

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

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

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

III.1. Introduction

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

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

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

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

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

⁽⁹⁵⁾ This section was prepared by Eric Meyermans and Plamen Nikolov. The authors wish to thank Alessandro Turrini and Alfonso Arpaia for useful comments.

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

III.2. Labour market effects and divergence

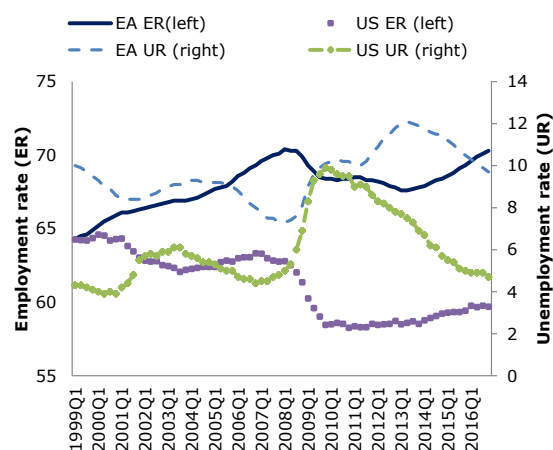
In the euro area, employment and unemployment rates show strong and persistent fluctuations. In the third quarter of 2008, the euro area employment rate reached its highest level at around 70%, but in subsequent quarters, when the crisis hit hardest, it fell notably, bottoming out at around 67% in the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

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

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

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

Graph III.1: : Euro area and US employment (ER) and unemployment (UR) rates



(1) Scale on left-hand side vertical axis refers to employment rate; scale on right-hand side vertical axis refers to unemployment rate.

(2) US employment rate measured as employment to population ratio for people 16 years and over. ER employment rate covers population aged 20 to 64 years.

Source: Eurostat and Bureau of Labour Statistics

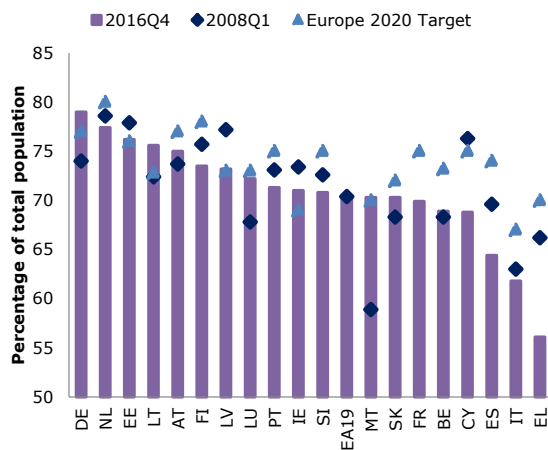
⁽⁹⁶⁾ In this section macroeconomic aggregates are analysed. Such analysis has to be distinguished from the microeconomic analysis that tracks the impact of persistent unemployment spells over the affected persons' life-cycle, including their income and job opportunities. For a review of the literature analysing the damaging effects of the crisis on individuals' working careers and future life chances, see Fondeville, N. and T. Ward (2014), 'Scarring effects of the crisis', Social Situation Monitor Research note 06/2014.

⁽⁹⁷⁾ Less generous unemployment benefit schemes with less coverage in the US than in euro area may be a mechanism that explains this different pattern. More on the labour market recovery in the euro area in comparison to the US and the role of rigidities can be found in Ruscher, E. and B. Vasicek (2015), 'The euro area recovery in perspective', *Quarterly Report on the Euro Area*, Vol. 14, No. 3.

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

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

Graph III.2: Employment rates across euro area Member States



Source: Eurostat, Labour Force Survey.

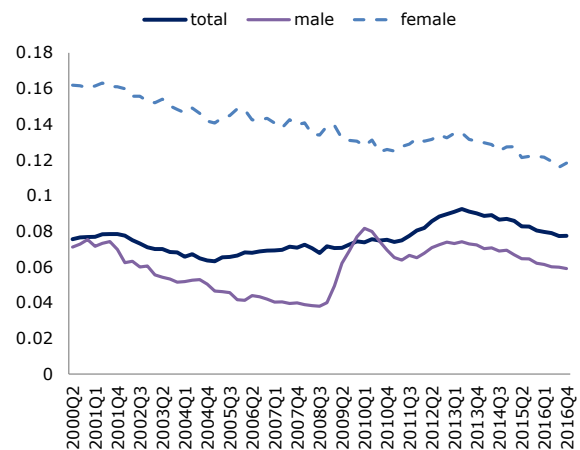
While the dispersion of the unemployment rate of older persons was highest before and during the first years of the crisis, it has become less intense compared to other age groups in recent years (Graph III.77).

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

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

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

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



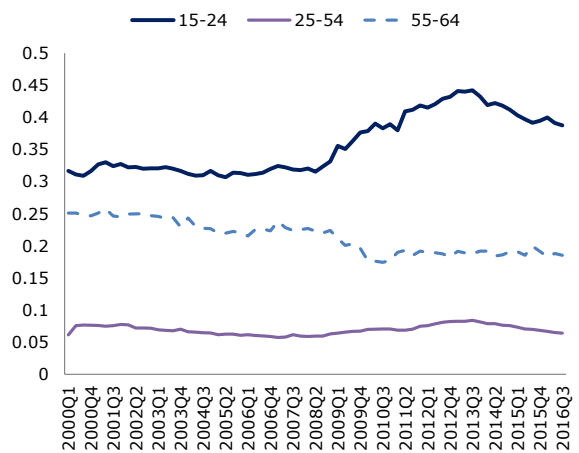
(1) Employment rate dispersion is the coefficient of variation of Member States' employment rates

Source: Authors' estimation based on Eurostat, Labour Force Survey.

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

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

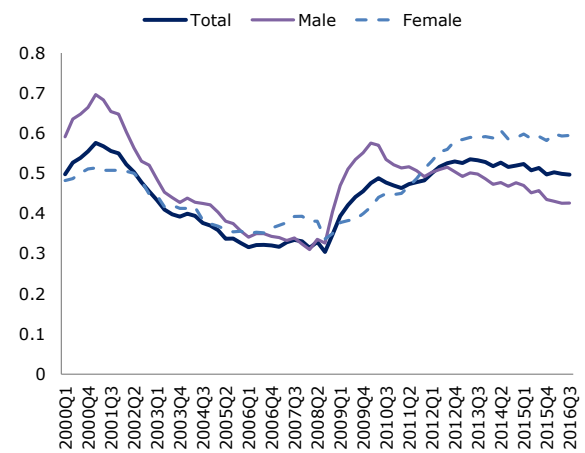
Graph III.4: **Employment rate – euro area dispersion by age**



(1) Employment rate dispersion is the coefficient of variation of Member States' employment rates.

Source: Authors' estimation based on Eurostat, Labour Force Survey.

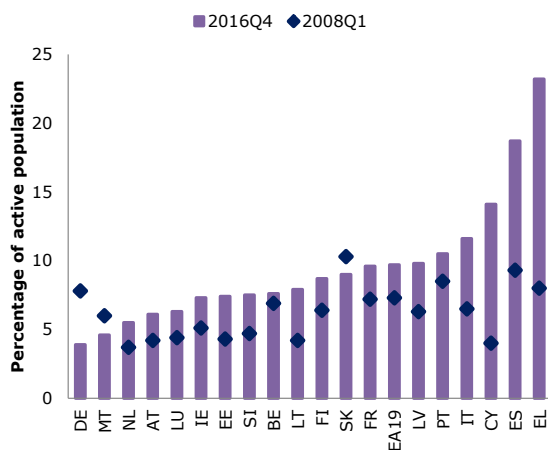
Graph III.6: **Unemployment rates – euro area dispersion by gender**



(1) Unemployment rate dispersion is the coefficient of variation of Member States' unemployment rates.

Source: Authors' estimation based on Eurostat, Labour Force Survey.

Graph III.5: **Unemployment rates across euro area Member States**

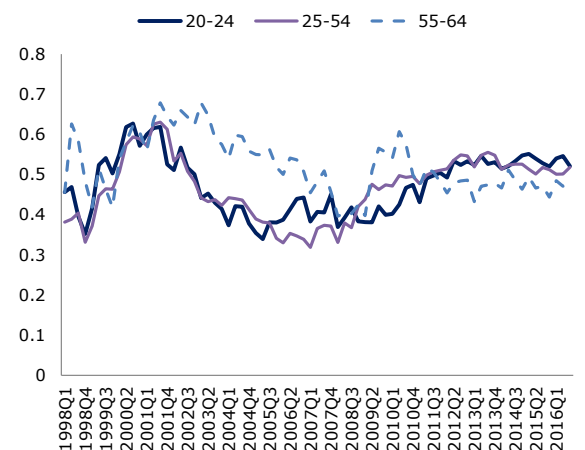


Source: Eurostat, Labour Force Survey.

III.3.1. Risk of unemployment persistence

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

Graph III.7: **Unemployment rate – euro area dispersion by age**



(1) Unemployment rate dispersion is the coefficient of variation of Member States' unemployment rates.

Source: Authors' estimation based on Eurostat, Labour Force Survey.

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

generating mechanisms differ between these groups.

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

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

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

The results in Table III.11 suggest that a unit root, i.e. non-stationarity, of unemployment rates can be

rejected with confidence in Belgium and Finland for all groups considered in this section, i.e. unemployment in these countries does not seem to be persistent. By contrast, the null hypothesis of non-stationarity cannot be rejected, for the total, nor for any of the groups, in Italy and Cyprus, i.e. unemployment in these countries appears to be persistent.

Table III.1: Time series properties of unemployment rates

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

(1) Significance: *** for p < 0.01, ** for p < 0.05, * for p < 0.1; Sample: sample size; na: not available.

(2) Test performed for several variants, i.e. without any additional explanatory variables, with a constant and with a constant and a trend (most significant reported in table); length of lagged dependent variable selected on the basis of the AIC information criteria. More details available upon request.

Source: Authors' estimates based on Eurostat, Labour Force Survey.

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

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

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

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

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

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

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

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

III.3.2. Risk of labour market polarization and marginalisation

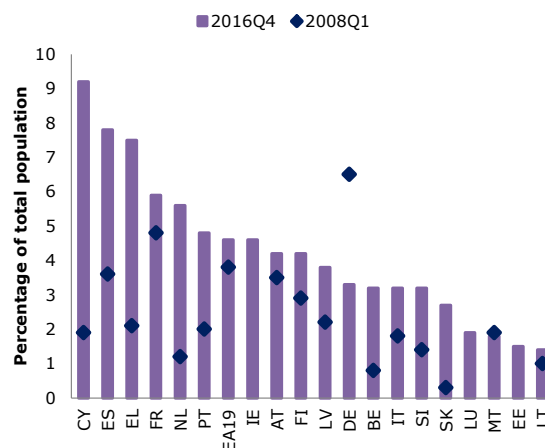
Apart from the risk of workers staying unemployed once the macroeconomic causes of their unemployment have faded, the risk that workers get trapped in non-standard employment types, such as (involuntary) part-time and fixed-term contracts, should also be explored.

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

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

aggregate level these types of effects may then negatively affect potential productivity growth.⁽¹⁰⁹⁾

Graph III.8: **Underemployed part-time workers**



(1) Underemployed part-time workers are persons working part-time who wish to work additional hours and are available to do so.

Source: Eurostat, Labour Force Survey.

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

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

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

⁽¹⁰⁶⁾ These empirical results are available upon request.

⁽¹⁰⁷⁾ First quarter for which harmonised data are available.

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

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

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

Applying the same statistical techniques as in the previous sub-section shows ⁽¹¹⁾ that the null hypothesis that the share of involuntary part-time work in total employment will not return to its equilibrium, once the disturbance has disappeared, can be rejected with strong confidence only for Germany and Luxembourg, followed by Malta, Slovenia, and Slovakia (Table III.2). Focussing on specific groups, the null-hypothesis for the group of young (which can also be labelled the "unexperienced") can be rejected with strong confidence for Germany, France, Austria, Slovenia and Slovakia (for 5 Member States the data are not available).

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

Graph III.9: Long-term unemployment rate

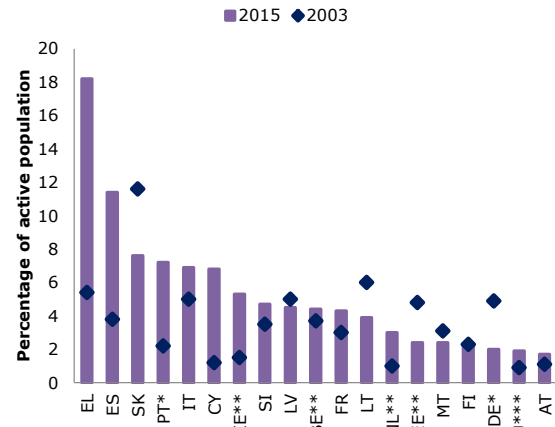


Table III.2: Time series properties of underemployed part-time workers (Percentage of total employment)

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

(1) Underemployed part-time workers are persons working part-time who wish to work additional hours and are available to do so. See also notes in Table II.1.

Source: Authors' estimates based on Eurostat, Labour Force Survey.

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

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

Source: Eurostat and authors' estimates.

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

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

Persistence of labour market shocks...

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

⁽¹¹⁾ Albeit for a shorter sample size starting in most cases in the first quarter of 2008.

- **Erosion of skills and employability.** As already mentioned in previous sections, when the unemployed are trapped in a persistent unemployment spell, their employability may decrease as their skills and motivation to search for a job are eroded, which in turn lowers the likelihood to find a job. This process may then be reinforced to the extent that employers use the duration of unemployment spells as a screening device to assess workers' productivity and employability. ⁽¹¹²⁾
- **Sectoral skills mismatch.** When there are strong changes in economic structures leading to new skills being required and old skills becoming obsolete, skill mismatch may also emerge that may trigger hysteresis effects (in the absence of effective policies to train the unemployed).
- **Irreversible labour market exits.** When older people are encouraged to take early retirement by firms facing weak demand for their goods and services, the labour force may decrease permanently. Firms may have a strong incentive to call for early retirement if that is cheaper than firing older workers, while older employees may have a strong incentive to accept such an offer if the (financial) penalty for early retirement is low.
- **Underinvestment in capital goods.** If firms close, or if they cancel or postpone investments, in the face of a depressed outlook, then it will become more difficult to find employment as it takes time and effort to restore lost production capacity. A lack of investments embedding the latest innovations and technological advances may aggravate this sluggishness.
- **Secular stagnation.** If effective aggregate demand remains persistently below potential output, unemployment may get stuck at a level above the non-accelerating inflation unemployment rate. ⁽¹¹³⁾

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

... triggering adequate policy responses

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

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

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

Stagnation: What It Is and What to Do About It', *Foreign Affairs*, March/April 2016 Issue.

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

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

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

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

⁽¹¹³⁾ Secular stagnation may be driven by an increasing propensity to save and a declining propensity to invest. In turn, this may be triggered by an ageing population, rising inequality, and deleveraging. See Larry Summers (2016), 'The Age of Secular

and reforms of employment protection legislation and wage setting.

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

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

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

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

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

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

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

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

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

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

(1) Market openness= (exports + imports of goods and services) / nominal GDP. Dummy =1 if rise in unemployment rate else =0. Error correction term is lagged gap between real wage and productivity in logarithm.) "Naive" refers to dummy with a 1, ...,5 scale. Separate dummies with (0,1) values did not affect the estimates significantly; variant V4 is the version V1 with separate (0,1) dummies for coordination and bargaining.

Source: Authors' estimate based on AMECO database (macro-variables), Eurostat (long-term unemployment, minimum wage set to 0 for AT, DE, CY,FI, IT), ICTWSS-Database (wage coordination variables).

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

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

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

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

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

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

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

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

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

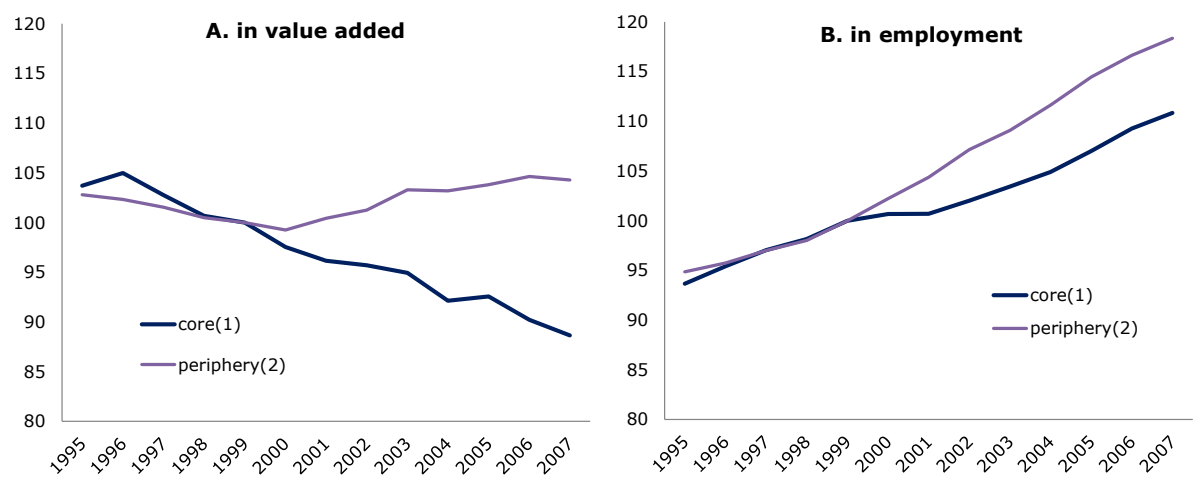
This suggests that Member States where non-tradable sectors expanded the most in the years before the global financial crisis had a more pronounced negative cyclical impact. This is due to the negative demand shock being more pronounced in non-tradables (as external demand in the tradable sectors recovered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

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

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

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

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



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

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

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

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

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

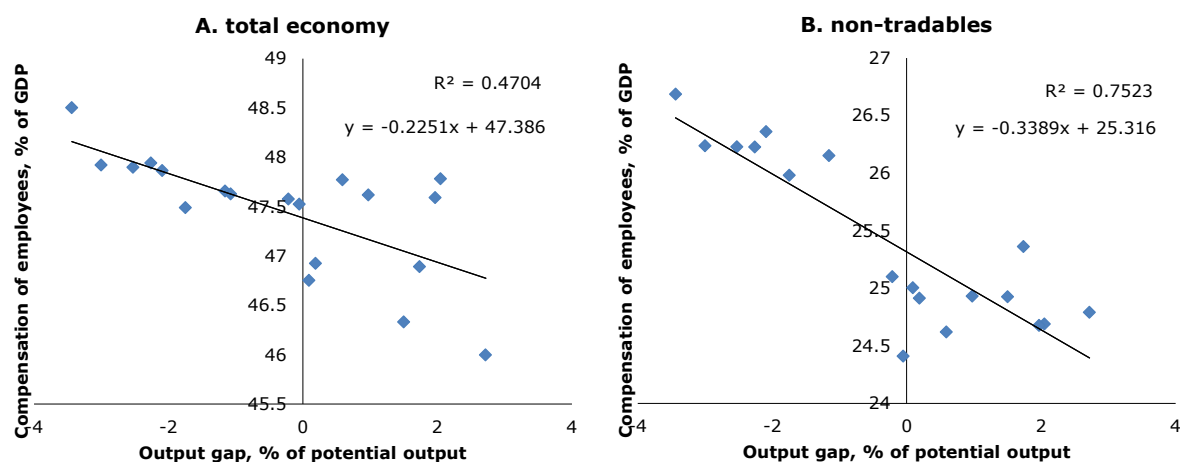
Since the coefficient of variation measures variability in relative terms, Member States where a wide-spread demand shock suppresses employment in all sectors will have a relatively lower mismatch index value than Member States where the Great Recession resulted in numerous job losses only in some sectors, i.e. real estate, not compensated by job creation in other sectors. Sectors are also weighted by their share in total employment, so that large job losses in a relatively less important (in terms of employment) activity area weigh less.

⁽¹²⁵⁾ Assuming that in the short-run wages are downward rigid.

⁽¹²⁶⁾ Arpaia, A., A. Kiss, and A. Turrini (2014), 'Is unemployment structural or cyclical? Main features of job matching in the EU after the crisis', *European Economy Economic Papers*, No. 527.

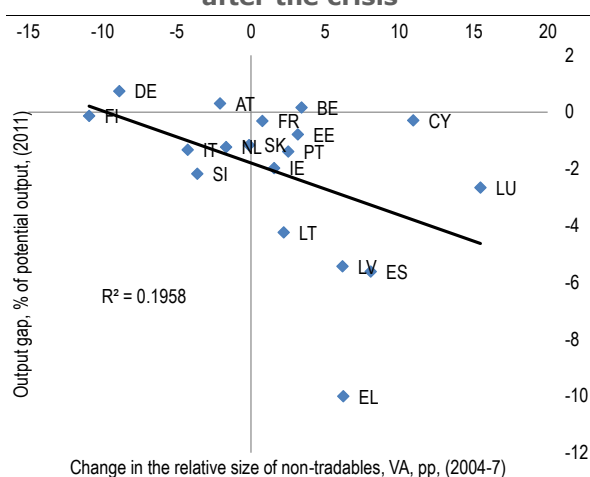
⁽¹²⁷⁾ The economy is subdivided in 15 sectors: Agriculture; Manufacturing (incl. mining, quarrying, electricity, water supply, sewerage); Construction, Wholesale trade, retail trade, repair of motor vehicles; Transportation and storage; Accommodation and food service; Information and communication; Finance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

Graph III.11: **Cyclical conditions and workers' compensation**
euro area, 1998-2016



Source: AMECO.

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



Source: AMECO.

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

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

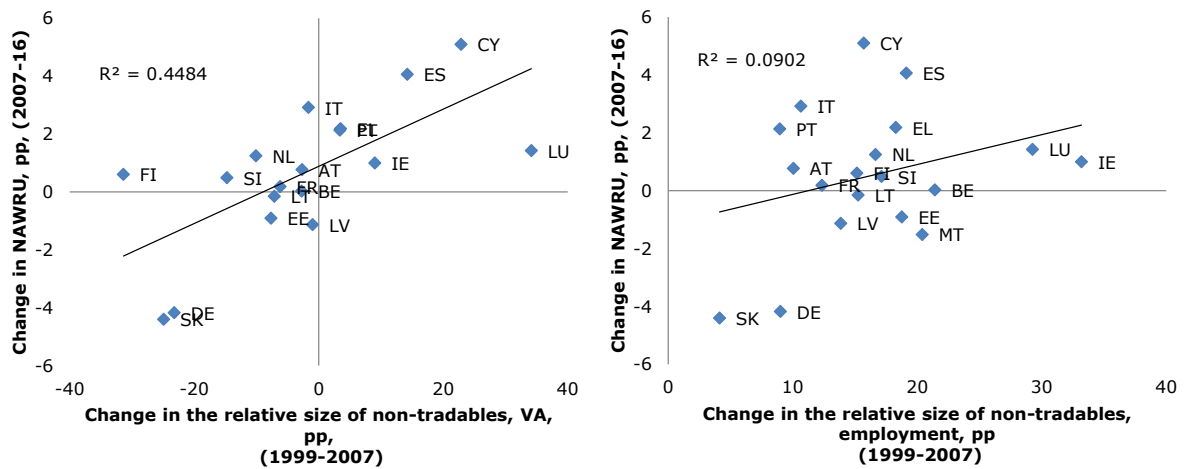
The sectoral mismatch indicator is used to test the role of sectoral misallocation for persistence in unemployment in the following way. First, for each country, in a simple ordinary least squares (OLS) regression, the quarterly unemployment rate is regressed on the sectoral mismatch indicator in Arpaia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

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

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

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

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

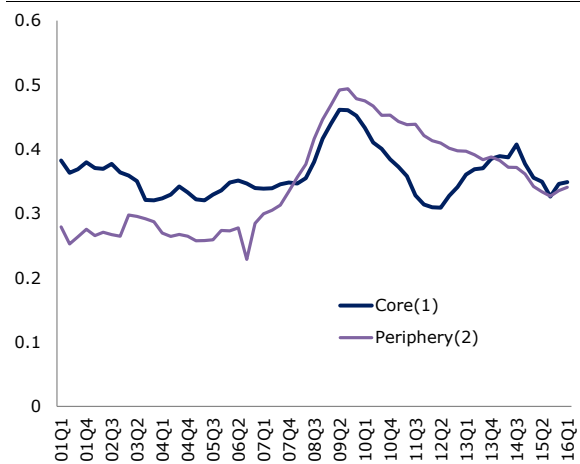


Source: AMECO.

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

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

Graph III.14: Sectoral mismatch indicator



(1) BE, DE, EE, FR, LV, LT, LU, NL, AT, SI, SK, FI (2) IE, GR, ES, IT, PT.

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

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

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

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

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

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

unemployment rate not persistent due to misallocation. ⁽¹³⁰⁾

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

III.7. Conclusions

The empirical analysis, based on data covering a sample ranging from the mid-90s (for some Member States from the early 00s) until 2016 presented in the previous subsections suggests that wages responded weakly to long-term unemployment and that sectoral skills mismatch

hindered labour reallocation in the wake of a strong boom and bust hitting more strongly specific sectors of the economy, like construction. Both mechanisms carry the risk that the unemployed may get trapped in persistent unemployment spells, which would in turn limit Member States' resilience and growth potential.

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

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

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

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

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

A panel vector autoregression (panel VAR) attempts to trace the dynamics of employment to changes in labour costs. A standard way to estimate a panel VAR is the mean-group estimator in Pesaran and Smith (1995)¹. A separate mean group estimator panel VAR of lag order one is run for Germany, France, Spain, Portugal and Austria. The endogenous vector in annual frequency in several economic sectors between 2000 and 2015² consists of (in that order): the growth of total employment in terms of persons, the growth of real gross value added (GVA) and the growth of real compensation per hour worked. The panel VAR includes a vector of exogenous variables that do not vary by economic sector. These are: the growth of real GDP and the consumer-price index. The panel VAR also includes a constant.

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

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

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

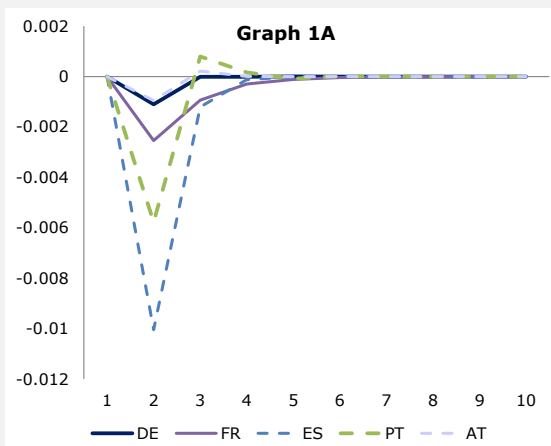
It is evident from the graph that in Austria, Germany and France the responsiveness of employment growth to changes in labour costs is several times lower than in Portugal and Spain. The impact of a negative demand shock is also higher in Spain and Portugal, while being positive but not statistically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

¹ See also Dieppe et al. (2016) for a description of the Matlab routine to estimate a mean-group estimator panel VAR.

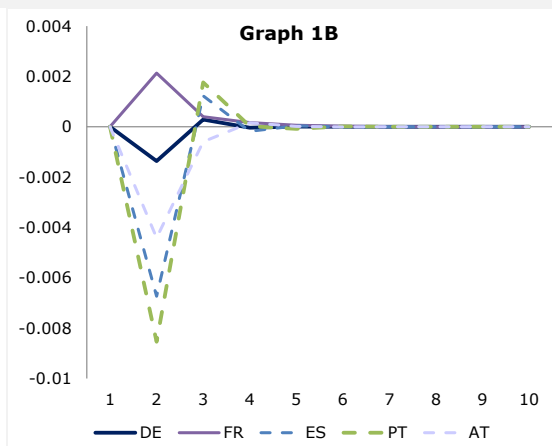
² The economic sectors are: Manufacturing; Electricity, gas, steam and air conditioning supply; Water supply, sewerage, waste management and remediation activities, Construction; Wholesale and retail trade; Transportation; Accommodation and food services; Information and communication; Real estate; Professional, scientific and technical activities; Education, Health services; Arts and entertainment.

Box III.2: Panel VARs on response of employment growth to labour costs

Impulse response functions, positive shock in labour costs, response in employment



Impulse response functions, negative shock in value added, response in employment



Notes: all variables in growth rates, 2000-15

References:

Dieppe, A., R. Legrand and B. Van Roye (2016), 'The BEAR toolbox' *ECB Working Paper Series*, No. 1934.

Pesaran, H. and R. Smith (1995), 'Estimating long-run relationships from dynamic heterogeneous panels' *Journal of Econometrics*, 1:79-113.

The risk of erosion of skills and employability for people facing (persistent) unemployment or underemployment spells calls for retraining and life-long learning to prevent the build-up of skill mismatches, as well as well-targeted active labour market policies for the long-term unemployed. More specifically, the re-integration of the long-term unemployed calls for individualised, tailored support, including help with job search as well as further education and training. ⁽¹³¹⁾

Addressing the skills mismatch calls for adequate skills formation, a strengthening of cross-border mobility by making degrees and educational achievements more internationally comparable and recognized, and aligning better education and training with the rapid pace of change in the labour

market - as has been outlined in the recently launched New Skills Agenda for Europe. ⁽¹³²⁾

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

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

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

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