery from 2009Q3 to 2011Q3, while the black lines trace the evolution of the Beveridge curve since the onset of the second recession and the subsequent recovery (i.e. from 2011Q4 to the latest observation).
* There are no vacancy data available for the period prior to 2006Q1 for the euro area aggregate.

Beveridge curve analysis provides a simple and well-established approach to investigating the extent to which developments in unemployment, and long-term unemployment in particular, may be due to transitory downturn in labour demand or a structural mismatch between worker attributes and employer job requirements. Chart 42 depicts movements in the euro area Beveridge curve according to two measures of labour demand. Panel (i) uses the Eurostat job vacancy rates; for a longer perspective, Panel (ii) the widely-used European Commission DG-ECFIN survey data on employers' perceptions of labour shortages in manufacturing as a proxy for vacancy dynamics.[40]

Prior to the crisis, the counter-clockwise movements observed in the euro area Beveridge curve since the mid-2000s reflected a typical business cycle pattern, with unemployment falling as vacancies increased. However, as it has been documented above, as the Great Recession took hold, strong declines in labour demand resulted in a strong increase in euro area unemployment, with the euro area Beveridge curve moving into the low vacancy-high unemployment space. At the initial stages of the crisis, it was not clear whether the evolution observed reflected simply the typical cyclical movements along the prevailing euro area Beveridge curve, which were likely to be reversed during a subsequent recovery, or whether these unfolding developments instead represented the first signs of an outward "shift" of the Beveridge curve, marking the start of a structural change to euro area labour markets. However, the pick-up in labour demand seen over the course of 2010 generated very little decrease in the euro area unemployment rate. The second recessionary episode, starting in the final quarter of 2011, led to a further strong increase in the unemployment rate even though the vacancy rate remained elevated. Thus far, at the aggregate euro area level, even the rebound in

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40 See Bonthuis, B., V. Jarvis and J. Vanhala (2012): "What's going on behind the euro area Beveridge curve(s)", ECB Working Paper Series No 1586, European Central Bank.

Chart 43 Beveridge curves for the four largest euro area countries, using employers' perceptions of labour shortages as proxy for vacancy rates

(x-axis unemployment rate (percentage of labour force); y-axis: labour shortages (diffusion index))
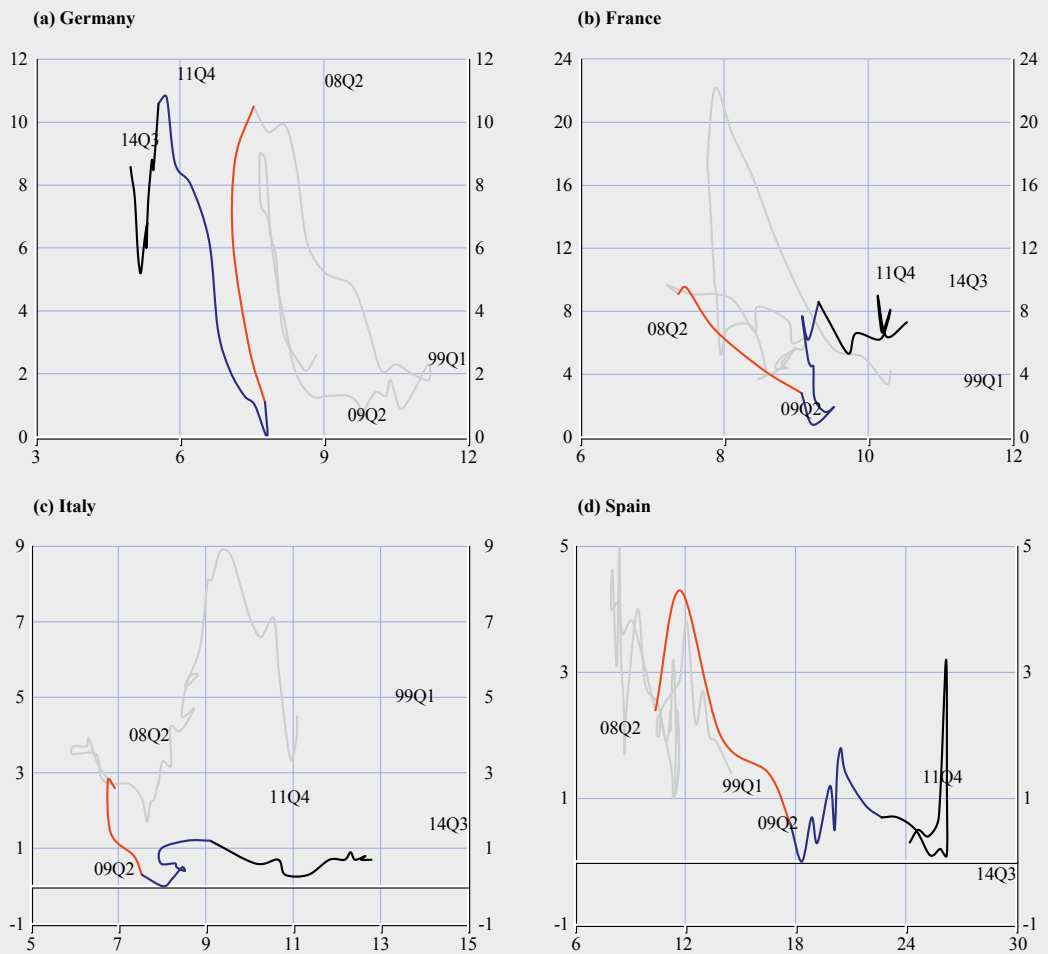
Sources: Eurostat and ESCB calculations.
Note: Harmonised euro area unemployment rate and DE-ECFIN manufacturing employers' perceptions of labour shortages. Light grey lines from 1999Q1 to 2008Q1, red lines represent the Great Recession period from 2008Q2 to 2009Q2; dark blue lines the subsequent recovery from 2009Q3 to 2011Q3, while the black lines trace the evolution of the Beveridge curve since the onset of the second euro area recession (i.e. from 2011Q4 to the latest observation).

activity seen since the second quarter of 2013 has not yet resulted in any reversal of the apparent outward (north easterly) shift in the euro area Beveridge curve, away from its pre-crisis values, suggesting signs of entrenched mismatch in some euro area labour markets.

Chart 43 and Annex C show the range of diversity at country level behind the euro area aggregate, by showing the markedly different Beveridge curve developments for the four largest euro area economies, again using manufacturing employers' perceptions of labour shortages as a proxy for vacancy developments.

From visual inspection, it seems that the crisis had a relatively short-lived impact on the German labour market as unemployment fell over most of the period under review. Even at its worst, the steep decline in labour demand from mid-2008 to mid-2009 left the unemployment rate broadly

unchanged. The resilience of the German labour market over the Great Recession is partly due to the relatively low unemployment inflows as the private sector made extensive use of short-time working schemes over the depths of the Great Recession in response to the (perceived) temporary downturn in global trade. In addition, outflows from unemployment were only mildly influenced by the crisis. The increase in vacancies from mid-2009 to end-2011 was accompanied by falling unemployment. Since then, unemployment has continued to fall despite a further recession in 2012Q4-2013Q1. The inward shift in the Beveridge curve suggests an apparent improvement in the structural efficiency of the German labour market, likely in large part attributable to the effects of the labour market reforms introduced in the mid-2000s[41].

In France, the strong rebound in perceived labour shortages during 2010 left the unemployment rate unchanged at around 10%. While for much of the inter-recession period, it remained an open question whether the French labour market would return to its typical pre-crisis patterns, with the onset of the second recession from 2012Q4, the French Beveridge curve appears to have shifted to the right, reflecting rising unemployment despite a high (and stable) vacancy rate (compared to its EMU pre-crisis average, from 1999Q1 until 2008Q1). Similar patterns have also been evident in Italy, where the labour market adjusted sluggishly to the onset of the crisis in 2008, leaving the unemployment rate broadly unchanged despite a marked decline in vacancies. Developments seen since the start of the second recession are more difficult to interpret. Although there are signs of a shift in Italy's Beveridge curve since the end of 2011, the unemployment rate remains above but close to its pre-EMU accession levels. Furthermore, given the historically low level of vacancies seen since the beginning of the crisis, it might be too early to draw strong conclusions on the cyclical or structural nature of Italy's Beveridge curve developments.

Conversely, the Spanish Beveridge curve unambiguously moved away from the origin and its pre-crisis observations, with a decline in vacancies concurrent with a steep increase in the unemployment rate, particularly over the course of the Great Recession of 2008-09, resulting in an increase in that country's unemployment rate by over 7.0 percentage points by 2009Q2. While Spanish unemployment rose throughout the interim period, since 2008Q2 the unemployment rate has increased by nearly 16.0 percentage points (and 12.0 percentage points on its EMU-entry level). Despite a series of labour market reforms which began in 2012, unemployment has been slow to react, although it has stabilised in the most recent period.

In the stressed countries of Spain and Greece there is evidence of an outward shift in the Beveridge curve, suggesting emerging structural problems in the labour market (see Annex C). The same picture also emerges in the Netherlands and Slovenia. In other countries, including Austria, Belgium, Estonia, Finland, Malta and Slovakia, the Beveridge curve follows typical business cycle dynamics (either showing a counter-clockwise movement or evolving within its pre-crisis values). Movements of Luxembourg's Beveridge curve, as depicted by harmonised Eurostat data, are more ambiguous and have to be interpreted with caution because of the lower responsiveness of unemployment to labour demand given Luxembourg's exceptionally high cross-border flows into total employment.[42]

Rather than seek to reproduce Beveridge curves for each of the 18 euro area economies, Table 2 "clusters" as far as possible euro area and country-level developments since the onset of the crisis

41 The major aspects of the Hartz-reforms were improving employment services, redesigning active labour market policies, activating the unemployed (via the reduction of the unemployment benefits duration, stricter eligibility criteria or the introduction of sanctions in case of job refusal) and the fostering of labour demand by deregulating the labour market.
42 Cross-border workers, whose employment adjusts promptly to changes in output and vacancies, do not contribute to Luxembourg's unemployment rate. In addition, LFS data are subject to small sample bias and methodological changes that intervened in 2009. Unemployment data from national administrative sources depict a clear outward shift of Luxembourg's Beveridge Curve over the last decade.

Table 2 Cluster analysis of Beveridge curve movements for euro area and countries

| | "Eyeball" method[1] | | Econometric Specification[2] |
	Vacancy rates	Labour shortages	
No shift	CY, EE, FI, [IT?], LV, [NL?], SK	AT, BE, [?CY?], EE, [?IT?], LV, [LU?], MT, [PT?]	BE, EE, IT, LU, MT, AT, PT, SI
Shift: (+) reflects outward shift; (-) denotes apparent inward shift	DE(-), euro area(+), ES(+), FR(+), [?GR(+)?], SI(+)	DE(-), euro area(+), ES(+),[3] [?FI(-)?], FR(+), [?GR(+)?]	EA (+), DE(-), ES(+), FR(+), NL(+), GR(+)

Sources: Eurostat and ESCB calculations.
1) Assigned on the basis of visual inspection of recent (post-2008) developments compared to the series dynamics since 1999Q1 (see Annex C for full series by country); no assignment of AT, BE, LU and MT using vacancy rates, IE using labour shortages, due to data limitations.
2) Updated using methodology developed in: Boele Bonthuis, Valerie Jarvis and Juuso Vanhala, "What's going on behind the euro area Beveridge curve(s)?" (ECB WP No. 1586, September 2013). Results are presented only for those countries with "well behaved" Beveridge curve specifications (i.e. parameter estimates on labour shortages variable significant at 5% level and no unit root on lagged dependent variable). In the original analysis, three remaining economies – IE, GR and CY – also suggested an outward shift since the onset of the crisis, but their respective Beveridge curves were not well specified statistically.
3) Difficult to judge with certainty due to structural breaks in series. See Table 1 in Annex C for country specific estimates.

using three distinct metrics: a visual inspection of apparent developments using the official Eurostat job vacancy rates; visual inspection, substituting employers' perceptions of labour shortages (as used above) as a proxy for vacancy developments; and an econometric specification examining Beveridge curve developments from a statistical perspective.

While the various series yield somewhat different groups of countries, three economies – the euro area aggregate, France and Spain – consistently stand out as having exhibited clear signs of an outward shift in their respective Beveridge curves. This result holds regardless of the measure of vacancies or structural form of the econometric specification.[43] However, for all countries included in the lower row of Table 2 (except Germany), the evidence suggests emerging mismatch between labour demand and supply.

3.4 EVIDENCE OF SKILL MISMATCH [44]

This section examines the recent evolution of skill mismatches between labour supply and labour demand across 16 member states of the euro area.[45] Using microeconomic data, three skills mismatch indices are presented, computed at the regional, country and euro area level. The three indices registered a marked increase since the onset of the crisis, decreased somewhat in 2011 before increasing again in the second phase of the crisis.

The method applied to construct a skill mismatch indicator measuring the gap between the skill distribution of labour demand and labour supply uses data from the European Labour Force Survey for the period 1998-2012. This dataset allows us to derive labour demand (proxied by employment

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43 Several additional specifications have been tried. The choice of the most satisfying specification has been guided by the fact that countries clearly showing an outward or an inward shift using the eyeball method (especially Spain and Germany) should get significant estimates of a shift in the econometric estimation of their Beveridge curves. Using a time trend instead of the EMU dummy, ES, FR, EA and DE (among others) still appear significant. In addition, we created an additional dummy accounting for the second part of the crisis, equal to 1 starting from the first of two consecutive quarters of increase in the harmonised long-term interest rate (secondary market yields of government bonds with a remaining maturity close to ten years). Even though many countries appeared to have a significant shift of their Beveridge curves, we decided to exclude it since it did not include ES.
44 Prepared by Mario Izquierdo.
45 Malta and Latvia are excluded, due to data limitations at the time of analysis.

levels) and labour supply (defined as the whole labour force) based on six International Standard Classification of Education (ISCED) levels of education.[46]

Specifically, the Skill Mismatch Index (SMI) is constructed for each country i at period t using the following formula[47]:

$$SMI_{it} = \sum_{j=1}^{6} (S_{ijt} - D_{ijt})^2 \qquad (1)$$

where j is the skill level, S_{ijt} is the share of the labour force with skill level j in country i at time t, and D_{ijt} is the share of employees with skill level j in country i at time t. SMI can be computed at different aggregation levels (country-level, regional level within each country, and also at a euro area level). These different indexes will all be computed for the same aggregation level (euro area), but the one derived at the euro area level reflects differences in the aggregate skill distributions, whereas the latter use disaggregated skill distributions (by country or region). Thus, if there is a lack of certain skills in some countries, compensated by an excess in others, then the SMI calculated at the euro area level will tend to underestimate the degree of mismatch, because the aggregate skill distribution will not capture the full nature of this cross-country heterogeneity. By contrast, the SMI calculated at the country level will deliver a higher degree of mismatch because mismatches of different types will not cancel out. Therefore, it is possible to extract conclusions from the comparison of both indexes: their difference can be interpreted as the size of the mismatch that is caused by a mobility problem. As a check on the robustness of the results presented, an alternative SMI using the distribution of skills of the unemployed (rather than the whole labour force) is also provided.

EMPIRICAL RESULTS FOR SKILL MISMATCH

Chart 44 shows the SMI computed at three different levels of aggregation. The euro area index reflects differences between the aggregate skill distributions of labour demand and supply. The country index is constructed by aggregating 16 SMIs computed using country-level skill distributions. Finally, the regional index is the aggregation of SMIs computed at a regional level.

There was a strong increase in mismatch in the initial phase of the crisis according to all of the 3 indexes plotted in the top panel of Chart 44. This increase reflects a substantial intensification of educational mismatch in euro area labour markets since the start of the crisis in 2008. Looking at the more recent evolution, it seems that while the SMI decreased somewhat in 2011, recent data point to an additional increase in the mismatch in euro area labour markets, with the SMI reaching a new maximum at the end of 2012. At the same time, a higher gap between the SMI computed at the regional level has appeared compared with the other two SMIs. This may suggest that, at least partially, this most recent increase in SMI could be significantly mitigated by higher labour mobility between euro area regions.

Moreover, as a robustness check, Chart 45 plots SMI when skill supply is proxied by the stock of unemployed workers (rather than the total labour force). Although the main results are similar, the increase in the skill mismatch in the second phase of the crisis could have been a little lower than the one indicated by the previous SMI. In any case, the educational mismatch between supply and

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46 The levels of education are the following: primary education or less; lower secondary education; upper secondary education; post-secondary – non-tertiary education; first stage of tertiary education; and second stage of tertiary education.

47 The sum of absolute deviations were also calculated (instead of the sum of squares), with very similar results, both for the aggregate and for individual countries.

Chart 44 Skill mismatch in the euro area labour market: workers vs labour force

— euro area
····· country
---- region
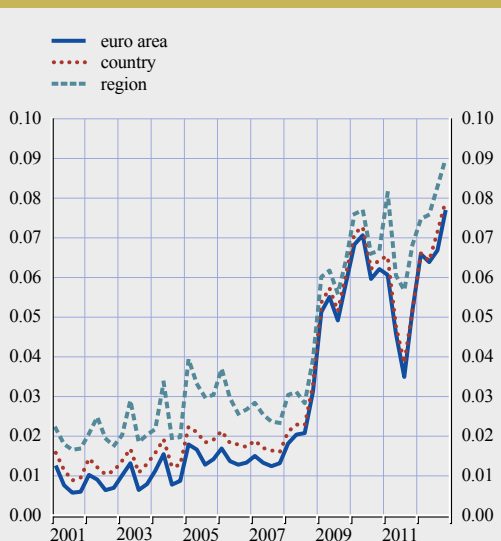
Sources: Eurostat and ESCB calculations.

Chart 45 Skill mismatch in the euro area labour market: workers vs unemployed

— euro area
····· country
---- region
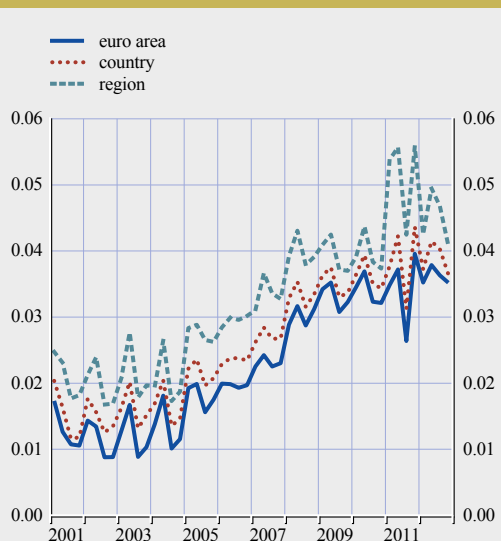
Sources: Eurostat and ESCB calculations.

demand in euro area labour markets has remained at high levels in the more recent period and may be indicating difficulties for significant reduction in unemployment rate in the incipient recovery phase of activity in the euro area at the beginning of 2014.[48]

RESULTS AT THE COUNTRY LEVEL

Chart 46 reports the SMI for stressed and non-stressed countries, calculated as the difference in skills between the labour force and employment. Focusing on the more recent evolution, skill mismatches remained at high levels in most euro area countries, especially in the stressed euro area countries (Chart 47), such as Spain, Greece, Ireland and Portugal, where increases already occurred in the first phase of the crisis. In other stressed countries– Italy, Cyprus and Slovenia – skill mismatch has recently significantly increased while this was not the case in the first years of the crisis. Finally, other countries managed to keep skill mismatch subdued over the whole period (Austria, Belgium) and, in some cases (as in Germany) a mild decrease is observed. In this respect, Estonia appears to be a remarkable case, as most of the large increase in SMI in the

Chart 46 SMI across stressed and other euro area countries

— stressed countries
····· other euro area countries
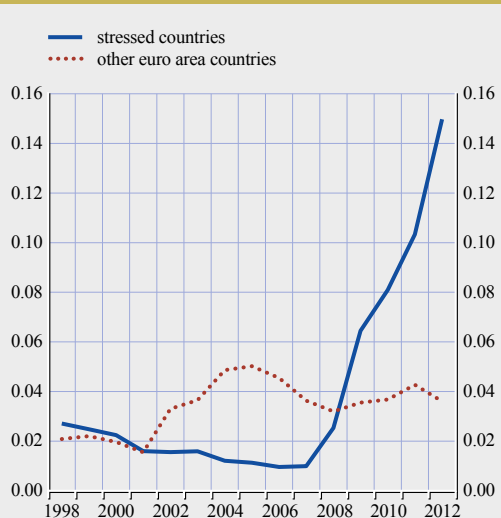
Sources: Eurostat and ESCB calculations.

48 Additional results are available using the different definitions of SMI computed in SIR-2012. On a general basis, the results are robust to these different definitions, showing a similar level of educational mismatch in the euro area labour markets independently of the definition used.

first part of the crisis has already largely dissipated in 2012. Overall, the skill mismatch index of the stressed countries shows an upward trend during both phases of the crisis, reaching unprecedented levels since the inception of the euro.

Chart 47 SMI across countries

Sources: Eurostat and ESCB calculations.
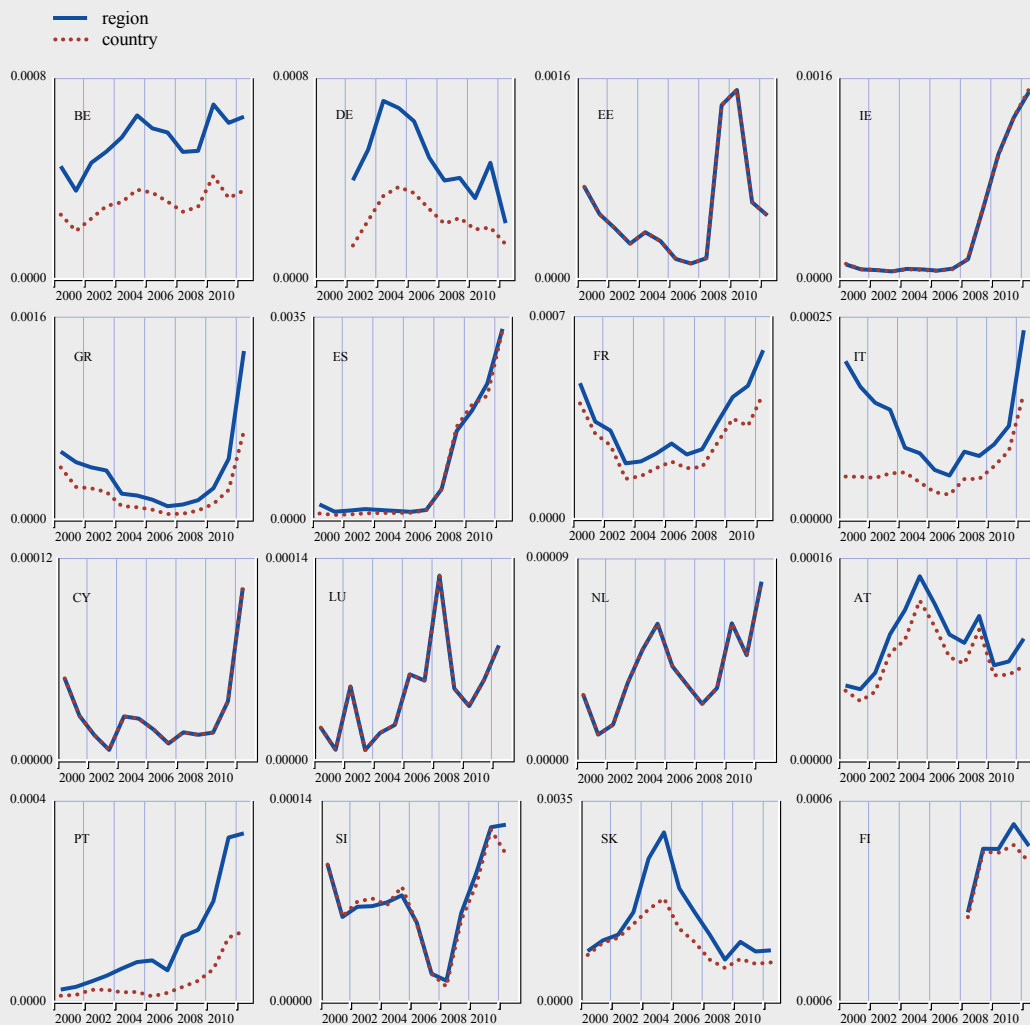
4 THE ADJUSTMENT OF WAGES DURING THE CRISIS

This chapter first investigates the extent of wage adjustment in euro area countries since the start of the crisis by looking at developments in several wage and labour cost indicators. Preliminary evidence seems to suggest that the wage response in the euro area was rather limited during the first phase of the crisis; however, wages seemed relatively more responsive to unemployment in the second phase of the crisis. This is broadly confirmed by wage equation estimates for the euro area based on aggregate data which suggest tentative evidence of downward wage rigidities in the euro area, although this result applies to all downturns and not just to the recent crisis period. During the second phase of the crisis the downward rigidities seem to have become somewhat weaker, partly related to the implementation of structural reforms in labour markets across a number of euro area countries, and/or to public sector wage restraint associated with fiscal consolidation. Box 5 shows that, in comparison to estimates based on aggregate data, the response of euro area real wages to unemployment is generally significantly stronger when individual level micro data are used to account for the effects on wages of changes in the composition of employment.

4.1 A CLOSER LOOK AT THE EVOLUTION OF WAGE INDICATORS

At the beginning of the first phase of the crisis in 2008, all four of the euro area nominal wage indicators presented in Chart 48 continued the upward movement observed in the second half of 2007. [49] As regards compensation per employee and negotiated wages, this mostly reflected stipulations in wage contracts concluded before the crisis, since the average length of wage contracts in the euro area ranges between one and three years (Du Caju et al., 2008). The upward trend started to reverse in the second half of 2008 and a slowdown of the growth rates of compensation per employee and negotiated wages was observed thereafter, which levelled off in 2009/2010 and picked up again in the first half of 2011.

When hours worked is taken into account, the upward movement in labour costs during the first phase of the crisis continued until the beginning of 2009. This merely reflected the large downward adjustment in hours worked observed in some euro area countries and a less than proportional reduction in compensation. When the downward movement of working time stopped, hourly compensation started to slow down, reaching relatively low growth levels in 2010, although it picked up again in 2011 possibly reflecting lagged responses to the ongoing recovery at that time. Shortly after the start of the downturn in the second phase of the crisis, some wage indicators began to decelerate (such as hourly labour cost and compensation per employee), while others

Chart 48 Euro area wage indicators

(annual percentage change)

— compensation per employee
····· hourly labour cost
--- negotiated wages
— compensation per hour
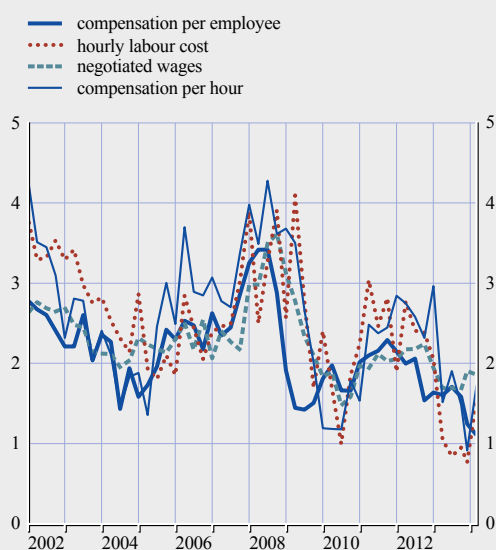
Sources: Eurostat and ESCB calculations.

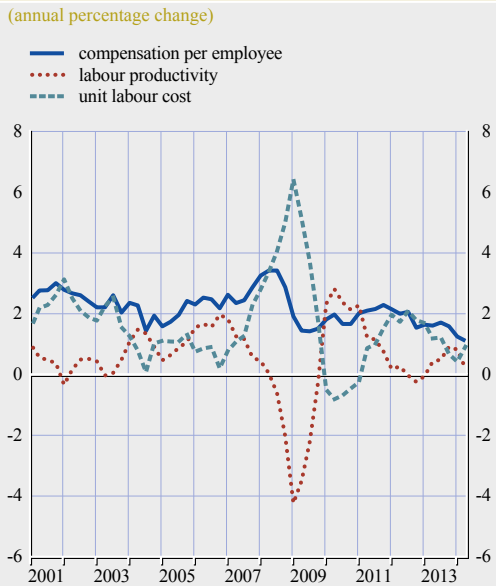49 In part, these computations based on aggregate data may suggest a somewhat more muted response than seen at firm level, due to changing composition effects. In brief, given the strong concentration of job losses among the less skilled (and lower paid) workers, to some extent the lack of adjustment may also reflect the growing proportions of higher-skilled/higher-paid workers in aggregate workforces.

decelerated later (compensation per hour and negotiated wages). However, as the second phase of the downturn continued, the growth rate of wage indicators fell sharply and – despite the relatively more limited fall in GDP in the second phase – decelerated to the low wage growth rates seen at the trough of the first phase of the crisis.

Turning to unit labour costs (ULCs), labour hoarding resulted in a sharp drop in productivity per employee during the first phase of the crisis. As a consequence, unit labour costs increased strongly during the early stages of the recession, and then decelerated in the course of 2009, before falling in 2010 as compensation growth moderated and productivity growth rebounded strongly (see Chart 49). Unit labour costs returned to positive growth rates in 2011 and continued to increase as productivity fell in response to the fall in activity during the second phase of the crisis. However, in line with the deceleration in compensation and hourly labour costs, unit labour costs began to slow down markedly as the downturn of the second phase took hold.
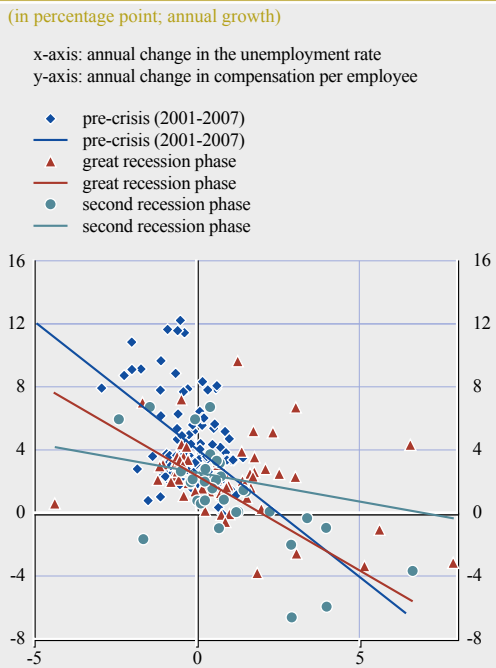
Taking into account the intensity of the crisis, the wage response in euro area countries during the first phase of the crisis appears to have been rather limited. Chart 50 shows a traditional Phillips curve relationship between changes in compensation per employee and unemployment changes at country level both in the period before the crisis (2001-2007) and in the two phases of the crisis. During the first phase (2008-2011), the estimated response of wages to changes in the unemployment rate seems to have been lower than in the pre-crisis period. However, the responsiveness of wages to unemployment seems to increase in the second phase of the crisis compared to the first phase (i.e. the Phillips curve becomes steeper), although wages still appear less responsive than in the pre-crisis period. A more structural analysis of wage determination is presented in Section 4.2 below and tends to confirm these differences in wage responses between the two phases of the crisis.

Chart 49 Euro area labour cost indicators

(annual percentage change)

— compensation per employee
····· labour productivity
---- unit labour cost

Sources: Eurostat and ESCB calculations.

Chart 50 Phillips curves for the euro area

(in percentage point; annual growth)

x-axis: annual change in the unemployment rate
y-axis: annual change in compensation per employee

♦ pre-crisis (2001-2007)
— pre-crisis (2001-2007)
▲ great recession phase
— great recession phase
● second recession phase
— second recession phase

Sources: Eurostat and ESCB calculations.
Note: Latvia is excluded from the sample due to data limitations.

There were differences in wage developments between the private and public sectors in euro area countries. While the growth rate of private sector hourly compensation continued increasing during the initial stages of the downturn in the first phase of the crisis (Chart 51), the growth of hourly public sector compensation stabilised immediately, as short-time working schemes were less common in this sector and few strong reductions in hours worked were observed. In addition, some countries introduced temporary wage freezes or cuts to nominal wages in the public sector. In both sectors, hourly labour cost growth had slowed down to 1% by the end of 2009. In the private sector, the trough was reached in the second quarter of 2010, while compensation growth continued to slow down more rapidly in the public sector and was close to zero in the third quarter of 2010. By the third quarter of 2011 the compensation growth rate in the private sector rebounded to more than 3%,

Chart 51 Euro area compensation per hour: private and public sectors

(annual percentage changes)

— private
···· public

Sources: Eurostat and ESCB calculations.

while public sector compensation growth, at around 1%, remained more subdued. However, as the second phase of the downturn continued, the growth rate of private sector compensation decelerated markedly towards lower growth rates similar to the public sector, and reaching the low wage growth rates seen at the trough of the first phase of the crisis (see Chart 51).

Chart 52 Wage evolutions in France (left-hand-scale) and Spain (right-hand-scale)

(annual percentage change)

— compensation per employee
···· hourly labour costs
--- hourly compensation
— negotiated wages

Sources: Eurostat and ESCB calculations.
Note: CPE is nominal compensation per employee.
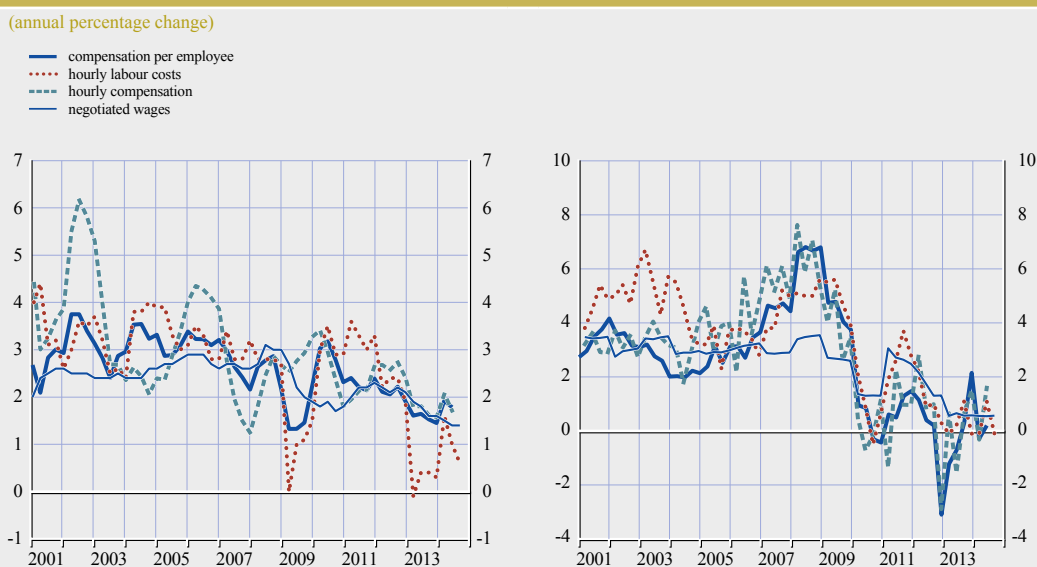
Turning to country level, it is clear that many of the stressed countries experienced quite substantial decelerations in wage growth during the crisis. This is well illustrated by Spain, which shows considerable wage moderation during recent years, largely in response to factors such as public sector pay restraint driven by fiscal consolidation concerns, higher unemployment, as well as some possible impacts from recent labour market reforms (Chart 52). Turning to other larger countries, France provides an interesting contrast to Spain. Although during the initial stages of the crisis we see some deceleration in wage growth in France, while at the same time wages carried on growing in Spain, in more recent years French wage growth has shown less wage moderation which seems due to the following factors: it has not experienced heavy pressure from financial markets to apply fiscal consolidation; it has experienced a smaller increase in unemployment; and has implemented fewer structural reforms (Chart 52). Meanwhile, the rest of the larger countries show a variety of wage responses at different times, but most exhibit some slowdown in wage growth during the last couple of years.[50]

4.2 WAGE SETTING AND UNEMPLOYMENT ELASTICITIES[51]

The objective of this section is to improve our understanding of the effect of rising unemployment on the evolution of wages in downturns, particularly during the recent crisis period. Short and long-term unemployment may have different impacts on wage adjustment, and this might be important during the crisis, since the proportion of those defined as long-term unemployed has increased markedly. A rise in structural unemployment, perhaps due to an increase in labour market mismatch, may also reduce the impact on wages of a given change in unemployment. At the same time, other factors, such as the wave of labour market reforms across a number of euro area countries since the onset of the most recent crisis, may have increased the impact of unemployment on wages. Accordingly, this section investigates whether the sensitivity of wages to movements in unemployment has changed over the crisis period and during downturns more generally. The following dynamic wage specification is defined, based on quarterly data:

$$\Delta RW_{c,t} = C_c + \sum_{j=1}^{4} \alpha_j \Delta RW_{c,t-i} + \sum_{i=0}^{4} \beta_{1,i} U_{c,t-i} + \sum_{i=0}^{4} \beta_{2,i} \Delta Prod_{c,t-i} + (\sum_{i=0}^{4} \beta_{3,i} \Delta CPI_{c,t-i}) + \beta_4 D_{c,t} * U_{c,t} + e_{c,t} \quad (1)$$

Where:

$\Delta RW_{c,t}$ = annual difference in log of real/nominal compensation per person-hour

$U_{c,t}$ = unemployment rate

$\Delta Prod_{c,t}$ = annual difference in log of real output per person-hour

$\Delta CPI_{c,t}$ = annual difference in log of consumer price index

$D_{c,t}$ = country-specific dummy for economic downturns

C_c = fixed effect

Sample period = 1991Q4 – 2013Q4.

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50 Charts 1 and 2 of Annex D shows ULC and its decomposition for Belgium, Germany, Spain, France, Italy and the Netherlands, as well as compensation per employee, hourly compensation, hourly labour costs and negotiated wages for Belgium, Germany, Italy and the Netherlands.

51 Prepared by Robert Anderton and Boele Bonthuis.

Because of stationarity issues, all variables are in logarithms and differenced with respect to the corresponding quarter a year previously (except the unemployment rate).[52] The estimates are therefore based on year-on-year percentage changes using quarterly data. The equation is estimated in a panel setting with fixed effects by pooling the data across 14 euro area countries, with the dependent variable defined as real compensation per person-hour (not available for some countries such as Greece, Luxembourg, etc).[53] In addition, variants of these specifications are also estimated by using nominal compensation as the dependent variable and then including the *CPI* as an explanatory variable. Hence, when real compensation is the dependent variable, the *CPI* is not included as an explanatory variable on the right-hand side of the regressions (as is restricted to unity), while the nominal compensation specification can be freely estimated.[54] The last term is an interaction term designed to capture the possible impact of economic downturns on wage determination, focusing on the possible change in the wage elasticity with respect to the unemployment rate. A country-specific dummy *(D)* takes the value of 1 if yearly GDP growth is negative: this dummy captures downturns and is interacted with the unemployment rate *(D*U)* to see if the responsiveness of wages to unemployment changes during periods of annual declines in GDP growth. In the sample the longest period of economic downturn is the current crisis.

The sign on the unemployment rate is expected to be negative as a rise in the unemployment rate should put downward pressure on wages. The sign on productivity should be positive, on the assumption that employees' wages incorporate some reward for rises in productivity. The sign on the *CPI* should also be positive as nominal compensation should rise in accordance with prices as wage setters will attempt to (at least partially) preserve wages in real terms. A coefficient of (close to) unity for the *CPI* term may reflect strong employee bargaining power or a high degree of wage indexation.[55] The sign for the interaction term ($D*U$) will be positive if wages are less responsive to increases in unemployment during downturns and would imply that euro area wages are rigid downwards.

One reason for the latter phenomenon could be that during downturns a rising share of long-term unemployment puts less downward pressure on wages because of the relatively lower probability of re-employment of the long-term unemployed, as they become less able to effectively compete for jobs (due to the loss of human capital). It could also be the result of a generally observed downward wage rigidity for many euro area countries due to labour market institutions. Another reason could be a rising mismatch between vacancies and the unemployed, possibly due to the reasons mentioned earlier in the report. Alternatively, it could be because the public employment services of countries with rapidly rising unemployment are overloaded with job seekers, decreasing their ability to effectively place people into work. By contrast, non-significant parameters for the interaction term, in combination with significant and correctly signed other coefficients, could simply mean that the effect of unemployment on wages is the same for upturns and downturns. Estimates of equation (1) are shown in Table 5. Coefficients are reported as long-run parameters, which are calculated as follows:[56]

$$\overline{\beta} = \frac{\sum_{i=0}^{4} \beta_i}{1 - \sum_{j=1}^{4} \alpha_j} \tag{2}$$

52 The unemployment rate is not differenced as it is frequently found to be stationary in levels. However, a specification with the unemployment rate in differences was also estimated and largely similar results were obtained.
53 Belgium is dropped from the compensation per hour specification too because of lack of data for productivity per hour.
54 Hence the CPI term in equation (1) is put in parentheses, indicating that its inclusion is a variation of the baseline equation.
55 In some countries wage indexation is automatic or widespread (i.e. BE, CY, ES, MT and SI).
56 The significance of the long-run parameter is tested with a non-linear joined F-test. In Table 1 of Annex E, the full dynamic results of equation 1 are shown, including the sum of the coefficients of the lagged dependent variable which gives an insight into the wage transition speed.

Table 3 Wage equation panel estimates for the euro area				
	(1) Real	(2) Nominal	(3) Real	(4) Nominal
U	-0.427 [0.000]	-0.465 [0.000]	-0.368 [0.000]	-0.411 [0.000]
Δprod	0.608 [0.000]	0.782 [0.000]	0.581 [0.000]	0.754 [0.000]
ΔCPI		0.779 [0.000]		0.777 [0.000]
D*U	0.116 [0.0010]	0.105 [0.0039]	0.215 [0.000]	0.194 [0.0003]
D*U*Trend			-0.008 [0.0085]	-0.008 [0.0230]
Constant	3.530 [0.000]	4.089 [0.000]	3.067 [0.000]	3.677 [0.000]
Observations	874	874	874	874
R^2	0.677	0.750	0.680	0.751
Number of euro area countries covered	14	14	14	14
SER	1.580	1.428	1.575	1.424
Adj-R^2	0.666	0.740	0.669	0.741

Note: P-values in brackets; trend in *D*U*Trend* starts in 2008Q1; sample period maximum data range 1991Q4-2013Q4. Unbalanced panel; long-run parameters are reported.

However, given the relatively short sample period (1991 Q4-2013 Q4), the long-run parameters are not necessarily capturing full equilibrium wage relationships.

The results (Columns 1 and 2 of Table 3) generally confirm previous priors. For all panel estimates the unemployment rate has the expected negative sign, suggesting downward pressure from the unemployed on wages. The downturn interaction term is positive and statistically significant for all equations, indicating a lower downward responsiveness of wages to higher unemployment during downturns. This could be capturing the impacts of higher long-term and/or structural unemployment on wage pressures, or it could indicate general downward wage rigidity, possibly because of the difficulty of renegotiating wages downward, especially close to the zero lower bound.

The long-run parameter on productivity ranges from 0.58 to 0.78, indicating that only part of the productivity gains are incorporated into wages. This seems to be consistent with the well-documented decline in the labour share in the euro area which may be partly due to globalisation and the associated impacts of increased competition with low-wage countries.[57] Meanwhile, the sign of the parameter on *CPI* is positive as expected, but again not all of the change in prices is transmitted to wages (only about 78% of the change in prices is passed through to wages).

The next step is to test whether the degree of downward wage rigidity changes over the duration of the crisis. As mentioned above, various arguments suggest that the results could go either way. On the one hand, stylised facts suggest that wage moderation increased during the crisis, possibly related to labour market reforms implemented during the crisis, which may help to increase the impact of unemployment on wages. By contrast, the rapid rise in long-term unemployment as the crisis continued may lead to even less downward pressure on wages from unemployment. This hypothesis is tested using two techniques: first, by adding an additional term which simply multiplies the unemployment interaction term *(D*U)* by a simple time trend *(D*U*TREND)*. The sign and significance of *(D*U*TREND)* will indicate whether the degree of downward wage rigidity

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57 See, for example, Anderton and Hiebert (2011), pp. 48-50.

Chart 53 Rolling regressions of the downward wage rigidity parameter (D*U)

— D*U
······ 95% confidence interval

(i) Real wage equation

(ii) Nominal wage equation
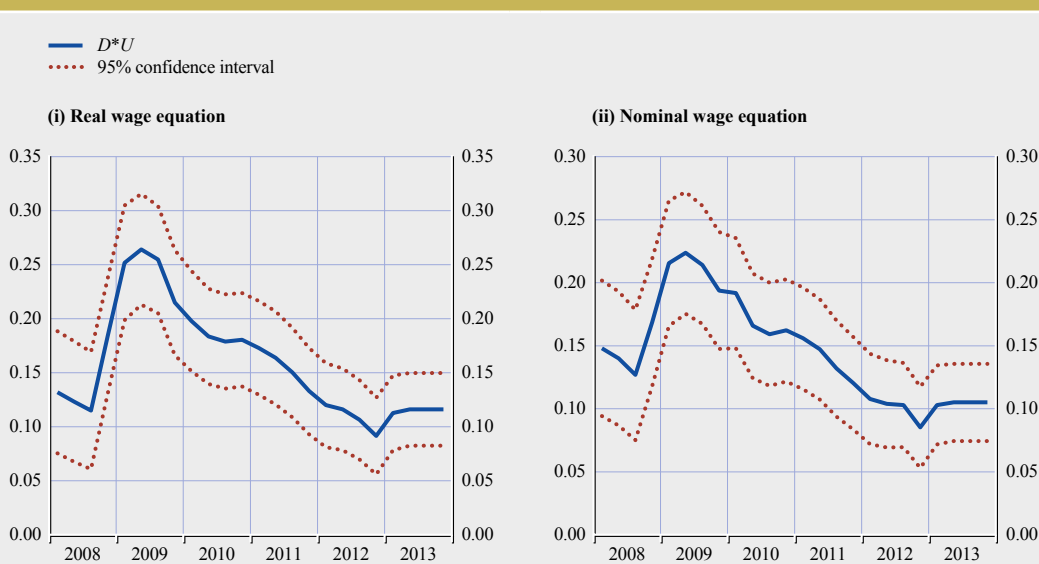
Sources: Eurostat and ESCB calculations.

rises or decreases as the duration of the crisis becomes more prolonged; second, the specification with the included interaction term *(D*U)* is estimated and a rolling regression is used to see if the parameter of the interaction term changes during the crisis.

Overall, the results of both techniques lead to the same conclusion that the degree of downward wage rigidity has declined as the duration of crisis increased. Columns 3 and 4 of Table 3 show that the term *(D*U*TREND)* is negatively signed and statistically significant. This result is corroborated by Chart 53 which shows that the long-run parameter of *(D*U)* tend to decline as the length of the crisis increases. These indications of a decline in wage rigidity as the crisis became more prolonged could be explained by several factors: (a) the magnitude of the rise in unemployment, also over an extended period, may lead to threshold effects which deliver stronger downward pressure on wages relative to previous downturns; (b) the wave of labour market reforms since the onset of the crisis, particularly those aimed at reforming wage setting, may already have a significant downward impact on wages (e.g. in Spain); (c) the continuation of fiscal consolidation and persistent downward pressure on public sector wages which may also entail spillover effects to private sector wages.

In summary, panel estimates across the euro area countries suggest a lower responsiveness of wages to rising unemployment during economic downturns. This may indicate that rising long-term unemployment and/or increasing labour market mismatch reduce the elasticity of wages with respect to unemployment during downturns, or that the euro area is generally characterised by downward wage rigidities due to institutional features. However, various tests using dummy variables and rolling regressions suggest that the degree of downward wage rigidity in the euro area has declined as the crisis became more prolonged. This may reflect various factors such as incipient downward pressure on wages from the wave of labour market reforms since the onset of the crisis, or may reflect other factors such as threshold effects related to the unprecedented length of the crisis and the large magnitude of the rise in unemployment in some euro area countries.

Box 5

REAL WAGE CYCLICALITY IN THE EURO AREA: DISENTANGLING COMPOSITION FROM WAGE STRUCTURE EFFECTS[1]

It has been argued that the observed downward rigidity of real wages might explain a significant part of the large unemployment increase observed in some countries (see e.g. Schmitt-Grohé and Uribe, 2013).[2] However, the evolution of aggregate data is difficult to interpret because the skill composition of employment has changed significantly over the crisis as lay-offs were heavily concentrated on low wage/low skill workers.[3] Accordingly, the aggregate average wage may rise in a purely mechanical fashion simply because the share of low wage workers in employment declines. If these compositional effects are large, it may be difficult to see the adjustment of wages in response to rising unemployment in the aggregate wage data. In this box, individual level data are used in order to account for employment composition effects and examine the relationship between real wages and unemployment in major euro area countries for the pre-crisis period. In comparison to estimates based on aggregate data, the response of real wages to unemployment is significantly higher when individual level data are used to allow for the effects of changes in employment composition. The implication is that the response of wages to rising unemployment during the crisis may be underestimated using aggregate data (due to the upward bias in the evolution of aggregate wages resulting from the large outflow from employment of less skilled/low-paid workers during the crisis, while the proportion of higher skilled/higher paid workers among those employed increased significantly).

Econometric model

The empirical model is based on Solon et al. (1994) and Bils (1985). The estimated regression models relate log real wages at the individual level with the unemployment rate at the country level. In order to get an average across countries, the baseline model is estimated by pooling all countries in the sample as in Bellou and Kaymac (2012). Following Solon et al. (1994), the model is estimated in two steps[4]. The first step is the estimation of a simple Mincerian log wage model:

$$\ln w_{i,c,t} = X_{it}\beta + \alpha_i + \gamma_{c,t} + \varepsilon_{i,c,t} \tag{1}$$

where wages depend on observable individual characteristics X_{it}, which contains experience and experience squared, a term constant over time α_i, which captures the effect of observable and unobservable characteristics of worker i (such as education or ability) and time fixed effects by country denoted by $\gamma_{c,t}$. The term $\gamma_{c,t}$ aims to capture the effect of cyclical changes in labour demand on wages in a given country c in period t. Since the model includes individual fixed effects α_i, the parameters $\gamma_{c,t}$ capture the residual variations in average wages at the country level and over time which are not explained by changes in the composition of the labour force.

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1   Prepared by Gregory Verdugo.
2   For the US data, see Bils (1985) or Solon, Barsky and Parker (1994), for the UK see Devereux and Hart (2006). Recent work on major European countries includes Anger (2011) for Germany, Peng and Siebert (2008) for Italy, Martin (2007) and Carneiro, Guimarães and Portugal (2012) for Portugal.
3   Figures from aggregate LFS data from Eurostat.
4   A two-step approach is used to obtain correct estimates of the standard errors of the effects of the unemployment rate. Although individual level data are used, the unemployment rate varies only at the aggregate country by year level. This implies that conventional standard errors will be significantly downward biased since they do not take into account the potential correlations of the error term within country and year (see e.g. Card 1995 or Angrist and Pishke, 2009, chapter 8).

In the second step, the "residual" average wage changes is regressed on unemployment rate changes:

$$\Delta \hat{y}_{c,t} = \pi_t + \rho \Delta U_{c,t} + u_{c,t} \tag{2}$$

To control for potential common trends in wages across countries, the model includes time fixed effects π_t in some specifications. This implies that the parameter ρ is identified by using deviations from average changes in the unemployment rate across countries.

Data

To estimate the model outlined above, data in which an individual is observed at least twice are needed. Two large nationally representative samples are used covering the same set of countries but different time periods. The first dataset is the European Community Household Panel (ECHP), where information on wages and salaries is available from 1994 to 2001[5]. These data are supplemented with the Statistics on Income and Living Conditions longitudinal panel (denoted LG-SILC), which superseded the ECHP, containing retrospective information on total annual income over the period from 2003 to 2010 and on monthly income for a selected subgroup of countries from 2004-2011[6].

To focus on workers with a substantial attachment to the labour force, the final sample uses workers aged between 18 and 60 years, who declare they are working full time, are not self-employed and are working in the private sector[7]. Real wages are computed with the national HICP.

Initially 11 countries are considered, for which data are available both in ECHP and SILC: Austria, Belgium, Germany, Greece, Finland, France, Ireland, Italy, the Netherlands, Portugal and Spain[8]. A precise description of the data coverage per country is reported in Verdugo (2014).

Real wages to unemployment elasticities estimates

Estimates of the elasticity of real wages to changes in unemployment rate are presented using data on income from 1994-2001 (ECHP) and 2003-2007 (LG-SILC).

For comparison purposes, first estimates of the model of equation (2) are presented using aggregate wage data for the same period for the countries as the dependant variable instead of our wage estimates based on individual level data. Chart A shows changes in real labour compensation per unit of labour input from national accounts data (Eurostat). Column 1 provides
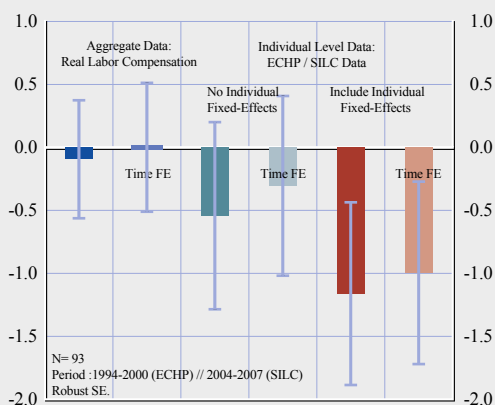
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5 The ECHP panel is a harmonised cross-national longitudinal survey focusing on household income and living conditions. Information on net current monthly wage and salary earnings to estimate wages is used. Full-time workers are those that declare having a full time job.

6 Information on income in the LG-SILC is quite different than the one contained in the ECHP. In particular, there is no information on current monthly wages and only information on annual "employee cash or near cash income" in the year previous to the survey is reported. In addition, only retrospective information on the number of months worked full or part-time during the previous year is available. As a result, in case of the LG-SILC, the focus is on workers who report having worked full time full year during the previous year. For this selected subgroup of the population, it is more likely that annual wage variations reflect changes in the wage rate and not changes in the number of hours worked.

7 The focus is on observations with valid information on wages and excludes imputed observations. To eliminate the influence of outliers, we trim the top and bottom 1% of wage observations within each country and years.
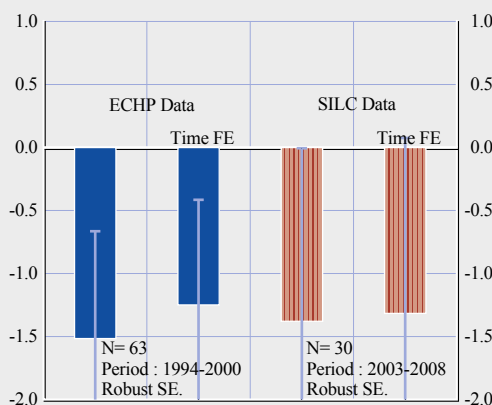
8 A typical year contains about 25,000 individuals for ECHP and 80,000 for SILC for which we have at least two individual observations to estimate the first stage model.

Chart A Baseline estimates of real wages elasticities to unemployment

Aggregate Data:
Real Labor Compensation

Individual Level Data:
ECHP / SILC Data

No Individual
Fixed-Effects

Include Individual
Fixed-Effects

Time FE

Time FE

Time FE

N= 93
Period :1994-2000 (ECHP) // 2004-2007 (SILC)
Robust SE.

Sources: Eurostat and ESCB calculations.
Notes: Each bar represent the parameter estimates of the elasticity of real wages to unemployment. OLS estimates with robust standard errors.

Chart B Real Wage Elasticities in different subperiods using different sample periods

ECHP Data

SILC Data

Time FE

Time FE

N= 63
Period : 1994-2000
Robust SE.

N= 30
Period : 2003-2008
Robust SE.

Sources: Eurostat and ESCB calculations.
Notes: Each bar represents the parameter estimates of the elasticity of real wages to unemployment. OLS estimates with robust standard errors.

a simple bivariate regression, while Column 2 includes a time-fixed effect capturing common trends across countries. Consistent with other studies using aggregate data, the results point to little evidence of wage cyclicality. While a very small and negative unemployment elasticity is presented in Column 1, the elasticity is close to zero in Column 2, and both parameter estimates are very imprecise and not statistically significant.

Column 3 and 4 shows the constructed aggregate wage series using micro-data. To do this, parameters $\gamma_{c,t}$ are estimated without including individual fixed effects or additional covariates in the first step. As a result, the dependant variable simply reflects changes in average wages over time. Using these averages, some evidence of wage cyclicality is found in the second stage regression, with unemployment elasticities between -0.5 and -0.3, depending on whether time fixed effects are included in the model. However, the unemployment elasticities are not statistically different from zero.

Columns 5 and 6 show the baseline estimates from the two-step model, which includes individual fixed effects in addition to controls for experience and experience squared in the first step. The results are strikingly different with respect to the previous specification. The estimated wage elasticities with respect to unemployment are between two to three times larger than the elasticities obtained in the previous specifications and are statistically significant. The results in column 5 and 6 indicate elasticities of -1.2 and -1 respectively. These elasticities predict that a 1pp increase in the unemployment rate is correlated with a decrease of between 1.2 and 1pp in the average log wage in the country, net of composition effects of the workforce.

Chart B shows the result of a robustness check using different datasets and time period. Using separately the ECHP or the LG-SILC data, similar results are obtained. However, the LG-SILC estimates are slightly more imprecise, which may reflect the fact that they capture a shorter period of time.

Overall, these estimated elasticities might seem large but they are remarkably in line with existing estimates from the literature obtained using individual level data[9]. Existing studies report elasticities between -0.7 to -1.7 for the US (Solon et al. 1994) and -1.7 to -2.0 for the UK (Devereux and Hart, 2006). For euro area countries, Anger (2011) reports elasticities from -0.8 to -1.7 for Germany, Verdugo (2013) finds -1.5 for France, Carneiro et al. (2012) find -1.6 to -2.5 for Portugal, while Peng and Siebert (2008) find -1.4 to -3 for Italy.

Overall, aggregate wage data obscure an important element of wage growth over the crisis – namely the importance of compositional effects, particularly when a large share of job losses were heavily concentrated among lower paid workers (including the low-skilled and the young). In consequence, comparisons based entirely on aggregate trends seem to substantially underestimate the full degree of wage flexibility in the euro area.

9   There are sometimes important differences in the sample construction and the unemployment measure used to estimate the model which must be taken into account. See Anger (2011) for a detailed comparison of the existing cross-country empirical estimates.

5   CONCLUSION

The global economic and financial crisis disproportionately affected euro area countries with macroeconomic and financial imbalances built up before the crisis. In these countries, sectoral overheating, structural imbalances and labour market rigidities contributed to strong falls in output and employment, rather than wage adjustment (particularly in the first phase of the crisis). Some groups – the young, the unskilled, those on temporary contracts and those displaced from earlier overheated construction sectors – were particularly hard hit. Moreover, the crisis has led to a strong increase in long-term unemployment and structural unemployment in some countries.

This paper distinguishes between the two distinct phases of the crisis: the first phase of 2008-2009 and the second phase of 2011-2013. The first phase affected all euro area countries to a certain extent, and employment losses were concentrated in the construction sector and sectors open to global trade. By contrast, the labour market effects of the second phase were heavily concentrated in the stressed countries with the largest imbalances – Cyprus, Greece, Ireland, Italy, Portugal, Slovenia and Spain – where rigidities of the economies seem to have exacerbated the labour market adjustment of these countries.

The crisis significantly affected the young (15-24 years old): the euro area youth unemployment rate increased to almost one quarter of the labour force by 2013. While the rise was sizeable, the young remained attached to the labour market as inactivity and discouragement within this group has been fairly limited. An analysis of underemployment and discouraged workers showed that both the share of underemployed and discouraged workers increased considerably in countries under acute financial pressures, suggesting that labour market slack in the euro area and in particular in countries under stress is significantly higher than indicated by the official unemployment figures. The significant slow-down in the euro area labour force growth during the crisis is a result of deceleration and eventually a decline in population growth (which is partly due to a fall in immigration into countries with the largest rise in unemployment), and a deceleration of the growth of the participation rate. Labour market flow data showed that job destruction increased considerably already in the first phase of the crisis, mainly driven by exits from employment of those with temporary contracts, and this tendency intensified further in the second phase of the crisis.

The second part of the report focuses on the long-term consequences of the crisis and the structural changes on the euro area labour markets. The strong rise in long-term unemployment across most euro area labour markets has been one of the most striking consequences of the crisis, with the stressed countries suffering more severe increases in long–term unemployment than the other euro area countries, despite better initial conditions. Underpinning the increase in the estimates of structural unemployment, strong evidence was found on increasing structural mismatches between worker categories and labour demand at the euro area level and also for some euro area countries. Skill mismatches have also increased, both within countries and across the euro area.

The final section of the report analysed wage developments and found evidence of wage moderation as the crisis persisted. The results suggest tentative evidence of downward wage rigidities in the euro area, although this result applies to all downturns and not just to the recent crisis period. These downward rigidities seem to have become somewhat weaker recently, with wages becoming more responsive to unemployment. This may be partly due to structural reforms in labour markets across the number of euro area countries, but may be related to other factors such as public sector pay restraint, threshold effects, etc. Consistent with these results, micro data show that downward wage

adjustment was much stronger during the crisis than indicated by aggregate data if the upward impact on wages of employment composition effects (namely that mostly low-skilled and low-wage workers lost their jobs) are subtracted from aggregate wages.
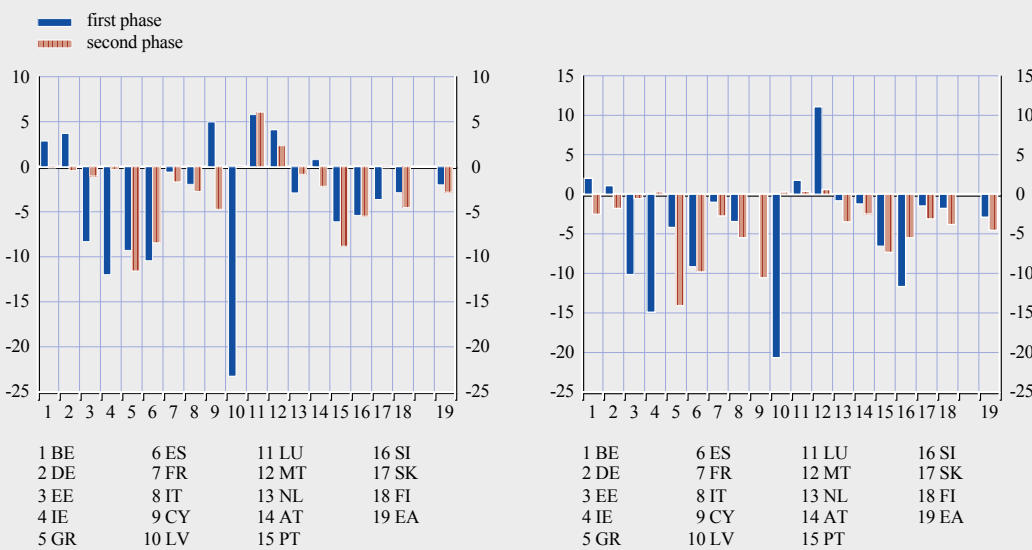
Based on the findings of the paper, several policy issues deserve attention. In the presence of high unemployment, a flexible response of wages to labour market conditions is essential to facilitate the necessary sectoral reallocation and to encourage job creation. A greater emphasis on reducing labour market segmentation is required to improve firms' flexibility to respond to changing demand conditions and to provide increased access to work and training for those disproportionately hit by the crisis. A stronger effort should be put on re-prioritising active labour market policies, to prevent hysteresis effects and reduce the risk of persistent unemployment turning into structural unemployment. Further reforms to collective bargaining as well as to tax and benefit systems are necessary so that firm-level agreements can better reflect local labour market conditions and to increase the economic incentives to work. Reducing employment protection legislation for some groups would speed up the reallocation of labour resources to more productive sectors. Overall, reforms which deliver greater flexibility in employment and wages will reduce adjustment costs associated with idiosyncratic shocks and enhance the efficiency and effectiveness of the monetary policy transmission mechanism. Finally, labour market reforms must be accompanied by increased competition and reforms on product markets, for the euro area to respond optimally and rapidly to economic shocks.

ANNEX A

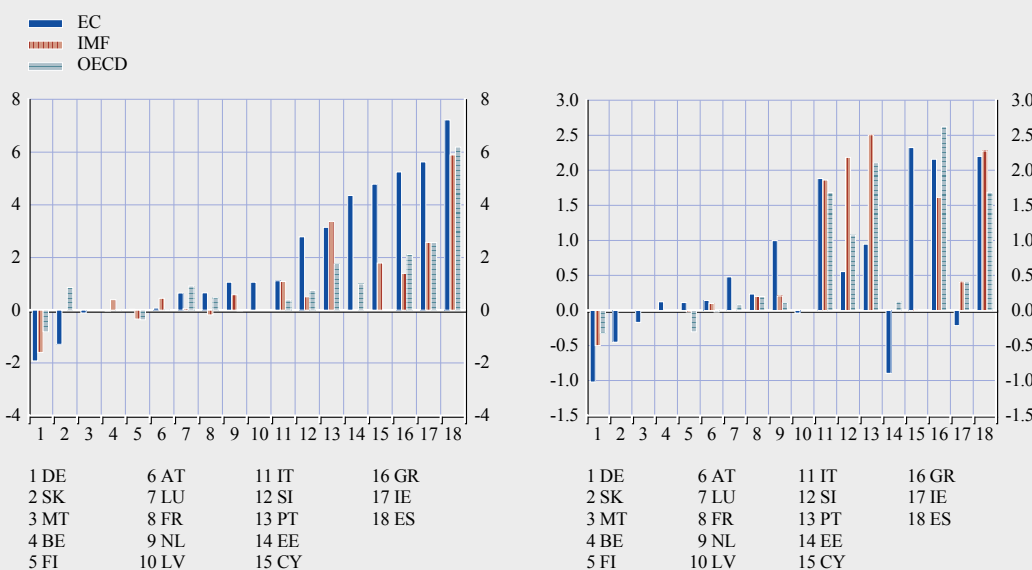### Chart A1 Developments in employment (a) and hours (b) adjustment over the two phases of the crisis

(annual percentage change)

- first phase
- second phase

1 BE	6 ES	11 LU	16 SI
2 DE	7 FR	12 MT	17 SK
3 EE	8 IT	13 NL	18 FI
4 IE	9 CY	14 AT	19 EA
5 GR	10 LV	15 PT	

Sources: Eurostat and ESCB calculations.
Note: The first phase refers to 2008Q2-2011Q2; the second phase to 2011Q2-2013Q1 (Growth rate).

Charts A2 Developments in structural unemployment over the two phases of the crisis: a) 2007-2011 and b) 2011-2013
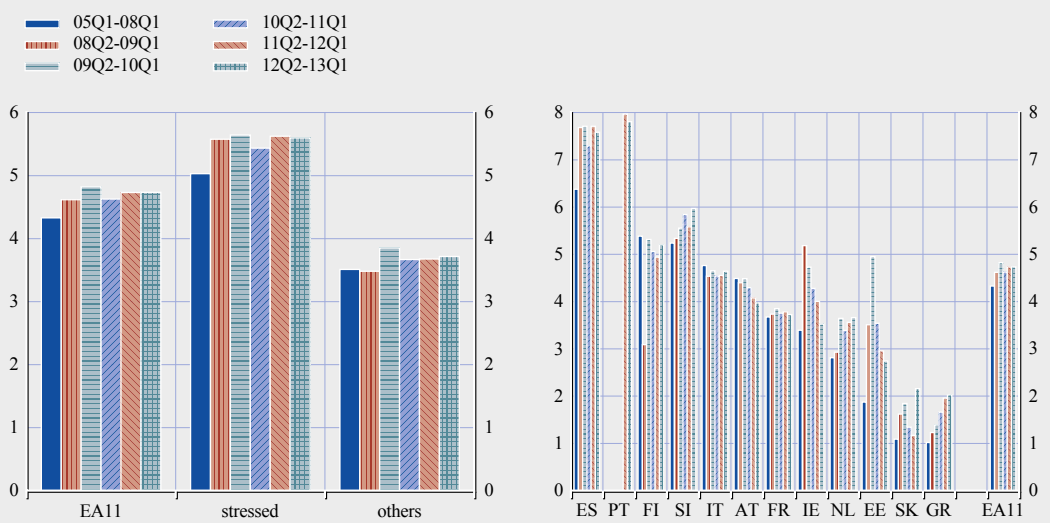
(changes in percentage points)

- EC
- IMF
- OECD

1 DE	6 AT	11 IT	16 GR
2 SK	7 LU	12 SI	17 IE
3 MT	8 FR	13 PT	18 ES
4 BE	9 NL	14 EE	
5 FI	10 LV	15 CY	

Sources: European Commission, IMF and OECD and ESCB calculations.

Chart B1 Total exits from employment

■ 05Q1-08Q1	▨ 10Q2-11Q1	
▥ 08Q2-09Q1	▨ 11Q2-12Q1	
▤ 09Q2-10Q1	▦ 12Q2-13Q1	

Sources: Eurostat and ESCB calculations.

Chart B2 Exits from unemployment to employment

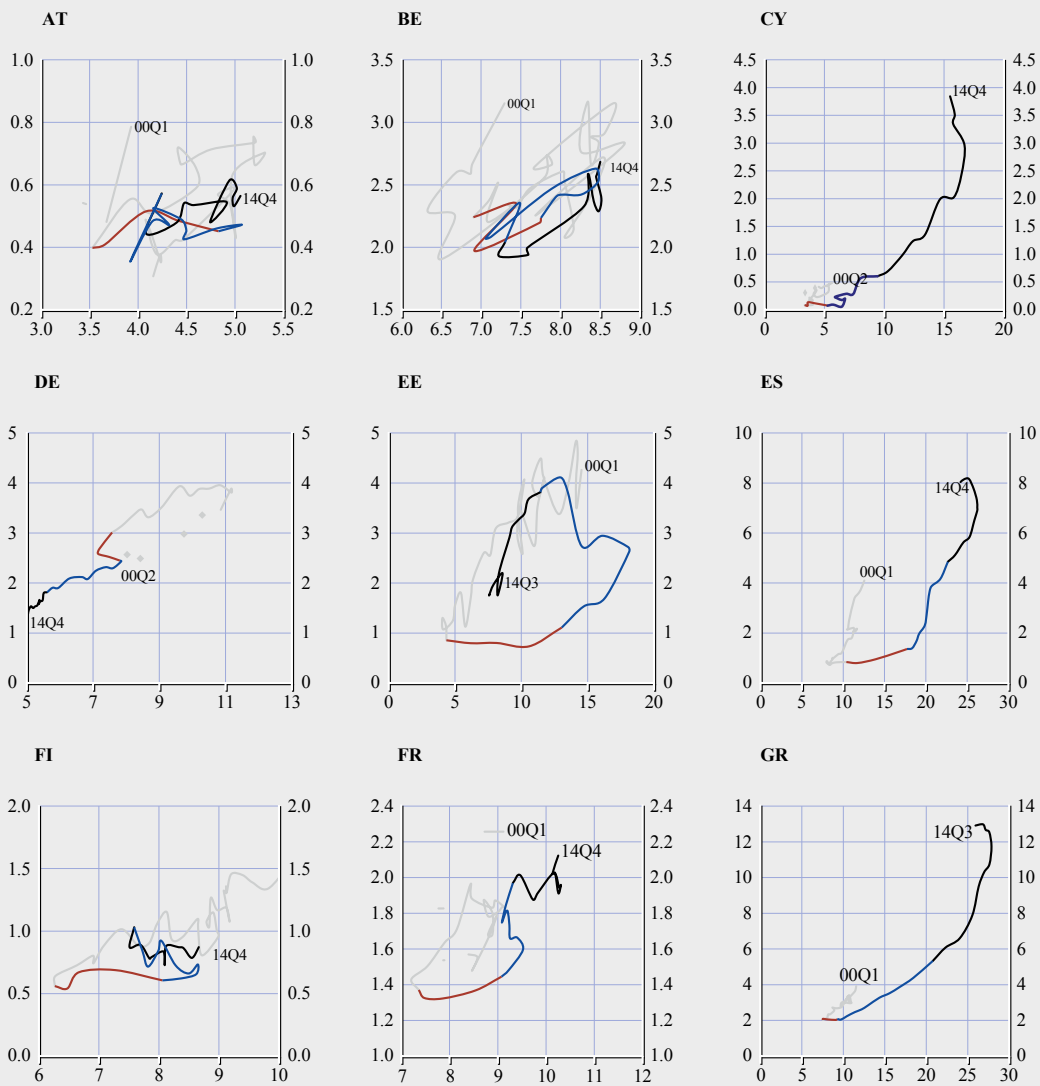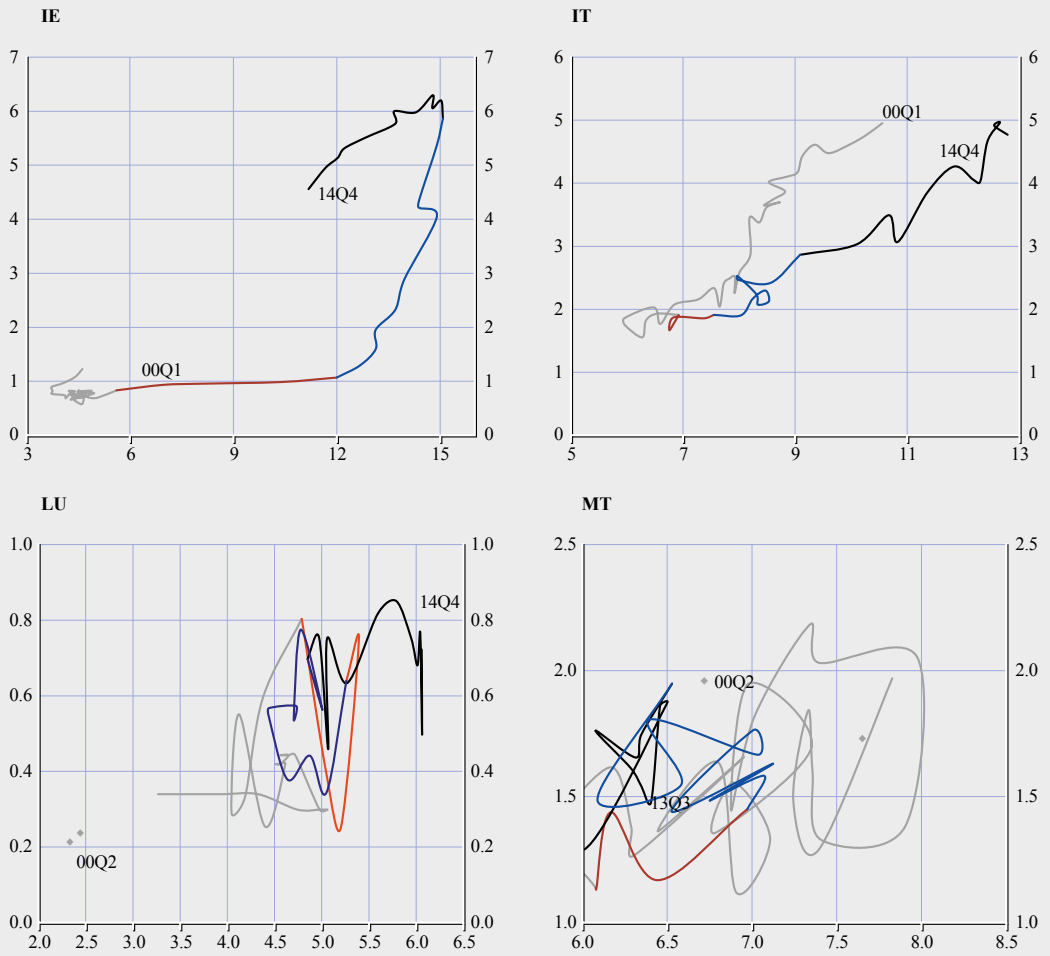|		
■ 2005Q1-2008Q1	▨ 2010Q2-2011Q1	
▥ 2008Q2-2009Q1	▨ 2011Q2-2012Q1	
▤ 2009Q2-2010Q1	▦ 2012Q2-2013Q1	
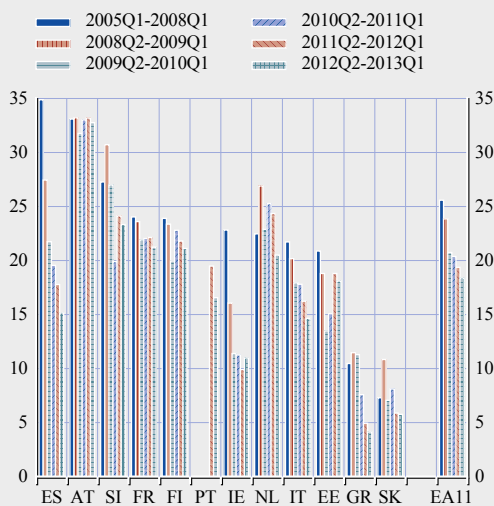
Source: LFS.

ANNEX C

Chart C1 Evolution of the unemployment rate and long-term unemployment (one year or more) in euro area countries, 2000-2014

x-axis: unemployment rate
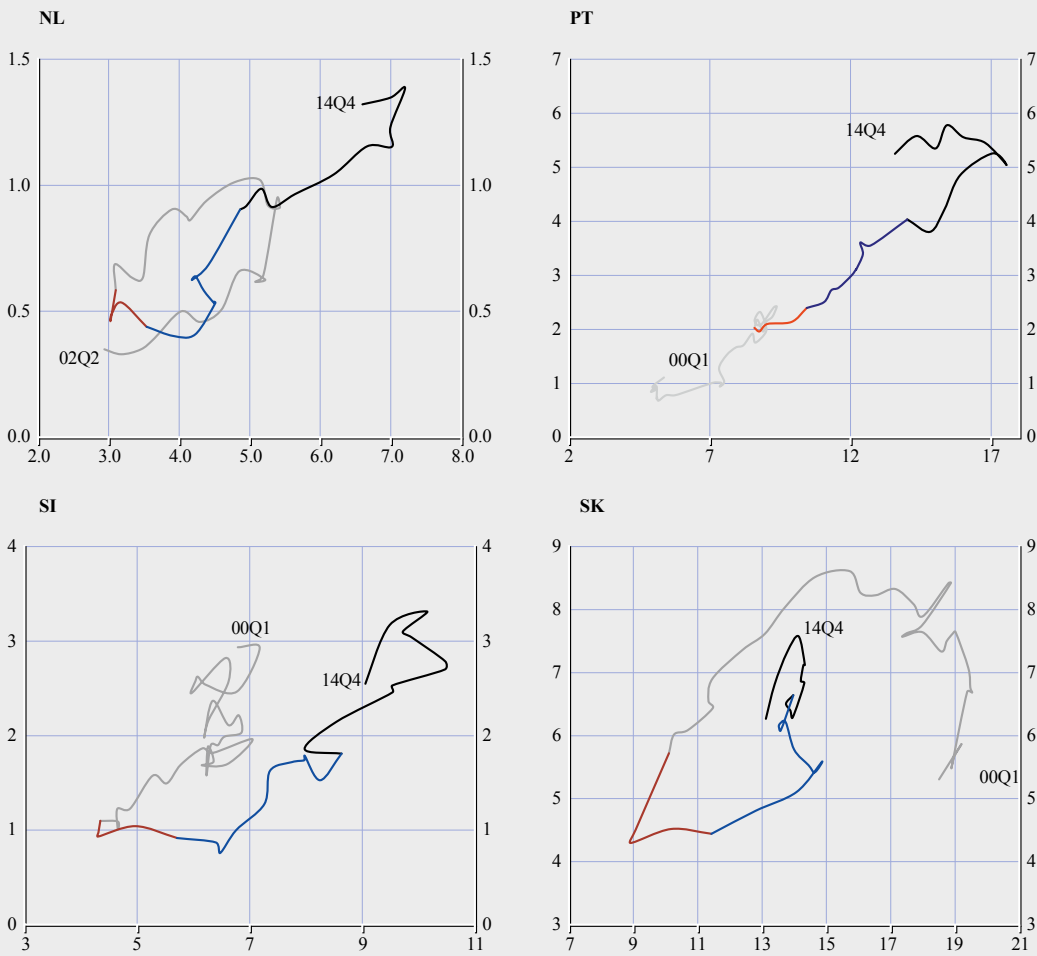y-axis: long-term unemployment rate (as a percentage of total labour force)

Sources: Eurostat (harmonised unemployment rates and long-term unemployment).
Note: Light grey lines from 2000Q1* to 2008Q1 (pre-crisis), red lines represent the Great Recession period from 2008Q2 to 2009Q2; dark blue lines the subsequent recovery from 2009Q3 to 2011Q3, while the black lines trace the evolution of the unemployment rate and long-term unemployment since the onset of the second recession and the subsequent recovery (i.e. from 2011Q4 to the latest observation, 2014Q4). *All countries except Cyprus, Germany, Luxembourg, Malta (from 2000Q2) and Netherlands (from 2002Q2).

IE

IT

LU

MT

Sources: Eurostat (harmonised unemployment rates and long-term unemployment).
Notes: Light grey lines from 2000Q1* to 2008Q1 (pre-crisis), red lines represent the Great Recession period from 2008Q2 to 2009Q2; dark blue lines the subsequent recovery from 2009Q3 to 2011Q3, while the black lines trace the evolution of the unemployment rate and long-term unemployment since the onset of the second recession and the subsequent recovery (i.e. from 2011Q4 to the latest observation, 2014Q4). *All countries except Cyprus, Germany, Luxembourg, Malta (from 2000Q2) and Netherlands (from 2002Q2).

Chart I Evolution of the unemployment rate and long-term unemployment (two years or more) in euro area countries, 2000-2013 (cont'd)

Sources: Eurostat (harmonised unemployment rates and long-term unemployment).
Note:Light grey lines from 2000Q1* to 2008Q1 (pre-crisis), red lines represent the Great Recession period from 2008Q2 to 2009Q2; dark blue lines the subsequent recovery from 2009Q3 to 2011Q3, while the black lines trace the evolution of the unemployment rate and long-term unemployment since the onset of the second recession and the subsequent recovery (i.e. from 2011Q4 to the latest observation, 2014Q4). *All countries except Cyprus, Germany, Luxembourg, Malta (from 2000Q2) and Netherlands (from 2002Q2).
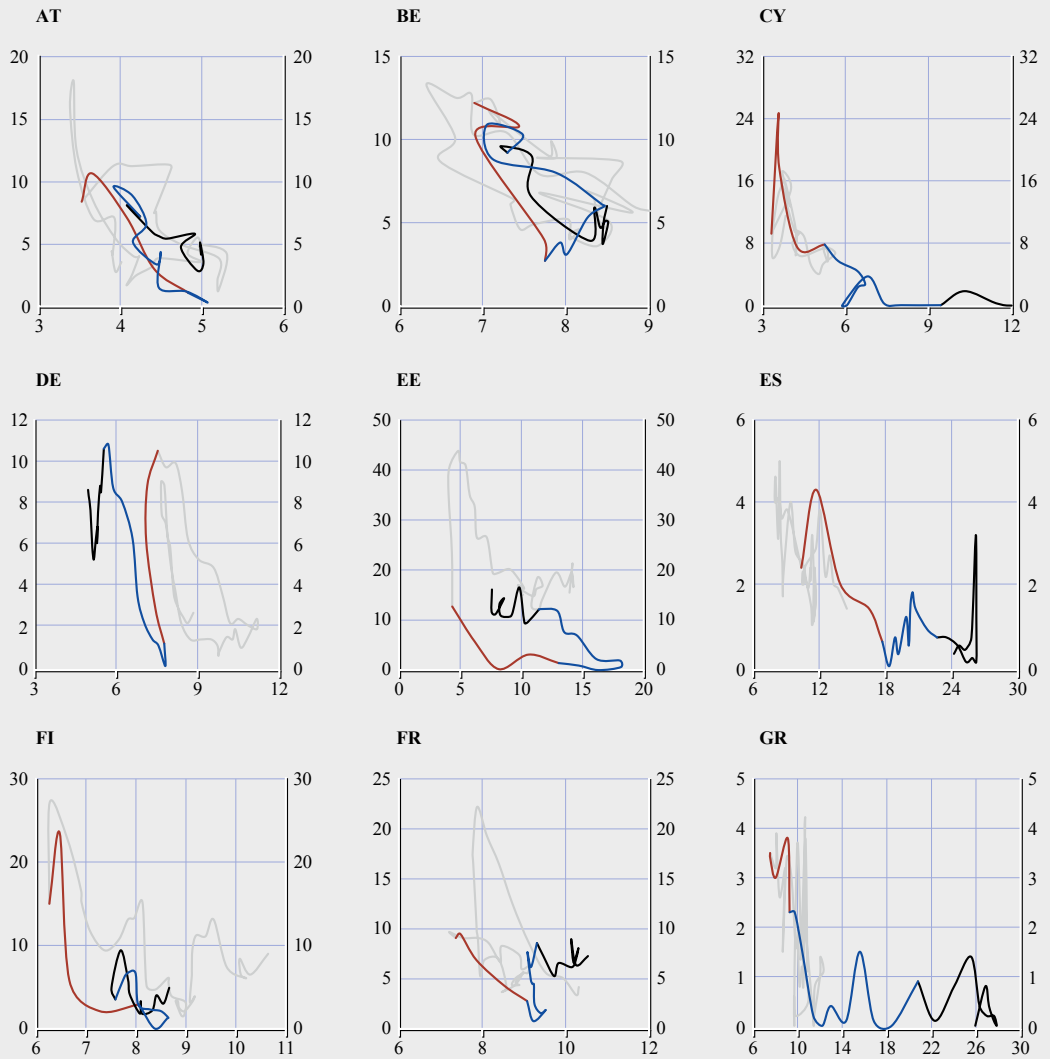
## Chart C2 Beveridge curves for euro area countries using labour shortages

x-axis: unemployment rate (percentage of civilian labour force)
y-axis: labour shortages (diffusion index, mean adjusted)

Sources: Eurostat; ESCB calculations.
Notes: Light grey lines from 1999Q1 to 2008Q1 (pre-crisis), red lines represent the Great Recession period from 2008Q2 to 2009Q2; dark blue lines the subsequent recovery from 2009Q3 to 2011Q3, while the black lines trace the evolution of the Beveridge curve since the onset of the second recession and the subsequent recovery (i.e. from 2011Q4 to the latest observation, 2014Q3). *All countries to 2014Q3, except: Austria (up to 2014Q2) and Ireland (to 2008Q2) and all countries from 1999Q1, except: Cyprus (from 2001Q3), Estonia and Malta (from 2000Q1) and Latvia (from 2004Q1).

Chart C2 Beveridge curves for euro area countries using labour shortages (cont'd)
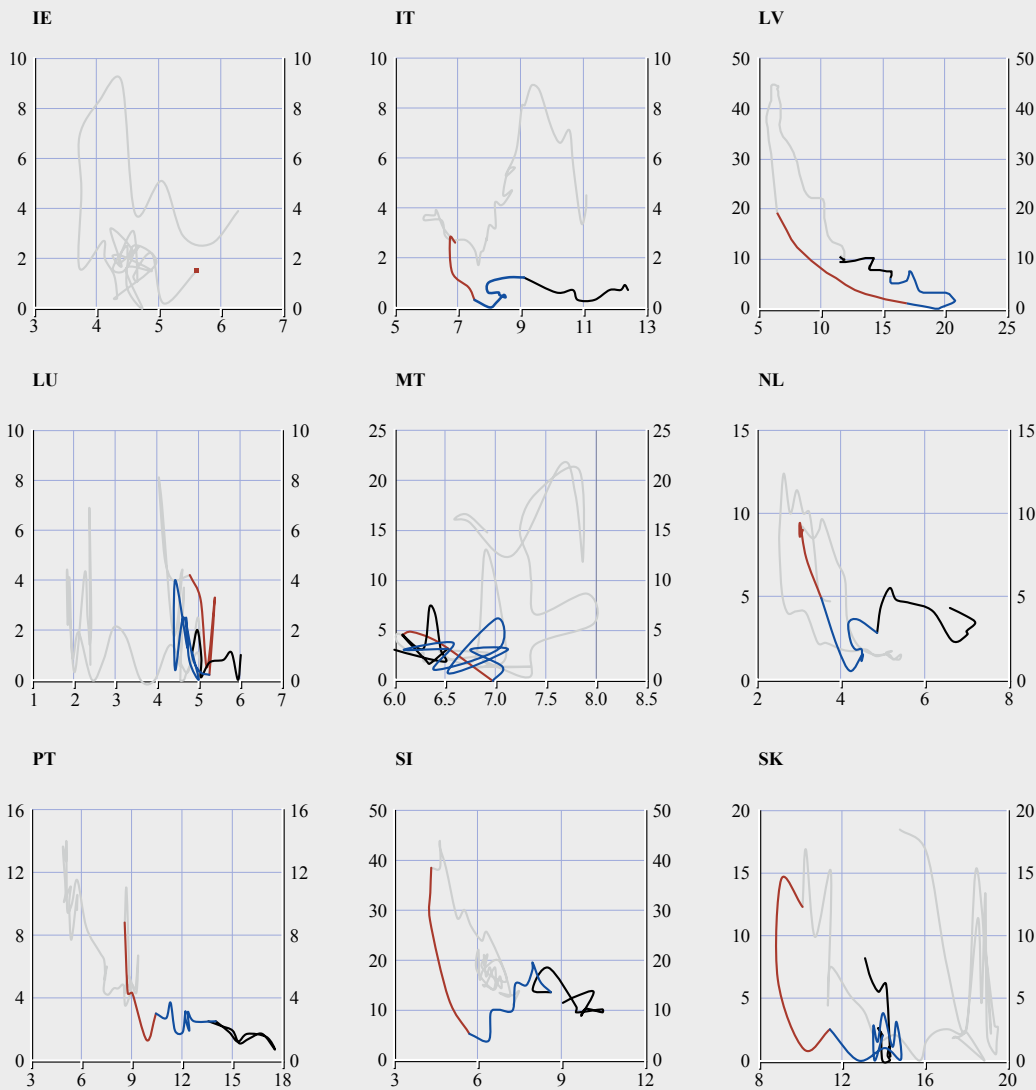
IE

IT

LV

LU

MT

NL

PT

SI

SK

Sources: Eurostat and ESCB calculations.
Notes: Light grey lines from 1999Q1 to 2008Q1 (pre-crisis), red lines represent the Great Recession period from 2008Q2 to 2009Q2; dark blue lines the subsequent recovery from 2009Q3 to 2011Q3, while the black lines trace the evolution of the Beveridge curve since the onset of the second recession and the subsequent recovery (i.e. from 2011Q4 to the latest observation, 2014Q3). *All countries to 2014Q3, except: Austria (up to 2014Q2) and Ireland (to 2008Q2) and all countries from 1999Q1, except: Cyprus (from 2001Q3), Estonia and Malta (from 2000Q1) and Latvia (from 2004Q1).

Table I Regression results for Beveridge curve analysis: euro area and countries

	URt-1	LS	LS²	CRI	CRI*LS	EMU	Constant	Observations	Adjusted R-squared
BE	0.848*** [0.0333]	-0.0797*** [0.0154]	0.00368 [0.00338]	0.0432 [0.0800]	0.0187 [0.0273]	-0.00459 [0.0785]	1.196*** [0.282]	95	0.924
DE	0.895*** [0.0171]	-0.0799*** [0.0107]	0.00726** [0.00251]	-0.284*** [0.0636]	0.0216 [0.0147]	0.0699 [0.0509]	0.793*** [0.133]	91	0.99
EE	0.860*** [0.0329]	-0.0541 [0.0476]	0.00063 [0.00172]	-0.118 [0.858]	-0.0638 [0.0951]	-0.566 [0.692]	1.381** [0.417]	55	0.966
IE	1.020*** [0.0230]	-0.0970** [0.0335]	0.00959 [0.00733]	0.366 [0.261]	0.207 [0.212]	0.344 [0.199]	-0.5 [0.294]	73	0.996
GR	0.989*** [0.0165]	-0.0734 [0.0939]	0.0124 [0.0448]	1.036*** [0.169]	-0.0393 [0.131]	-0.0311 [0.178]	0.0655 [0.241]	62	0.994
ES	0.914*** [0.0165]	-0.118 [0.0631]	0.0353 [0.0269]	1.542*** [0.190]	0.0502 [0.118]	-0.747*** [0.171]	1.530*** [0.318]	95	0.993
FR	0.871*** [0.0221]	-0.0345*** [0.00650]	0.000906** [0.000273]	0.228*** [0.0509]	0.0268 [0.0169]	-0.212*** [0.0521]	1.287*** [0.221]	95	0.975
IT	1.005*** [0.0185]	-0.0442* [0.0213]	0.00324 [0.00456]	0.324 [0.194]	0.0388 [0.0859]	-0.144* [0.0716]	0.00426 [0.198]	95	0.982
CY	1.044*** [0.0299]	0.021 [0.0324]	-0.000671 [0.00234]	0.592 [0.329]	-0.0229 [0.0368]	-0.081 [0.294]	-0.238 [0.170]	50	0.989
LU	0.978*** [0.0216]	-0.0334* [0.0166]	0.00188 [0.00446]	0.0548 [0.0568]	0.0673* [0.0313]	0.0742 [0.0457]	0.0621 [0.0599]	95	0.984
MT	0.695*** [0.106]	0.0139 [0.00779]	-0.00109 [0.00151]	0.117 [0.312]	-0.0153 [0.0398]	-0.28 [0.204]	2.245** [0.765]	55	0.716
NL	0.944*** [0.0257]	-0.0455*** [0.0105]	0.00218 [0.00223]	0.194*** [0.0524]	0.0131 [0.0172]	-0.00164 [0.0579]	0.211 [0.140]	95	0.978
AT	0.808*** [0.0632]	-0.0182 [0.0121]	-0.000358 [0.00151]	0.0407 [0.0544]	-0.0147 [0.0199]	0.0231 [0.0707]	0.819** [0.283]	72	0.826
PT	0.910*** [0.0265]	-0.0951** [0.0315]	0.00955 [0.00603]	0.0734 [0.149]	-0.0166 [0.0474]	0.0375 [0.0948]	0.640*** [0.184]	95	0.991
SI	0.886*** [0.0345]	-0.0296* [0.0117]	0.000226 [0.000615]	0.0852 [0.275]	0.000675 [0.0150]	0.165 [0.284]	0.711** [0.238]	71	0.958
SK	1.009*** [0.0276]	-0.0421 [0.0247]	0.00771* [0.00372]	NO RECESSION		0.445* [0.193]	-0.583 [0.465]	56	0.974
FI	0.811*** [0.0324]	-0.0532*** [0.0108]	0.00112 [0.00108]	-0.13 [0.118]	0.0172 [0.0161]	-1.115*** [0.186]	2.642*** [0.454]	88	0.987
LV	0.606*** [0.0322]	-0.158*** [0.0193]	0.00288*** [0.000671]	-0.34 [0.189]	-0.170*** [0.0338]		4.475*** [0.403]	63	0.984
EA18	0.919*** [0.0234]	-0.0421* [0.0179]	0.00212 [0.00409]	0.357*** [0.0525]	0.0257 [0.0256]	-0.0523 [0.128]	0.693* [0.271]	62	0.983

Notes: ***, **, * denote significance at the 1%, 5% and 10% level, respectively. Standard errors are shown in parentheses. There is no recession in Slovakia. The basic model is the following: $u_{it} = \alpha_i + \beta_{1i} u_{it-1} + \beta_{2i} LS_{it} + \beta_{3i} LS^2_{it} + \beta_{4i} CRI_i + \beta_{5i} CRI*LS_{it} + \beta_{6i} EMU_i + e_{it}$ where u is the official Eurostat harmonised unemployment rate, LS is the labour shortages variable (representing vacancy developments), and the subscripts i and t denote country and time dimensions. LS^2 ensures the convexity of the Beveridge curve; CRI is a dummy variable indicating the crisis and post-crisis period, taking a value of one from the first of at least two consecutive quarters of negative quarter-on-quarter GDP growth to the end of the series; CRI*LS is an interaction term between the crisis dummy and the labour shortages designed to capture changes in the slope of the Beveridge curve and EMU is a dummy variable taking a value of one when the country joins the EMU until the end of the series.
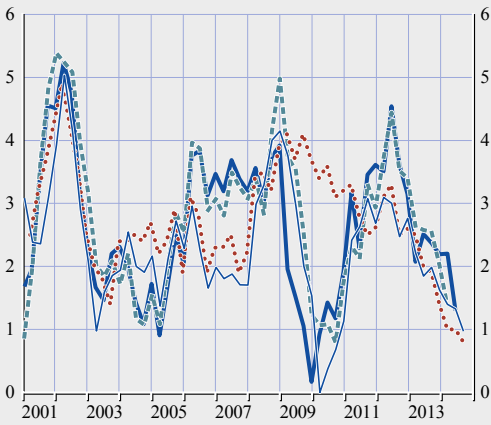
ANNEX D

Chart D1 Compensation per employee, hourly compensation, hourly labour costs and negotiated wages evolution
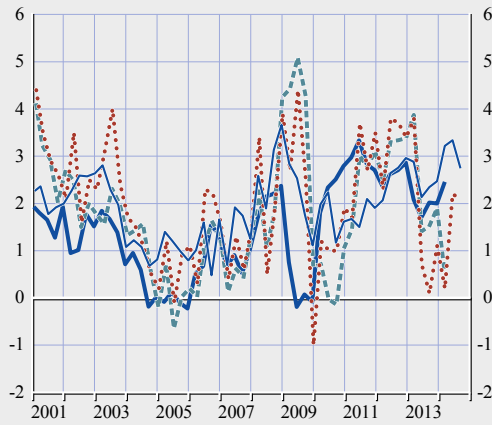
(annual percentage change, quarterly data)

— compensation per employee   - - - - hourly compensation
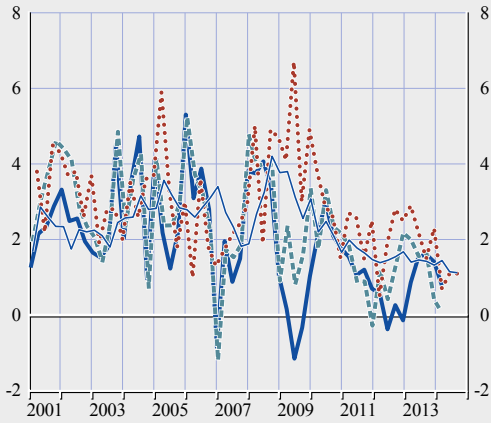····· hourly labour costs   —— negotiated wages
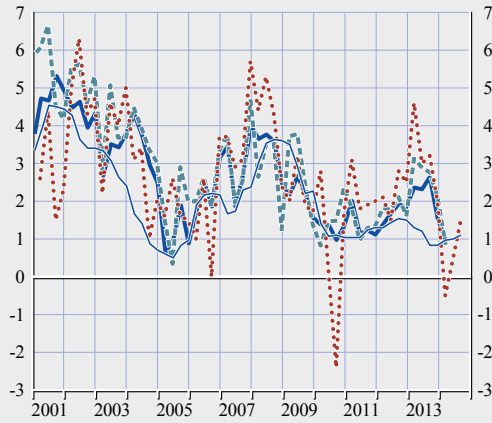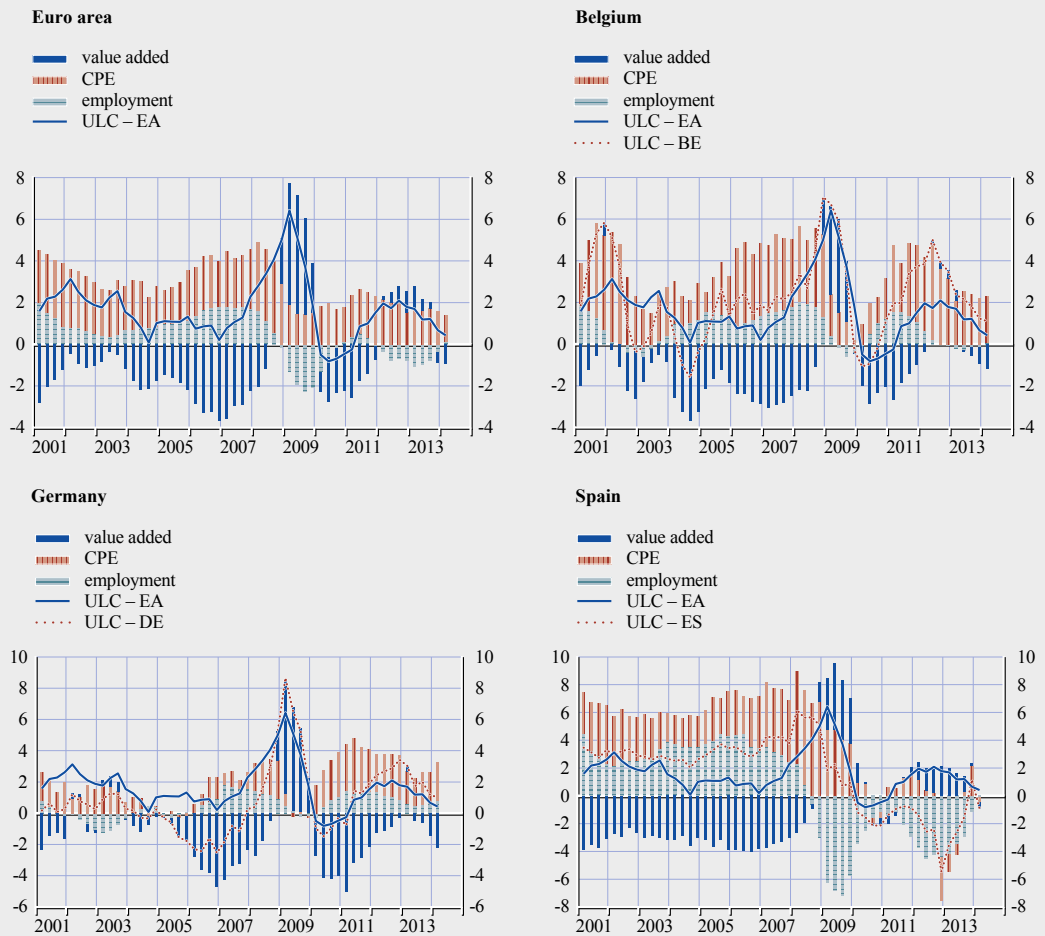

Belgium

Germany

Italy

The Netherlands

Sources: Eurostat and ECB.

Chart D2 Decomposition of unit labour costs

(contribution to annual percentage change, quarterly data)

Euro area

- value added
- CPE
- employment
- ULC – EA

Belgium

- value added
- CPE
- employment
- ULC – EA
- ULC – BE

Germany

- value added
- CPE
- employment
- ULC – EA
- ULC – DE

Spain

- value added
- CPE
- employment
- ULC – EA
- ULC – ES

Sources: Eurostat and ECB.

Chart D2 Decomposition of unit labour costs (cont'd)

(contribution to annual percentage change, quarterly data)

France

Italy

The Netherlands
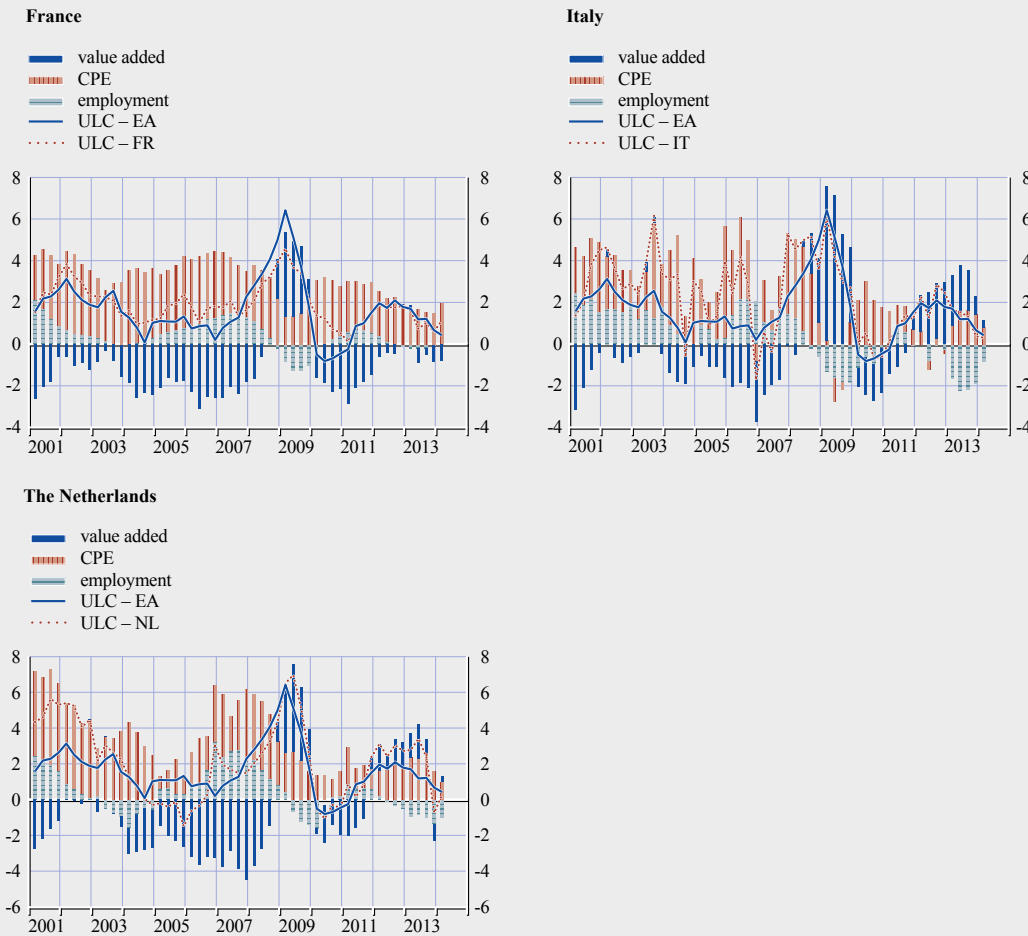
Sources: Eurostat and ECB.

Table E1 Wage equation panel estimates (full dynamic estimates of Table 1 parameters)				
	(1) Real	(2) Nominal	(3) Real	(4) Nominal
ΔRW	0.513	0.574	0.508	0.569
	[0.000]	[0.000]	[0.000]	[0.000]
U	-0.208	-0.198	-0.181	-0.177
	[0.000]	[0.000]	[0.000]	[0.000]
ΔProd	0.296	0.333	0.286	0.325
	[0.000]	[0.000]	[0.000]	[0.000]
ΔCPI		0.332		0.335
		[0.000]		[0.000]
D*U	0.0566	0.0448	0.106	0.0834
	[0.0008]	[0.0036]	(0)	[0.0003]
D*U*Trend			-0.00415	-0.00324
			[0.0083]	[0.0229]
Constant	1.719	1.742	1.509	1.585
	[0.000]	[0.000]	[0.000]	[0.000]
Observations	874	874	874	874
R-squared	0.677	0.750	0.680	0.751
Number of cross_no	14	14	14	14
SER	1.580	1.428	1.575	1.424
Adj-R-sq	0.666	0.740	0.669	0.741

Notes: Table A1 reports full dynamic equation estimates from which the long-run parameters of Table 1 (main text) are derived; P-values in brackets; Trend in D*U*Trend starts in 2008Q1; sample period maximum data range 1991Q4-2013Q4. Unbalanced panel.

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