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Foreword

This report shows a positive situation. The European labour market has so far proven to be strong and resilient to the weakening of the economy. Standing at 241 million, the number of people employed in the EU is at its highest level ever, and the EU's unemployment rate stands at its lowest level ever recorded. Moreover, high unemployment countries experienced high employment growth, further decreasing divergences across countries. Wage growth has been higher in in Central and Eastern European countries, contributing to wage convergence across the EU.

Since 2008, reforms have extended the coverage and increased the level of social benefits. These reforms have reinforced their effect on reducing poverty. Reforms of the tax and benefit systems enacted after 2008 have lowered inequality in almost all countries and the proportion of people with income below the poverty line. Yet, challenges remain as the poorest have experienced a worsening of their living conditions in about half of the Member States.

Building skills, creating equal opportunities and access to the labour market and social protection is more important than ever before to foster social inclusion. Investment in education and training remains the key policy action for the years to come to respond to the challenges of the ongoing job polarisation resulting from automation and digitalisation.

Marianne Thyssen
Commissioner for Employment,
Social Affairs, Skills and Labour Mobility

CONTENTS

LIST OF TABLES

LIST OF GRAPHS

LIST OF BOXES

SUMMARY AND MAIN FINDINGS

The EU labour market has proved so far quite resilient to the weakening of the EU economy

In 2018 and 2019, improvements in the EU labour market continued at a steady pace. In the first half of 2018, the labour market delivered robust employment gains, spurred by strong domestic demand. The economic slowdown in the second half of the year had only a minor impact on job creation, despite external developments becoming less favourable and confidence indicators reaching a turning point. Compared to 2017, about 3.1 million jobs were created in 2018 (almost 2.4 in the euro area); the yearly EU unemployment rate reached 6.8% (8.2% for the euro area), about one percentage point below the rate of the previous year. In 2019, trade tensions escalated, weighing on industrial production and trade flows. As the slowdown is primarily driven by external demand, the labour market has so far proved to be resilient. In the first half of 2019, EU employment expanded at 1%, slightly below the rate of one year earlier (1.3%) – for the euro area, 1.3% against 1.5% in 2018. In September 2019, the EU unemployment rate reached 6.3%, the lowest level since January 2000 – and 7.5% for the euro area, close to the pre-crisis lows.

The steady decline in unemployment has supported convergence across countries

As in previous years, the fall in unemployment was stronger than expected based on the pace of economic growth. High unemployment countries, including Croatia, Greece, Spain and Portugal, experienced high employment growth. As a result, the gap between the maximum and minimum unemployment rates dropped from 22.3 percentage points in the second quarter of 2013 to 16.7 percentage points in the fourth quarter of 2018 – and further to 15.2 percentage points in the second quarter of 2019. Although the dispersion in unemployment rates across countries also declined, it remained high in 2018.

The fall in unemployment partly reflects improvements in the structural features of the labour market

Structural unemployment is a theoretical concept that relates the failure of the labour market to absorb jobless individuals to factors other than the business cycle. Different indicators suggest that the structural unemployment has declined over the last years. First, between 2006 and 2012, the NAWRU – i.e. the unemployment rate at which wage growth is stable independently of the stage of cycle – hovered around 9%; it started falling in 2013 to get closer to 7% in 2018. Second, the EU long-term unemployment rate has been steadily declining, reaching 2.8% in the first quarter of 2019 (3.5% for the euro area). In the first quarter of 2019, 25 countries had an average duration of unemployment spells below the 2013-2018 average; in 20 countries – including Germany, France, Poland and Portugal – the duration fell below the pre-crisis average. Finally, since the second quarter of 2018, the proportion of firms reporting labour shortages has been falling from very high levels; and yet the unemployment rate has kept falling. This is consistent with an improvement of the process of matching job seekers with available jobs.

The fall in structural unemployment reflects the ageing of the population and the effects of reforms enacted after the 2008 crisis

Various explanations can be given for this decline in structural unemployment. First, ageing may have reduced unemployment as younger cohorts – whose unemployment rates are usually several times higher than older age groups – become smaller. Second, several countries enacted comprehensive reforms aimed at enhancing labour market adjustment that, together with reforms of the unemployment benefit schemes and active labour market policies, have made the labour market more fluid and spurred labour demand and supply.

The activity rates have kept rising

In 2018, the EU activity rate hit a new historic high – 73.7% in the EU and 73.4% in the euro area. This trend is in marked contrast with that in the United States, where the decade-long decline in labour force participation came to a halt only in 2016. Activity rates increased in nearly all Member States, and mostly in Cyprus, Finland, Latvia, Lithuania and Malta. Higher female participation and education levels are the main drivers of this increase.

Labour under-utilisation is still significant; the average hours worked remain low

Hidden unemployment includes both people willing to work more hours – *under-employed part-time workers* − and people who have given up on searching for a job because they consider their chances of finding a job low − *discouraged workers*. In 2018, *discouraged workers* declined from 8.2 to 7.7 million; *under-employed part-time* workers fell from 9 to 8.3 million. Yet, the number of discouraged workers remains high in some countries, especially in Italy and Portugal. The hours worked per person employed reached a historical low, with no major differences across countries. Between 1995 and 2018 the average hours worked dropped by about 26 hours quarterly; 70.6% of this decline is due to the fall of hours worked within each sector, with the shift of employment towards services, usually less hour-intensive, accounting for the remaining 29.4%.

Wages have continued to rise but wage growth remains moderate

In 2018, wages rose at a rate higher than one year earlier (for the EU 2.7% against 2.1%; for the euro area 2.1% against 1.6%), with a slight deceleration in the last quarter of the year. In the first half of 2019, they increased at about the same rate as in the second half of 2018. Nonetheless, the response of wages to unemployment appears subdued. The analysis suggests that the response of wages to unemployment has not changed after the 2013 recovery. Wages closely follow inflation expectations and productivity, two variables that have been growing at a very modest rate since the onset of the 2013 recovery.

In all Member States, nominal wages rose at a higher pace in 2018 than in 2017

Developments in 2018 remained consistent with the external rebalancing needs within the euro area. Nominal unit labour costs continued to grow faster in countries characterised by a current account surplus before the crisis than in countries with previous current account deficits. Real wages increased in almost all countries supporting workers' purchasing power. In 2018, they rose above productivity growth in the euro area as a whole after rising below productivity growth in 2013-2017. As in previous years, wage growth was higher in Central and Eastern European countries, contributing to wage convergence. In several Central and Eastern European Member States, real wages rose faster than productivity. Consequently, the wage share increased in countries where it was low.

Total social protection expenditure as a percentage of GDP shifted up during the 2008 crisis.

Total social protection expenditure as a percentage of GDP increased from 24% in 2008 to 27.5% in 2010 and it has remained at about this level ever since. Transfers typically paid to working age individuals accounted for about one-third of the increase in total spending, with the rest accounted mainly by spending for old age and sickness. High-income Member States spend relatively more on social protection as percentage of GDP than low-income ones. At the end of 2016, per capita spending in high-income countries was more than five times larger than in low-income countries. The composition of social spending also varies with the level of GDP per capita; wealthier countries spend more on sickness, family and unemployment benefits.

Social protection spending provides insurance against asymmetric shocks

Only unemployment benefits are clearly anti-cyclical. Results suggest that old age, unemployment and sickness benefits contribute the most to stabilising households' disposable incomes. The ability of social spending to insure against income shocks varies with the level of GDP per capita. It is higher for high-income countries, owing to the stronger stabilising effect of spending on old age, unemployment and social exclusion.

Social protection spending is effective in reducing poverty risks

Overall, social benefits reduce the incidence of poverty in the EU by about one-third when measured as the proportion of people with income below the poverty line and its depth – i.e. the gap between the median income of persons below the poverty threshold and the at-risk-of-poverty threshold – by more than one-half. Family, sickness and disability benefits have the largest effect on the poverty rate; housing and social inclusion benefits contribute less, but still significantly. Social transfers are more effective in reducing poverty in Nordic and Continental countries than in Southern European or Baltic countries.

Reforms increasing the generosity of social benefits have reinforced their moderating effect on monetary poverty

During the crisis, social transfers have mitigated the effect of the increased joblessness on poverty. This effect was higher in countries that implemented reforms increasing the level and coverage of benefits. Those that reacted early in the recession coped better with the effects of a prolonged recession. Doing reforms on time strengthens the effect of social benefits on poverty when unemployment increases. However, unemployment benefits provide only a temporary relief during a recession.

The reforms of the tax and benefit systems enacted after 2008 have lowered inequality in almost all countries

The tax and benefits systems in place in 2018 achieved a greater reduction in income inequality as compared to what the systems of 2008 would have produced. In 14 countries, the reforms enacted after 2008 protected the low-income earners. In Germany, the Netherlands and Latvia, policy changes benefitted relatively more the middle-income groups. For Spain, Portugal and Ireland, the disposable income of households at the lower end of the income distribution was negatively affected.

Reforms of tax and benefit systems decreased poverty but not often its depth

Tax and benefit reforms modify the at-risk-of-poverty rate as they affect the median income and the poverty lines. In eight countries (Belgium, Bulgaria, Denmark, Estonia, Luxembourg, Poland, Romania and Sweden), policy changes led to a decline in the number of people at risk of poverty and to an increase in the poverty line. In a few countries, including Germany and Slovakia, both the poverty line and the share of people at risk of poverty increased. In the remaining countries, policy changes led to a decline in the median income – i.e. in the poverty line – but the proportion of people at risk of poverty fell. In these countries, lower income groups benefitted from the changes in the tax and benefit systems. Nonetheless, the intensity of poverty – i.e. the gap between the median income of those below the poverty threshold and the poverty threshold – deepened in almost half of the Member States, indicating a relative worsening of living conditions of the poorest.

There is a close relationship between job polarisation and skill mismatches

Job polarisation – i.e. the increase of employment at the upper and lower ends of the wage (skill) distribution and the decline in the middle – is a long-term tendency influenced by technological changes and shifts in the international division of labour. Skill mismatches refer to a broad imbalance between skills sought by employers and skills offered by job seekers. This imbalance may be temporary, due to labour market frictions, or more persistent, because of

structural disequilibria between supply and demand of skills. Only few studies have assessed the link between job polarisation and skill mismatch.

The intensity of job polarisation declined after the 2008 crisis

Between 2002 and 2018, the EU share of middle-paying jobs declined by 13 percentage points, with some differences across countries. The drop was the largest for France, Luxembourg, Ireland and Portugal, and the smallest for Poland, Estonia, Slovakia and Bulgaria. In the EU as a whole, employment is largely shifting towards high-paying occupations. Yet, in some Member States (e.g. Bulgaria, Slovakia, Netherlands, Romania, Spain and Greece), employment increased more in low-paying occupations. After the crisis, only few countries (Bulgaria, Czech Republic, Finland and the Netherlands) continued to experience job polarisation; the opposite trend is observed in Germany, Greece, Romania and Slovenia.

The task-based approach provides a better measure of the drivers of polarisation

The introduction of technologies that replace human labour in routine tasks is one explanation of job polarisation. Most countries experienced a substantial shift from routine to non-routine tasks. While non-routine cognitive tasks are on the rise in all countries, in particular in Latvia, Luxembourg and Portugal, only few Member States experienced a simultaneous increase in both non-routine manual and non-routine cognitive tasks. Therefore, for the EU as a whole there seems to be a process of upskilling rather than one of genuine job polarisation.

The decline in routine employment is associated with an increase in skill mismatches

Technological progress is reducing the demand for workers performing routine tasks. The analysis suggests that this trend may increase skill mismatches. Middle-income countries are more exposed to this change than high-income ones that have largely completed the transition from more routine sectors (e.g. manufacturing) to less routine ones (e.g. services). Moreover, middle-income countries might find it more difficult to meet the fast changing labour demand towards more complex skills as it takes time to upskill their workforces.

Addressing the consequences of job polarisation would also help to reduce skill mismatches

The demand for workers performing routine tasks is falling relative to that of workers performing non-routine tasks. There is a clear need for policies that smooth the transition between jobs. Building skills is more important than ever before. More effective spending on education and training and lifelong learning is associated with lower skill mismatches. Workers need to be re-skilled to effectively deal with the challenges spurred by ongoing technological and climate change.

Part I

Labour market and wage developments

1. GENERAL LABOUR MARKET CONDITIONS IN THE EURO AREA AND THE EU

In 2018 and the first half of 2019, the improvements in the labour market continued at a steady pace. Unemployment kept falling and, in May 2019, reached its lowest rate since 2000. The decline in the unemployment rate in both the EU and the euro area was accompanied by a reduction in the divergences across countries.

The labour market has proved so far quite resilient to the weakening of the EU economy in the second half of 2018. The fact that the slowdown has been driven primarily by the weakness of external demand explains why the effects on employment have been limited so far. The hours worked per worker remain at historical lows. This is consistent with the downward trend in hours of the last two decades, and reflects the rising share of services in employment. Involuntary part-time employment has dropped from the peak of 2014, when it reached almost 6% and 7% of total employment for the EU and the euro area, respectively. Yet, at about 5% in the EU and 6% in the euro area, it remains high.

Both a decline in job losses and an increase in the job finding rates contributed to the observed reduction in unemployment. The drop in the jobless rate is not only the outcome of a prolonged economic expansion. Structural reforms enacted since the 2008 crisis may also have contributed to improve the matching between vacant jobs and unemployed people, resulting in an estimate of structural unemployment at the lowest levels since the EU time series is available.

Wage growth in the EU and the euro area continued to pick up at a steady pace consistent with the decline in unemployment. Nonetheless, wage growth remains moderate. Wages are linked to inflation expectations, which, however, remain subdued. It can be expected that the slow but persistent acceleration of nominal wages will continue as inflation moves closer to the reference value of 2% and unemployment stays below its structural rate. Yet, in a low inflation environment, wage growth depends more on long-term productivity growth, which has been on a downward path since the mid-1990s.

Structural reforms may have made the labour market more fluid and reduced structural unemployment, possibly more than currently captured by the available estimations. If the fall in the structural unemployment rate is larger than indicated by available measures, then cyclical unemployment (i.e. the labour market slack), would be larger, which may keep wage growth sluggish.

1.1. INTRODUCTION

In the second half of 2018, economic growth in the EU started to weaken. The softening of external demand, amid ongoing trade tensions, China's slowdown and the uncertainty of a withdrawal of the UK from the EU without an agreement, were the main drivers of the slowdown. Conversely, domestic demand continued to benefit from the good labour market developments and the gradual pick-up in wage growth. Employment rose by 1.3% in 2018, while wages expanded at a rate closer to 2.5%. Employment growth slightly declined in the second half of the year. The unemployment rate continued to fall and, in September 2019, reached its lowest rate since the start of available EU time-series 2000 (6.3%).

Against this background, this chapter analyses the main features of labour market developments in the EU and the euro area in 2018 and early 2019. It compares the EU labour market performance with that of other industrialised economies and assesses the role played by relevant variables including employment, participation, working hours and labour costs. Section 1.2 describes the recent labour market developments in the EU in an international perspective. Section 1.3 analyses the trends in employment, activity rates and hours worked. Section 1.4 reviews the latest trends in wages and labour costs. Section 1.5 focuses on aggregate movements in and out of unemployment, as well as job matching.

Table I.1.1: **Unemployment, compensation per employee and GDP growth in the euro area and EU**

					Quarter over same quarter of previous year, %						Quarter over previous quarter, %					
		2016	2017	2018	2018Q1	2018Q2	2018Q3	2018Q4	2019Q1	2019Q2	2018Q1	2018Q2	2018Q3	2018Q4	2019Q1	2019Q2
Unemployment rate	EA	10.0	9.1	8.2	-1.0	-0.8	-1.0	-0.8	-0.8	-0.7	-0.2	-0.2	-0.3	-0.1	-0.2	-0.1
	EU28	8.6	7.6	6.8	-0.9	-0.8	-0.8	-0.7	-0.6	-0.6	-0.2	-0.2	-0.2	-0.1	-0.1	-0.2
Unemployment growth	EA	-6.9	-9.3	-9.2	-9.2	-9.0	-10.1	-8.6	-8.9	-8.2	-1.9	-2.9	-2.9	-1.3	-2.2	-2.1
	EU28	-8.6	-10.3	-10.1	-10.3	-10.3	-10.5	-9.1	-8.8	-7.9	-2.5	-3.0	-2.4	-1.6	-2.1	-2.1
Growth of nominal compensation per employee	EA	1.2	1.6	2.1	1.9	2.2	2.5	2.2	2.3	2.2	0.4	0.7	0.7	0.5	0.4	0.6
	EU28	1.7	2.1	2.7	2.1	2.2	2.7	2.7	2.8	2.7	0.6	0.7	0.5	0.9	0.7	0.6
GDP growth	EA	1.9	2.5	1.9	2.6	2.2	1.6	1.2	1.3	1.2	0.3	0.4	0.2	0.3	0.4	0.2
	EU28	2.0	2.6	2.0	2.4	2.2	1.8	1.5	1.7	1.4	0.3	0.5	0.3	0.4	0.5	0.2
Employment growth	EA	1.4	1.6	1.5	1.6	1.6	1.4	1.4	1.4	1.2	0.4	0.4	0.2	0.3	0.3	0.2
	EU28	1.3	1.5	1.3	1.5	1.4	1.3	1.2	1.1	1.0	0.4	0.4	0.2	0.2	0.3	0.3

(1) Seasonally adjusted data.
(2) In the case of the unemployment rate, the table presents changes in percentage points, rather than percent.
Source: Eurostat.

1.2. SETTING THE SCENE: THE EU LABOUR MARKET FROM AN INTERNATIONAL PERSPECTIVE

1.2.1. Recent EU-level developments

In 2018, the weakening economic expansion weighed only moderately on the labour market. Spurred by strong domestic demand and high but rapidly falling levels of business and consumer confidence, the labour market delivered robust employment gains in the first half of 2018 (Table I.1.1). The deceleration of economic growth in the second half of the year had only a small impact on job creation, despite developments becoming less favourable with confidence indicators rapidly reaching a turning point. ([1]) After hovering around a growth rate of 0.4% for almost 8 quarters, employment growth temporarily dropped quarter on quarter in the third and fourth quarter of 2018 – to 0.3% and 0.4% in the EU and to 0.2% and 0.3% in the euro area (Table I.1.1). Given that the drop of GDP growth was larger, the employment content of growth increased; this implies that, as compared to the pre-crisis period, less GDP growth is necessary to have job creation. ([2])

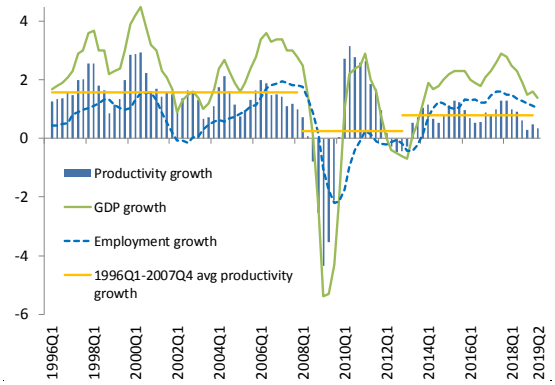
Because of these developments, employment in the EU rose on an annual basis by 1.3% (1.5% for the euro area), above the average growth of the period 2000-2007 (1% for both the EU and the euro area). Currently employment is about 3.4% above the pre-crisis level (2.7% in the euro area).

Employment has so far been resilient to the slowdown, while productivity growth has deteriorated. At the early stage of the 2013 recovery, GDP expanded at a higher rate than employment, and productivity growth increased from 0.5% in 2013 to 1.2% in 2015. The recovery was mainly driven by domestic demand and was supported by the strengthening of the labour market. Since consumption goods and services are usually labour intensive, economic growth had a stronger impact on job creation. Between 2013 and 2018, employment grew by about 6.5% with more than two-thirds of the growth stemming from job creation in market services (growing at 8%). So far, the labour market in the EU and the euro area has proved to be resilient to the weakening of economic growth, as domestic demand, the main driver of employment growth has held up fairly well during the slowdown. Thus, robust employment growth in 2018 amidst the deceleration of GDP growth in the second half of the year led to a further weakening of productivity growth (Graph I.1.1).

([1]) Graph I.1.1 suggests that since 2013 employment growth responded to GDP growth with little lags.

([2]) This can be verified by testing the response of employment growth to GDP growth. A regression of employment growth on a constant and GDP growth over the period 1996Q1-2018Q4 shows that from 2014Q2 onwards, employment growth was higher than expected. Usually, GDP growth has to be above a certain threshold to offset the employment effect of trends in technology and the intensity of labour in production. This threshold fell from 0.7% for the period 1996Q1-2007Q4 to 0.4% during 2013Q1-2018Q4.

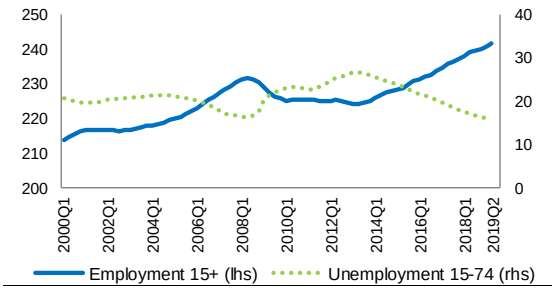
Graph I.1.1: **Employment, GDP and productivity growth in the EU**



Source: Eurostat.

Unemployment has been steadily falling. In 2018, employment in the EU further increased by 3.2 million (2.3 million in the euro area). It outpaced the increase in the labour force, leading to a drop in unemployment by almost 2 million. The number of unemployed hovered around the lowest level reached before the 2008 crisis (Graph I.1.2). The unemployment rate has fallen steadily from almost 11% in early 2013 (12% for the euro area) to 6.3% (7.5% for the euro area) in September 2019, the lowest rate since 2000. The decline of the unemployment rate was observed at all durations, including for those jobless for more than 12 months. At the onset of the 2013 recovery, the number of unemployed had reached 26.2 million (19 million in the euro area), but by 2018 it had dropped to 16.9 million (13.4 million in the euro area). More than half of this decline (54% in the EU and 56% in the euro area) can be attributed to the fall in the long-term unemployed.

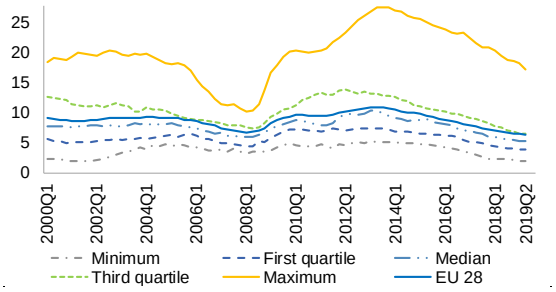
Graph I.1.2: **Employment and unemployment in the EU, million persons, 2001-2018, quarterly data**



(1) Employment is from National Accounts, domestic concept, ages 15 and over, seasonally adjusted.
(2) Unemployment is from the Labour Force Survey, ages 15-74, seasonally adjusted.
Source: Eurostat.

The decline of unemployment in the EU has been matched by a falling dispersion across countries. All Member States have benefitted from the favourable labour market performance. Graph I.1.3 shows how the distribution of unemployment rates across countries has evolved over time. The fall in the jobless rate involved all countries and was comparatively larger for high- than for low-unemployment countries. ([3]) With the broadening of the recovery, a larger number of countries benefitted from economic growth and the diversity in unemployment rates across countries declined. ([4]) The gap between the maximum and minimum unemployment rate dropped from 22.3 pps in 2013Q2 to 16.7 pps in 2018Q4. During the same period, the gap between the unemployment rates of the first and third quartile dropped from about 6 pps to 3 pps. Thus, both unemployment rates at the extreme ends of the distribution and at the centre improved.

Graph I.1.3: **Unemployment rates by quartile**



(1) A quartile divide data into four representative points. The first quartile is the middle number that falls between the minimum and the median (the second quartile). The third quartile is the point that lies between the median and the maximum. The median is the point where half of the values are greater and half are less than the value.
Source: Eurostat, LFS.

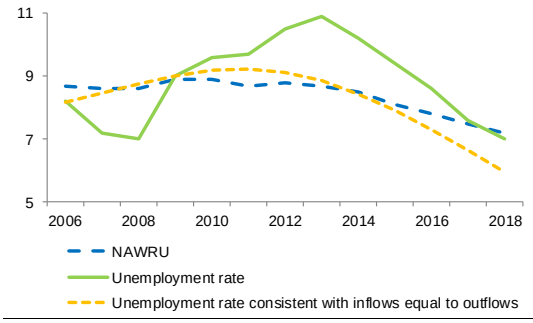
([3]) The ranking of countries in the distribution of unemployment rates varies over time. The highest unemployment rate in the EU was in Poland in the period 2002-2006; in Spain in 2008-2009, Latvia in 2009-2010, Spain in 2010-2012, and Greece in 2012-2019. Similarly, the country with the lowest unemployment rate was Luxembourg between 2000 and 2003, and the Czech Republic between 2016 and 2019.

([4]) Looking at the characteristics over time of the distribution of unemployment rates across countries gives better insight of how the dispersion across countries has varied. Indeed, the standard deviation and the average depend on countries with extreme values. Based on the standard deviation, the dispersion started to fall in 2013Q2; yet, this indicator does not tell if this decline concerned several countries or only few of them. Conversely, the coefficient of variation hints at a rising dispersion since 2008Q2 due to the effect of falling unemployment in Germany on the EU aggregate.

The fall in unemployment reflects both the favourable business cycle conditions and the decline in the structural unemployment rate. Structural unemployment is the level of unemployment rooted in the microeconomic functioning of the labour market. ([5]) It is a theoretical concept that needs to be estimated. Two notions are most commonly used. The *non-accelerating wage inflation rate of unemployment* (NAWRU) is the unemployment rate at which, controlling for supply shocks, wage inflation remains stable. *Frictional unemployment* is due to the *normal* turnover in the labour market and depends, *inter alia*, on the process of matching vacant jobs with job seekers (Pissarides, 2000). ([6])

Different indicators hint at a decline in structural unemployment. According to official Commission estimates (AMECO), the NAWRU for the EU declined slowly between 2009 and 2013 - by 0.1 and 0.2 pps for the EU and the euro area - and kept falling at a more rapid pace thereafter (1.5 and 1.3 pps for the EU and the euro area) to reach 7.2% in 2018 (8.1% for the euro area). ([7]) Graph I.1.4 also reports a measure of structural unemployment close to the notion of *frictional unemployment*. The frictional unemployment rate is the rate that equates inflows into and outflows out of unemployment. When unemployment equals its frictional rate, the unemployment rate does not change. Several observations stand out. First, between 2006 and 2012, both measures are in a ballpark of 9%. ([8]) Until 2009, the *frictional unemployment* rose by 0.8 pps (from 8.2% to 9%), while the NAWRU rose only by 0.2 pps (from 8.7% to 8.9%). ([9]). Second, both measures started falling from 2013. Given that both the actual and the structural unemployment declined, the deviation of unemployment from its structural rate (i.e. the cyclical unemployment) dropped more slowly. Third, the gap between the current unemployment rate and the NAWRU virtually closed in 2018, while it remained open in the case of frictional unemployment. Since the effects of structural reforms on structural unemployment can be quantified only with a lag, the effective size of the labour market slack (i.e. how far is the unemployment rate from its structural level) could be higher than the one currently observed. ([10])

Graph I.1.4: **Unemployment rate and structural unemployment rate in the EU**



(1) The frictional is computed as follows. Inflows into unemployment are the product of the stock of employed (N) times the job separation rate (s). Outflows out of unemployment are the product of the stock of unemployed (U) times the job finding rate (f). When the two flows are equal, unemployment does not change: sN-fU=0. The frictional unemployment is defined as the flow-steady state unemployment rate u=s/(s+f). Cyclical fluctuations are smoothed out with a Hodrick-Prescott filter.
Source: Ameco and Commission services calculations based on LFS.

Different explanations can be offered for the decline in structural unemployment. First, ageing may have reduced the overall unemployment rate, as young cohorts, usually with

([5]) It reflects institutional factors (tax and benefit systems, real wage rigidities, recruitment and retraining costs, availability of information about job vacancies) and structural elements (e.g. demographics, skills, technologies) that affect demand and supply of labour beyond the normal cyclical swings (Layard, 2005). The effect of the 2008 crisis on structural unemployment is discussed in European Commission, 2013a, *Labour Market and Wage Developments in Europe*.

([6]) Both concepts are not fully unreactive to the cycle. The NAWRU is pro-cyclical if real wages adjust slowly to labour demand shocks (Hristov et al., 2017; European Commission, 2013a, *Labour Market and Wage Developments in Europe*) or if prolonged periods of unemployment lead to a deterioration of skills and weak labour market attachment, which permanently affects employability (Blanchard and Summers, 1988). The *frictional* unemployment fluctuates over the cycle with the job finding and job separation rates (Elsby et al., 2010) or if employers adapt their recruitment intensity over the cycle (Diamond and Şahin, 2016). The NAWRU is a concept of structural unemployment that is more closely related to the wage formation mechanism; the frictional unemployment instead reflects mainly the functioning of the labour market, in particular the matching of the unemployed to vacant jobs.

([7]) AMECO and Hristov et al., 2017.

([8]) The average for the period is 8.7% for the NAWRU and 8.8% for the frictional unemployment.

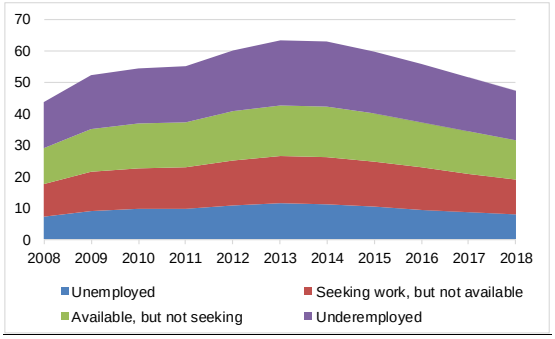
([9]) The deterioration in the probability of losing and finding a job and the greater mismatch between labour demand and supply were the main factors behind the increase in the *frictional unemployment* (European Commission, 2013a, *Labour Market and Wage Developments in Europe*).

([10]) Euro area estimates of the NAWRU have been continuously revised downwards (Praet, 2018; Cœuré, 2018).

high unemployment rates, are less represented in the population. The evidence provided in Chapter 2 ([11]) suggests that this effect may have played a role for some but not all Member States, i.e. in some countries, the unemployment rate would have been higher had the age structure of the population remained unchanged. Second, the reforms enacted after the 2008 crisis may have brought down structural unemployment. Measures increasing internal and external flexibility combined with reforms of the tax and benefit systems supporting transitions between jobs have made the labour market more fluid. This has led to better matching between vacant jobs and unemployed people and spurred demand and supply of labour. Box 2.2 in Chapter 2 shows that the rise in participation rates is explained by the increase in the probability of joining the labour force. This factor does not depend on socio-demographic changes and can be related to the effect of structural reforms. Moreover, the 2008 financial crisis and the ensuing deep recession might have made workers more reluctant to ask for a pay rise. ([12]) This might have lowered the lowest wage at which unemployed are willing to accept a job (the reservation wage), encouraging labour supply with a positive effect on structural unemployment. Finally, the decline in the reservation wage during the crisis may have strengthened the monopolistic power of employers in wage negotiations. This, in turn, is usually associated with moderate wage growth and sub-optimal employment outcomes. ([13])

Labour under-utilisation is still significant. The drop in unemployment observed between 2013 and 2018 has been remarkable (a decrease of 9.2 million in the EU or 35%). Nonetheless, the decline in unused labour resources appears less striking for those partially attached to the labour force (a drop by around 13%) (Graph I.1.5). ([14]) In 2018, the *discouraged workers* – those available to work but not seeking a job because they consider that no work is available for them – dropped in the EU from about 5% to 4% of the labour force (from 5% to 4.7% for the euro area). Besides, the number of part-time workers willing and ready to work more hours (underemployed) amounted to 8.3 million or 3.4% of the labour force (6.2 million or 3.8% in the euro area). Between 2013 and 2018, it decreased from 10.3 to 8.3 million (7.3 to 6.2 in the euro area). The number of discouraged workers and underemployed remains high in several countries (see Chapter 2).

Graph I.1.5: **Extended measures of labour utilisation (as percentage of extended labour force)**



(1) The extended labour force is the active labour force plus those available, but not seeking, plus those seeking but not available to work. All figures refer to the age group between 15 and 74 years.
Source: Own calculations based on LFS.

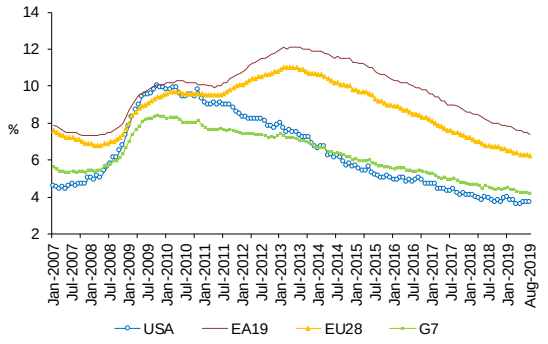
The growth of temporary jobs is still important. Since the onset of the 2013 recovery, employers` have increasingly favoured temporary hiring, especially in the euro area. Compared to previous years, in 2018 temporary employment appeared less dynamic (2.4% against an average of 3.5% in the previous five years), but still above the growth rate for the total number of employees (1.5%). Therefore, the share of temporary employment in the euro area reached 16%. The increase of temporary work involved only contracts with a duration of more than 4 months, while shorter-duration contracts actually inched down. Temporary employment in the EU remained mostly unchanged, with a share in the total number of employees hovering around 14%. ([15])

([11]) Box "The impact of demographics on unemployment".
([12]) In particular, in countries were reforms of EPL reduced the dismissals' cost at a time of high or increasing unemployment (Duval and Furceri, 2018).
([13]) The effect on structural unemployment might also be weakened by the prolonged restraint of aggregate demand transforming a temporary increase in unemployment into a permanent increase.
([14]) This group includes: (a) people available to work not seeking a job because they consider that no work is available for them – the so-called discouraged workers and (b) those seeking work but not immediately available.
([15]) This is about the same rate as before the 2008 crisis. Chapter 2 provide an overview of temporary employment growth at the national level.

1.2.2. Recent labour market developments in major world regions

Unemployment continued to decline in the main industrialised countries. Unemployment rates are back to pre-crisis levels in most industrialised countries. The gap with the EU unemployment rate has also been falling (Graph I.1.6 and Table I.1.2). In July 2019, the EU unemployment rate was only 2.6 pps and 2 pps above the rates of the US and the G7 countries. Yet, the lower unemployment rate in the US reflects mainly the decline in the activity rate. Indeed, the gap between the EU and the US unemployment rates would disappear if the activity rate in this country had stayed unchanged (Graph I.1.7). ([16])

Graph I.1.6: **Unemployment rates in the EU, the US and the 'Group of seven' advanced economies, 2000-2019, monthly data**



Source: OECD.

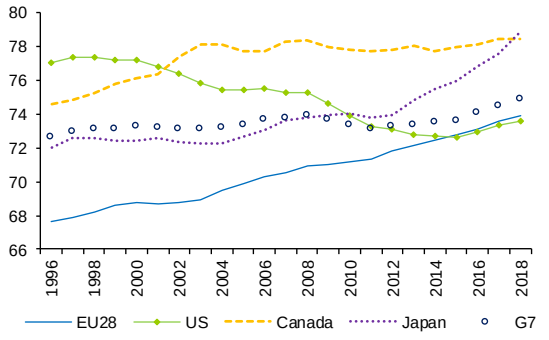
The US labour market is getting increasingly tight as the economy continues to grow. Rebounding from a sharp negative trend in 1999-2016, the employment rate hit a high in February 2019 (60.7 %). ([17]) According to the US *Bureau of Labor Statistics* (BLS), the unemployment rate since March 2018 has constantly been below 4% and the job vacancies (job openings in the BLS statistics) peaked in December 2018 at 7.5 million. A large fall in involuntary part-time employment along with a rebound in the hours worked suggests that the labour market slack has decreased significantly. All labour market indicators are now well below the averages of the period 2000-2008. The growth rate of average hourly wages, at 3.3% in 2018 and 3.5% in the first quarter of 2019, is higher than the 2.4% in 2015-2016. Wages picked up also at the lower end of the distribution, therefore solidly boosting domestic demand growth. ([18])

Table I.1.2: **GDP growth and unemployment in selected economies**

	GDP growth %			Unemployment rate %		
	2000-2007	2017	2018	2000-2007	2017	2018
EA	2.2	2.4	1.9	8.6	9.1	8.2
EU	2.5	2.5	2.0	8.7	7.6	6.8
CAN	2.8	3.0	1.8	7.0	6.3	5.8
JPN	1.5	1.9	0.8	4.7	2.8	2.4
USA	2.7	2.2	2.9	5.0	4.4	3.9
OECD	2.5	2.4	2.3	6.5	5.8	5.3
BRIC:	8.1	5.8	5.7	:	:	:
BRA	*3.6*	*1.1*	*1.1*	*11.3*	*13.3*	*:*
RUS	*7.2*	*1.6*	*2.3*	*8.1*	*5.2*	*:*
IND	*7.2*	*6.9*	*7.4*	*:*	*3.5*	*:*
CHN	*10.6*	*6.8*	*6.6*	*3.9*	*3.9*	*:*

Source: Eurostat and OECD.

Graph I.1.7: **The activity rate in the EU and selected advanced economies, 1996-2018**



(1) The activity rate is the ratio of active to total population. Active population includes those employed and unemployed, but excludes those inactive (e.g. not seeking work).
(2) Age group: 15-64.
Source: OECD.

In Canada, a supportive economy underpinned favourable labour market developments. Employment reached high levels in 2017 and added further 163 thousand employed in 2018. This brought the yearly employment growth to

([16]) European Commission, (2018b), Labour Market and Wage Developments in Europe. In 2019Q2, the US unemployment rate with activity rate unchanged at the start of the recovery would have been at 7.7% against an effective rate of 3.6%.

([17]) Between 1999 and 2016, the employment rate in the US dropped by 4.5 percentage points, from 64.3 to 59.7. About 3 pps of this decline is due to demographic effects, (Abraham and Kearney, 2018).

([18]) According to the Federal Reserve of Atlanta *Wage Tracker*, an indicator based on micro data from the *Current Population Survey*, wages of the first decile expanded at 4%.

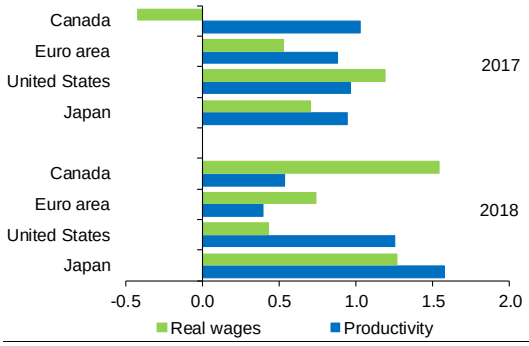
about 1%. The unemployment rate at 5.7% in August 2019 hit a four-decade low in May (5.4 %). The participation (25-54 years) continued to rise and peaked at 87%; the job vacancy rates and labour shortages suggest that the labour market is very tight. Nonetheless and similar to other countries, wage growth remained restrained until the first quarter of 2019 while in the second it went up to 2.4 %.

The Japanese labour market is well beyond full employment. All indicators point to a degree of tightness unseen since the early 1970s. In 2018, inactivity fell markedly by 2.7% while employment grew by 2%, boosted especially by the growth of non-regular employment (4.1 %). ([19]) The unemployment rate further decreased to 2.4% and in August 2019 unexpectedly hit a new low (2.2 %). The youth unemployment rate stands at 3.6 %. Real wage growth remains low at 1.4%, partly due to the increasing share of non-regular workers. In an attempt to tackle specific sectoral shortages, the National Diet (i.e. the Parliament) passed a bill revising the immigration law. By making immigration easier, this bill marks a significant policy change for the country as in the past it had effectively granted working visas only to highly skilled professionals.

Although the Chinese economy is slowing down, the unemployment rate keeps falling. In 2018, economic growth slowed down mainly due to trade tensions with the US and financial regulatory tightening to rein in financial stability risks and improve banking sector resilience. Yet, the official unemployment rate fell slightly from 4.1% to 3.9 %, hitting a historical low in July 2019 (3.6%). As the economy has been losing steam, job openings have weakened. Massive dismissals from manufacturing firms are no longer quickly and fully absorbed by the service sector. The gig economy is also starting to suffer from saturation and, in the last months of 2018, the Internet sector registered a large number of layoffs. The ongoing structural transition of the labour market also involves a rising highly educated labour supply, with an estimated 8.3 million graduates in 2019.

In Brazil, the gradual recovery from the 2015–16 recession continues. Employment and wage growth have been modest and mostly limited to the informal and the public sectors. Average real wages grew at a modest 0.6% in 2018. Following the crisis, the unemployment rate increased steeply for the youngest age group (15-29). In 2018, with 12.5 million of jobseekers, the unemployment rate was stuck at 12.5 %. The share of workers earning less than the minimum wage is rising with unemployment. An expanding informal employment is also particularly harmful for the youngest cohorts, which is the group with the highest risk of poverty. ([20])

Graph I.1.8: **Real wages and productivity growth in the euro area and selected advanced economies, 2017-2018**



Note: Real wages are wages adjusted for the change of prices in economic output (the GDP deflator) rather than consumption. This is the relevant indicator for determining the labour demand by firms ("real product wages").
Source: DG ECFIN AMECO database.

In 2018, real wage growth in industrialised countries picked up. In the euro area, real wages

([19]) In Japan, a regular employee is an employee who is hired directly by their employer without a predetermined period of employment and works for full time hours. A non-regular employee is an employee who does not meet the conditions for regular employment. See Asao (2010), and IMF (2019). To tackle labour market dualism, the government announced guidelines in 2018 for the equal treatment between regular and non-regular employment (Jones and Seitani, 2019).

([20]) Informal employment is common in developing and emerging countries. According to the ILO, "the term encompasses a variety of situations. It includes small or undefined work places, unsafe and unhealthy working conditions, low levels of skills and productivity, low or irregular incomes, long working hours and lack of access to information, markets, finance, training and technology. Workers in the informal economy are not recognized, registered, regulated or protected under labour legislation and social protection". See ILO (2019) "Women and Men in the Informal Economy: A statistical Picture". A specific global statistical indicator on informal employment (8.3.1) is used to monitor the Sustainable Development Goals. See ILO.

increased at a higher rate than in 2017 (1% against 0.5%), while productivity growth dropped from 0.8% to 0.6% (Graph I.1.8). This pattern represents a change with respect to the period 2013-2017, with real wages rising well below productivity growth. ([21]) In 2018, US real wages expanded at a lower rate than productivity in line with a decade-long pattern of a falling wage share. ([22]) This contrasts with Canada, where real wages regularly follow productivity developments with a lag of one year. The pick-up in wages in 2018 following the acceleration of productivity in 2017 contributed to keeping the US wage share constant at around 56%. In Japan, real wages expanded on average below productivity between 2000 and 2015. Since 2016, they are growing above productivity, which reversed the declining trend in the wage share. ([23])

1.3. EMPLOYMENT AND ACTIVITY RATES, HOURS WORKED IN THE EU

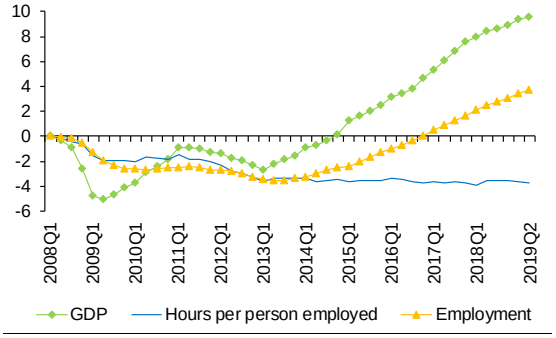
The labour market improvements along with falling population have contributed to a firming of both employment and activity rates. In 2018, the EU employment rate increased by less than one percentage point – from 67.7% to 68.6% (Graph I.1.9); since 2013, the gain has been around 4.5 pps (3.8 pps for the euro area). The participation rate hit a new historic high – 73.7% in the EU and 73.4% in the euro area. This upward trend in the participation rate tempered the impact of the employment recovery on the fall of unemployment. The positive dynamics in 2018 concerned mainly the medium- and high-skilled workforce. Another relevant factor is ageing, having a negative impact in most European countries, with the exception of the southern European Member States (Fernandéz and Turegano, 2018). ([24])

Graph I.1.9: **Employment, unemployment and activity rates, EU28, 2000-2018**

(1) Age group: 15-64 years old.
Source: Eurostat, Labour Force Survey.

The hours worked per person employed remain at a low level. In the aftermath of the crisis, the average hours worked continued to fall at an accelerated pace. They did not recover when economic growth picked up again. At the end of 2018, they stood at the same level as five years earlier (i.e. 3.5% below the level achieved at the beginning of the 2008 crisis) (Graph I.1.10). This feature has allowed a steeper rise in hourly productivity during the recovery. ([25])

Graph I.1.10: **Cumulative change in GDP, employment and average hours worked per person, euro area, 2008Q1-2019Q2**



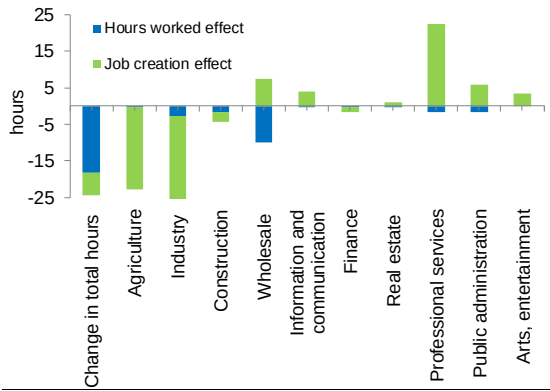
Source: Eurostat, National Accounts.

The decline in the average hours worked is a long-term trend that involves all sectors. Between the first quarter of 1995 and the fourth quarter of 2018, the average hours worked dropped by 25.7 hours quarterly– from 433.6 hours to 407.9 hours, about 2 hours less on a weekly basis. The decline occurred in all sectors, in particular in services, and most notably in wholesale and retail

([21]) Obviously, the fact that real wages grow below productivity does not mean that they do not follow changes in productivity growth.
([22]) Between 2000 and 2018, the wage share in the US fell from 61% to 56.8%.
([23]) The wage share in Japan fell from 62.4% in 2000 to 56.5% in 2015; in 2018, it stood at 58%.
([24]) The effect of ageing on the activity rate is positive in countries that started to experience a change in the age structure of the population only more recently. Demographic changes can play a role with large differences across countries (see Chapter 2).
([25]) The availability of more flexible working arrangements and of short-time working schemes has made hours worked more responsive to the cycle (European Commission, 2017a, *Labour Market and Wage Developments in Europe*).

trade (3.6 hours less on a weekly basis), professional services (2 hours less on a weekly basis) and construction (1.7 hours less on a weekly basis). The first two are the sectors where most of job creation was concentrated; their share in employment grew from 30% to 38%. Graph I.1.11 isolates the change in the average hours worked due to shifts of employment toward sectors with low average hours worked (a *job creation effect*) from the effect due to the change in the average hours worked within each industry for a given employment structure (*hours worked effect*). The decline in the hours worked within sectors (*hours worked effect*) led to a reduction in total hours worked on a quarterly basis by 18.14 hours, accounting for about 70.6% of the total decline in the average hours worked. The relatively stronger creation of jobs in services accounted for the remaining 29.4% (i.e. 7.6 hours less). The effect of the decline in the hours worked was stronger in wholesale and retail trade. The declining share of employment in industries contributed negatively to the change in the total average hours worked; the opposite is observed for professional services.

Graph I.1.11: **Contribution to the change of the average hours worked of changes of the average hours within sectors and of the employment structure**

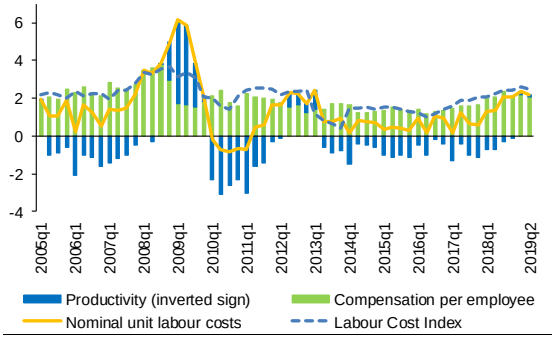


(1)The chart decomposes the change in the hours worked into a within and between component. The former captures the change in the average hours within each sector; the latter the change in the employment share towards sectors with hours worked lower and higher than the average.
Source: Own calculations based on Eurostat.

1.4. WAGES AND LABOUR COSTS

On a yearly basis, wages have continued to rise at a steady pace. Nominal wage growth in the euro area has been on an accelerating trend since mid-2016, albeit from very low rates (i.e. from about 1% in the second quarter of 2016). The economic slowdown has started to have a visible impact on wages only at the end of 2018, when their growth rate dropped from 0.7% (quarter on quarter) of the first half of 2018 to 0.4% of the second half. Thus, on an annual basis, wages still expanded at a higher rate than the previous year (2.7% and 2.1% against 2.1% and 1.6% for the EU and the euro area respectively); this is the highest growth rate since 2008. The decline in labour productivity growth is the counterpart of the employment resilience. Because of the lower productivity growth, wage growth in 2018 translated into accelerating dynamics of nominal unit labour cost, which reached an annual growth rate of almost 2%; in the first two quarters of 2019, it grew at 2.4% and 2.2%, respectively (Graph I.1.12).

Graph I.1.12: **Compensation per employee and unit labour costs in the euro area, annualised growth rates, 2005Q1-2019Q2**

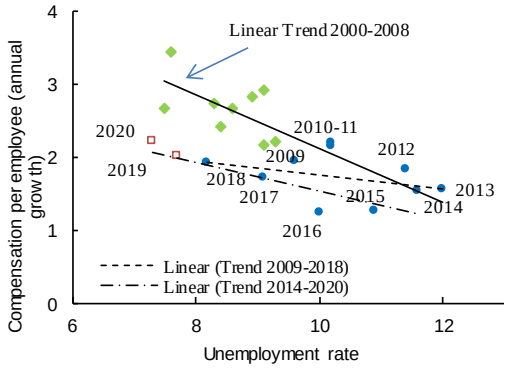


Source: Commission Services.

Although rising, wages expanded below the rate expected based on the pre-crisis relation with unemployment. Graph I.1.13 depicts the euro-area Phillips curve (see Box on Phillips curve). At the onset of the 2008 crisis and throughout 2012, the unemployment rate rose by almost 4 pps, while wage growth hovered around 2%. Wages remained initially muted as the recovery gained pace and unemployment started to fall. The fact that wage growth for the years 2015 to 2018 is below the pre-crisis line hints at a possible flattening of the Phillips curve (i.e. a lower response of wage growth to unemployment). Indeed, relative to the pre-crisis relation, there is a shortfall of wage growth in 2018 of about 0.5 pp. For 2019 and 2020, the European Commission's spring forecast points to a further decline of the unemployment rate to respectively 7.7% and 7.3% in the EU and

the euro area, with wage growth expanding at about the same rate as 2018.

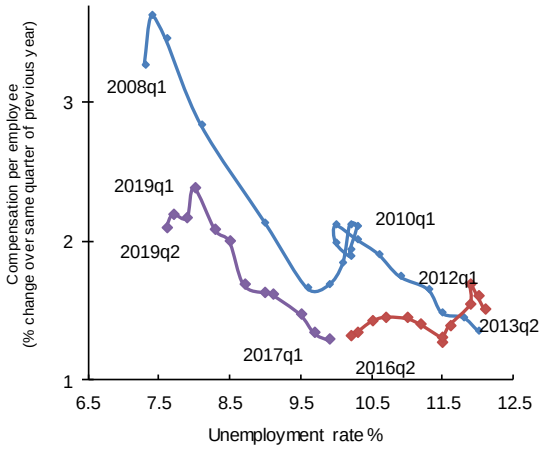
Graph I.1.13: **Phillips curve for the euro area: 2000-2018**



Source: DG ECFIN AMECO database and Eurostat, LFS.

A closer look at the quarterly data suggests that the Phillips curve may have shifted leftward (Graph I.1.4). Between the second quarter of 2013 and the second quarter of 2016, the unemployment rate fell from 12% to 10%. Yet, wage growth did not accelerate – actually it declined by one-third of a percentage point. Thus, while unemployment and wage growth are usually related negatively, their correlation became positive between the second quarter of 2013 and the second quarter of 2016. This is a pattern commonly associated with supply shocks, which concurs with the years of falling structural unemployment. (See Box "The Phillips curve: a primer").

Graph I.1.14: **Phillips curve for the euro area: 2008Q1-2019Q2**



Source: Eurostat, LFS and National Accounts.

There is mixed evidence on whether the relationship between wage growth and unemployment has changed after the 2008 crisis. Some studies (e.g. IMF, 2017) found that in several countries the Phillips curve has flattened. They relate this to the low inflation environment and downward nominal wage rigidity. ([26]) Others link the flattening of the Phillips curve to inflation expectations being firmly anchored (Blanchard et al., 2015; Ball and Mazumder, 2019) or to a decline in inflation persistence (Hooper et al., 2019). Conversely, the European Commission (2018b) finds no evidence of change in the relationship between wage growth and cyclical unemployment. ([27]) Fiercer competition in global markets and outsourcing of labour-intensive production may have also muted the response of wage growth to the recovery. This effect may have been reinforced by the rising employment in services, with lower bargaining coverage as compared to the more unionised manufacturing sector. This weaker collective bargaining capacity would manifest itself in flatter Phillips curves. ([28])

The rest of this section will try to shed light on two issues. First, it examines whether the Phillips curve has shifted leftwards. Second, it documents whether last year's shortfall in wage growth reflects a changing relationship with its determinants.

Wage growth depends on unemployment, productivity and price inflation. Estimates in the Box "The Phillips curve: a primer" show that wage growth is well explained by the cyclical labour market conditions, productivity growth as well as past and expected inflation. The evidence in the Box also suggests that there is no shift in the Phillips curve. The relation linking wage growth to these variables may change over time. Graph I.1.14 suggests that, for the three years that followed the 2013 recovery, a closing gap between

([26]) Downward nominal wage and price rigidity reduce the slope of the Phillips curve when unemployment exceeds the NAIRU and inflation is very low. See references in Bobeica et al (2019).

([27]) European Commission, 2018b, *Labour Market and Wage Developments in Europe* (Chapter II.1) shows that wage growth in the EU Member States closely followed inflation and productivity developments, and continued to respond to unemployment changes. However, the relationship was weaker in the low-inflation environment after 2010.

([28]) For an analysis of sectoral price inflation Phillips curves in the US, see Seydl and Spittler (2016).

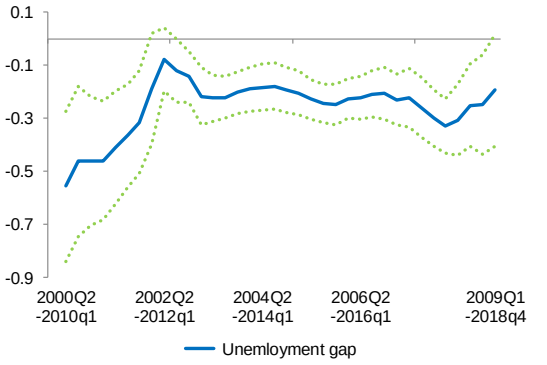
the current unemployment rate and its structural level (the unemployment gap) was accompanied by only a modest increase of wage growth (i.e. a flatter Phillips curve). ([29]) The remainder of this section examines whether the relation linking wage growth to its underlying variables has changed over time.

There is no evidence of a lower response of wage growth to unemployment after the 2013 recovery. Graph I.1.15 shows the responsiveness of wage growth to the difference between current unemployment and the structural unemployment rate (unemployment gap) estimated with a technique that allows this response to vary over time. ([30]) After 2010, wage growth has become less responsive to unemployment with most of the change occurring before the 2013 recovery. ([31]) At the end of 2017, it temporarily became more responsive, but, thereafter, returned to previous values of about 0.3. ([32])

Evidence suggests that wage growth is strongly anchored to inflation expectations, but less dependent on past inflation. Graph I.1.16 shows that wage growth has become less responsive to past inflation and that long-term inflation expectations play a constant stabilising role in guiding wage developments (see Box and Graph I.1.15).

Between the second quarter of 2014 and the second quarter of 2018, actual wage growth was about 0.3 pps lower than estimates based on the unemployment gap and trend productivity growth would suggest - i.e. predicting wage growth based on these variables leads to an overestimation of wage growth. This overestimation is substantially reduced when backward- and forward-looking measures of inflation are taken into account (compare the red and the orange dashed lines of the graph in the Box). The predicted wage growth gets closer to the effective one when past inflation is replaced with past wage growth, which indicates that in a low inflation environment wage growth tends to be highly persistent. This suggests that, without taking into account past wage growth, one would obtain a biased description of wage developments over time. This result remains valid when replacing inflation expectations, measured by the ECB Survey of professional forecasters, by a 2% reference for price inflation. ([33])

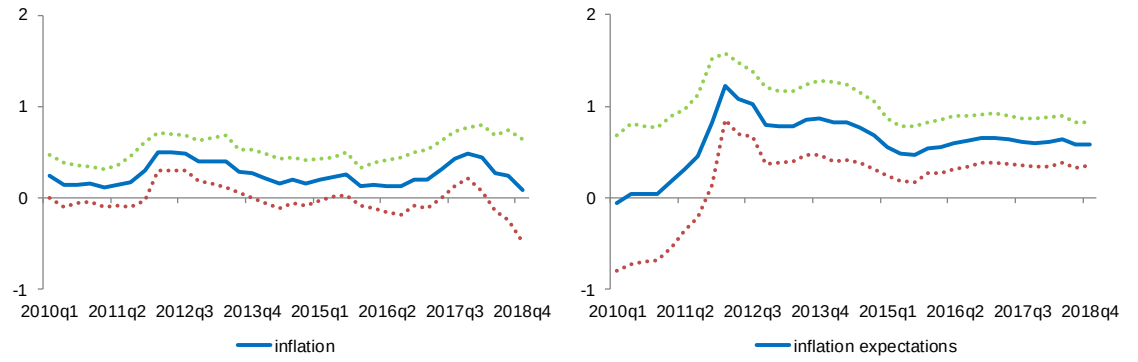
Graph I.1.15: **Responsiveness of wage growth to labour market slack**



(1) The chart shows the response of wage growth to a 1 percentage point increase in the deviation of the unemployment rate from the NAWRU. Each point shows the coefficient estimated with the rolling regression on windows of 10 years on a quarterly basis. See footnote. Dotted lines represent the degree of statistical precision with a 90% confidence interval.
Source: Own Calculations based on National Accounts, LFS.

([29]) A pattern of a falling unemployment rate and low price inflation is also confirmed by the ECB Survey of Professional Forecasters for 2009Q2.
([30]) This is done with the technique of the rolling regression, which estimates the relation over the period 2000Q1-2010Q1. The regression is re-estimated for each successive quarter up to the end of the sample. Thus, the last 10 years sample is 2009-2018. The chart shows the estimated response of wage growth to unemployment over the 38 sample periods. The date in the figure shows the end of each sub-sample. This evidence is consistent with Bulligan and Viviano (2017).
([31]) A weaker trade-off means that employers rise wages less in response to a tight labour market.
([32]) In other words, if the current unemployment rate drops below the structural level by 1 pp, wage growth would expand by 0.3 pp.
([33]) Same results have been found by Hooper, Mishkin and Sufi (2019) for the US.

Graph I.1.16: **Responsiveness of wage growth to inflation and 1-year-ahead inflation expectations**

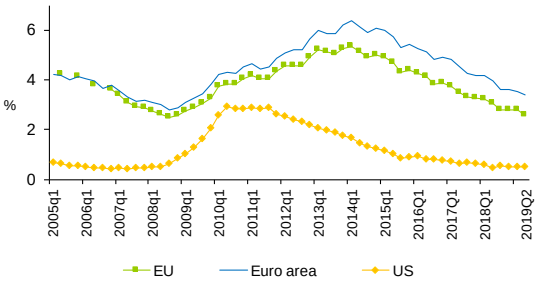


(1) The chart shows the response of wage growth to a 1 pp increase in inflation (Panel a) and to 1-year-ahead inflation expectations from the ECB survey of professional forecasters based on Phillips curve regression in column 6 of the Box "Phillips curve: a primer". Each point shows the coefficient estimated by means of rolling regression on windows of 10 years on a quarterly basis. See footnote. Dotted lines represent the degree of statistical precision with a 90% confidence interval.
Source: Owns calculations.

1.5. LONG-TERM UNEMPLOYMENT AND LABOUR MARKET MATCHING

The reduction in long-term unemployment continued. The share of the labour force unemployed for at least 12 months dropped significantly from a peak of 5.3% (6.4% for the euro area) reached in the first quarter of 2014 down to 2.6% (3.4% for the euro area) in the second quarter of 2019 (Graph I.1.17). In 2018, the number of long-term unemployed fell to 7.2 million (6.3 million for the euro area). This decline accounts for 60% of the total reduction in EU unemployment (70% for the euro area). In the euro area, almost half of the 2018 decline can be attributed to changes in the very long-term (at least 24 months) component. As a percentage of total unemployment, the respective EU rate fell from 28.1% to 26.8%. Rising job finding rates have led to shortened unemployment spells. The expected duration of unemployment fell from a peak of almost 19 months at the end of 2012 to less than 13 months. ([34]) Overall, the yearly EU long-term unemployment rate fell further from 3.4% in 2017 to 3% in 2018 and 2.6 in the first half of 2019. It is still higher than the corresponding US rate (0.5%), reflecting the much higher labour market churning in this country (Graph I.1.17).

Graph I.1.17: **Long-term unemployed (for 1 year or more) in the EU, the euro area and the US (% of total labour force), 2005-2018, quarterly data**

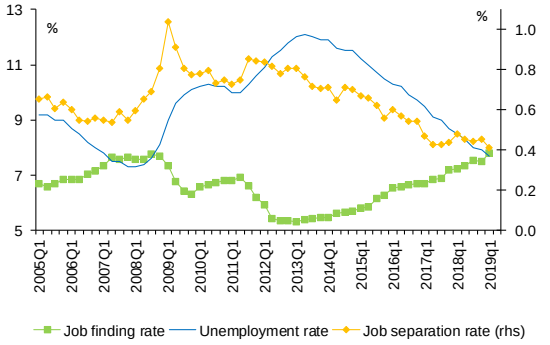


Source: Eurostat and U.S. Bureau of Labor Statistics.

Changes in unemployment reflect different dynamics of job finding and separation rates. Job finding rates have gradually improved, gaining momentum at the end of 2015 (Graph I.1.18). After an initial surge in the first quarter of 2009, separation rates declined steadily and in the second quarter of 2018, falling well below pre-crisis levels. In the first quarter of 2019, job-finding rates kept rising while job separation kept falling. This hints at a further decline in the long-term unemployment rate.

([34]) The expected duration of unemployment equals the reciprocal of the job-finding rate.

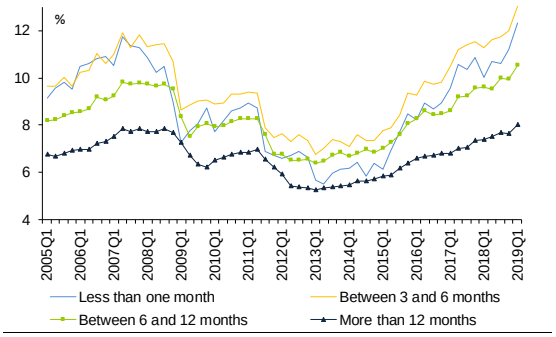
Graph I.1.18: **Job finding and separation rates in the euro area, 2005-2018, quarterly data**



Source: Commission Services based on Eurostat data.

The recovery has increasingly benefitted all the unemployed. This is evident from the evolution of job finding rates computed for different spells of unemployment (Graph I.1.17). In the first half of 2018, improvements have been milder than in 2017 while in the third quarter of 2018, they spiked considerably, hitting a high not seen since 2005. Corrected for volatility, job finding rates for all spells are now higher than in the pre-crisis period.

Graph I.1.19: **Job finding rate by duration of unemployment, euro area, 2005-2018, quarterly data**



Source: Commission Services based on Eurostat data.

While the labour market remains tight, recent developments suggest that the efficiency of the job matching process has improved. The Beveridge curve (Graph I.1.20) provides information on the labour market tightness and on possible changes in the job matching process. ([35])

At the onset of the 2008 crisis, vacancies dropped, layoffs increased and the probability of finding a job deteriorated. ([36]) With the lengthening of unemployment durations, the matching between demand and supply of skills worsened. ([37]) Thus, both a weak demand for labour (a quantitative margin) and a rising skills mismatch (a qualitative margin) were responsible for the rightwards shift of the Beveridge curve in the years after 2008 (European Commission, 2013a; ECB, 2019). Since 2013, vacancies have been growing in line with falling unemployment, an atypical pattern at the early stage of a recovery. The rapid rate at which the unemployed have found jobs together with the decline of the separation rate below the pre-crisis average suggest that the efficiency of the job matching process has improved in the EU. ([38]) Starting from the second half of 2017, vacancies jumped abruptly and reached a peak in the second quarter of 2018, reflecting rising labour shortages. With the economic slowdown, labour shortages have started to recede gradually while unemployment has continued to drop, in line with the decline in structural unemployment discussed in Section 1.2 and consistent with the improvements in the job matching process (European Commission, 2018b).

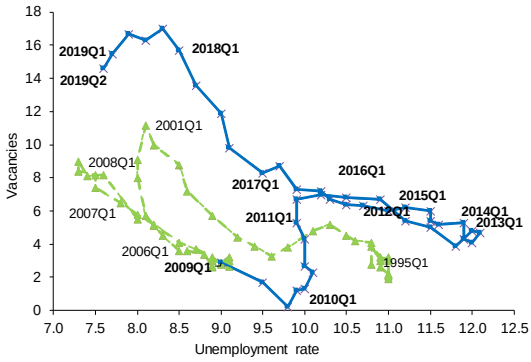
([35]) In the standard framework, higher unemployment over the cycle is associated with a lower number of vacancies per unemployed person (a quantitative margin). Movements along the curve are associated with cyclical fluctuations for unchanged efficiency of the process matching job seekers and vacant posts. A parallel shift of the curve means that employers are more (less) reluctant to fill their job openings. A shift rightward means that employers need to post more vacancies to keep unemployment unchanged. This implies a change in the efficiency of the job matching process (a qualitative margin). However, an outward shift of the curve is also possible at the beginning of a recovery as employers post vacancies at a faster rate than they are able to match jobs with jobseekers (European Commission, 2013a; Elsby et al. 2013; Consolo, A. and A. Dias da Silva, 2019). The Beveridge curve is complementary to the Phillips curve and adds a qualitative margin to the labour market analysis (Consolo, A. and A. Dias da Silva, 2019).

([36]) This deterioration can be attributed to both the labour market becoming less tight and the matching process becoming less efficient (see Petrongolo and Pissarides, 2001).

([37]) An increase in long-term unemployment, in the geographical dispersion of unemployment, in skill mismatches (Bova et al. 2018; European Commission, 2018b) are expected to worsen labour market efficiency. An increase in Spending on ALMPs per unemployed improves matching efficiency (European Commission, 2018b).

([38]) European Commission (2018b) provides an estimate of the matching efficiency by country. For the euro area, see ECB (2019).

Graph I.1.20: **Beveridge curve for the euro area, 1995-2018, quarterly data**



Note: The survey-based indicator of labour shortages in industry approximates Job vacancies (factors limiting production: labour).
Source: European Commission, based on data from the Labour Force Survey and the Business and Consumer Survey.

1.6. CONCLUSIONS

The EU labour market has proved resilient to the economic slowdown of the second half of 2018. In September 2019, the unemployment rate fell to its lowest level since the early 2000s - 6.3% and 7.5% in the EU and the euro area, respectively. Both the increase in the probability of finding a job and the fall of job destruction rates contributed to the drop in unemployment. The unemployment rate has been decreasing in conjunction with a strong decline of the structural unemployment rate and, possibly, with an improvement in labour market matching. Compared across the region, the decline in unemployment has been accompanied by a fall in the dispersion among Member States.

Nominal wage growth in the euro area has been on an accelerating path since mid-2016, albeit from very low rates. Nonetheless, since the onset of the recovery, it has remained below what one would expect based on the pre-crisis relation with unemployment. The analysis of this chapter suggests that there is little evidence that the response of wage growth to unemployment has changed. Wage growth is linked to inflation expectations and is determined by productivity growth and cyclical labour market conditions.

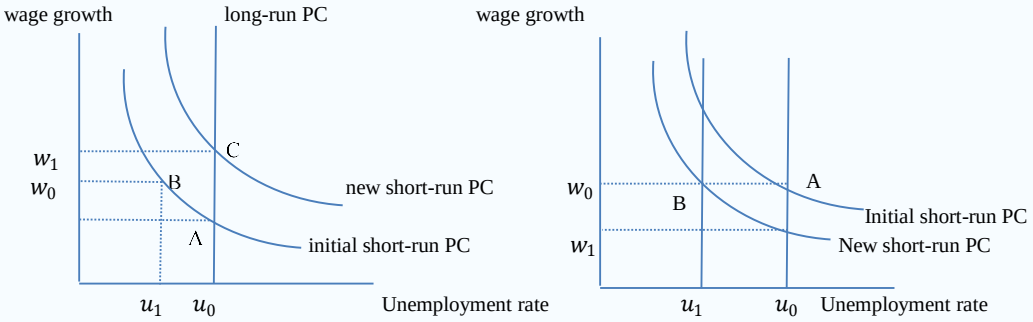
Looking ahead, while the labour market has improved considerably, its developments are increasingly linked to medium-term growth prospects, which are highly dependent on productivity growth and structural reforms, as well as uncertainties surrounding international trade relations.

Box I.1.1: **A primer on the Phillips curve**

The Phillips curve (PC) is the standard tool to study the link between wage growth and unemployment. A tightening (loosening) labour market is expected to lead to higher (lower) wage growth. During the 1950s and the 1960s, the idea of a stable relation between unemployment and wage growth was undisputed. The consensus broke down during the 1970s and 1980s, when inflation and unemployment turned out positively correlated. This led to major theoretical and empirical controversies over the causes of inflation and the nature of unemployment.

Milton Friedman (1968) and Edmund Phelps (1970) noted that the original relation missed the link between wage growth and expected inflation and that economic institutions and long-term trends could entail long-lasting changes in structural unemployment (i.e. defined as the unemployment rate consistent with steady inflation in the absence of supply shocks or NAWRU). It then became common to assume that expected inflation was *backward-looking* (dependent on the past) and that structural unemployment changed slowly over time. The *change* in wage growth rather than its *level* was linked to the unemployment gap (deviations of unemployment from the NAWRU). Unemployment could stay below the NAWRU only with a rising wage growth. In the long run, wage growth is unrelated to unemployment (the PC is vertical).

Subsequently, the importance of forward-looking inflation expectations was emphasised, which implies that inflation may be reined in without major increases of unemployment. The PC is vertical also in the short-term. A credible policy commitment to low inflation would be possible without inducing high levels of unemployment. Some noticed that with anchored (i.e. stable) expectations, the relation between the *level* of wage growth and inflation becomes stable (e.g. Blanchard, 2016).



The correlation between wages and unemployment can be positive in case of demand shocks (left panel) or negative in case of supply shocks (right panel). When a demand shock occurs, unemployment falls temporarily to u_1, while the NAWRU remains unchanged at u_0. As the labour market tightens, wage growth increases along the short-run Phillips curve, from point A to point B. Higher wage growth will trigger higher inflation and move workers' expectations of future inflation further up, which shifts the short-run PC to the right, from B to C. The reason of this shift is that workers care about real wage growth and will revise upwards their wage claims. At higher wages, also production costs will rise and firms will demand less labour. At C, unemployment rate has gone back to the NAWRU, but wage inflation remains higher than its initial level.

A drop in the price of energy, trend productivity growth or structural reforms induce a fall in the NAWRU. In panel B, a long-lasting supply shock brings the NAWRU down from u_0 to u_1. Actual unemployment follows only with lags the decline in the structural unemployment. If the economy is at point A, a gap opens between the unemployment rate and the new NAWRU, which restrains wage growth. With inflation expectations credibly anchored, the new short-run PC moves leftwards; the wage growth consistent with the new PC drops from w_0 to w_1. The faster is the response of wages, the less time wages and unemployment moves in the same direction.

Table 1 shows that the correlation between unemployment and wage growth is usually negative, except between 2013Q2 and 2016Q2, which coincides with the years where the NAWRU declined the most.

(Continued on the next page)

Box (continued)

Table 1. Correlation between yearly wage growth and unemployment rate and unemployment gap

	1996Q1-2018Q4	1996Q1-2007Q4	2008Q1-2018Q4	2008Q1-2013Q2	2013Q2-2016Q2	2016Q3-2018Q4
Unemployment rate	-0.67	-0.48	-0.71	-0.88	0.69	-0.96
Unemployment gap	-0.74	-0.47	-0.82	-0.85	0.66	-0.94

In empirical analysis, the triangle Phillips curve model (Gordon, 2013) has been used to identify the relation between wage growth and unemployment based on three elements: inertia, demand and supply. Inertia captures the idea that wages are set taking into account past price inflation. An increase in aggregate demand lowers unemployment below the NAWRU and increases wage inflation along the Phillips curve. Supply shocks shift the PC (leftwards or rightwards): the economy experiences both higher (lower) inflation and higher (lower) unemployment.

Table 2 reports estimates of the relation between wage growth and unemployment for the euro area for the period 2000Q1-2018Q4. The unemployment gap explains 67% of the variation of wage growth over time (Column 1). Column 2 adds a dummy variable that models a shift of the PC after 2013Q1; its negative coefficient suggests that for a given unemployment gap, after 2013 wage growth is 0.2% lower, i.e. the PC has shifted to the left. This effect is statistically significant when productivity growth is included among the determinants of wage growth (Column 3). Yet, when inflation lagged one year is added (Column 4), the coefficient turns statistically insignificant. This implies that there is no shift in the PC after 2013 and that the dummy variable captures the lagged response of wage growth to price inflation. Wages are not fully backward-looking. Column 6 adds the one-year-ahead inflation expectations, as measured by the ECB's Survey of Professional Forecasters (SPF). The fit improves while the estimated effects of the other variables remain fairly stable. Replacing the inflation expectations by a constant inflation expectation of 2% does not change the coefficients of the other explanatory variables or alter the fit, consistent with the view that inflation expectations are anchored. Estimates are robust to an alternative specification where possible endogeneity of inflation expectations with respect to inflation and unemployment is taken into account by replacing them with a residual of a regression of inflation expectations on current inflation (quarter over quarter) and the unemployment gap lagged four quarters.

Estimates based on column 6 suggest that a 1 pp decline in the unemployment gap (cyclical unemployment) is associated with an increase of wage growth of about 0.3 pps. ([1]) Between 2015 and 2018, the unemployment rate dropped by 3 pps, while wage expanded at 5%. According to this estimate, the decline of unemployment explains 0.9 pps (i.e. one fifth of the total increase of wages). Turning to the effect of productivity, only about half of the change in trend productivity growth is transferred into higher wages. Between 2015 and 2018, trend productivity growth declined from 0.7% to 0.5%; the fact that productivity changes are only partly reflected in wages, has contributed to smoothing out the effect of a falling productivity growth. Thus, the decline in trend productivity growth of about 0.2 pps constrained wage growth by about 0.1 pp. Finally, an increase in current inflation by 1 percent leads to a 0.5 percentage point increase in nominal wage growth. If this increase is combined with an increase of inflation expectations of comparable magnitude, wage growth is expected to increase by further 0.2%.

In a low inflation scenario, wage growth may depend more on past wage growth than on past inflation. This confirmed in column 7, which replaces inflation one year earlier with the previous quarter growth of wages. Accounting for past wage growth, allows capturing the dynamics of wages rather well, as proved by the higher R^2 (see also Graph). All variables remain statistically significant (i.e. continue to drive wage growth) but their effect is smaller. The coefficient of the unemployment gap in column (7) is not comparable to that of columns 1 to 6. In fact, lagged wage growth incorporates the effect of past changes in the other determinants of wage growth. The full effect of a change in the unemployment gap on wages equals the coefficient of the unemployment gap (0.16) divided by one minus the coefficient of lagged inflation (0.49). The full change of wage growth after all lags are played out is 0.3.

([1]) This is in line with previous findings (e.g. Blanchard et al, 2017; Gali and Gambetti, 2018).

(Continued on the next page)

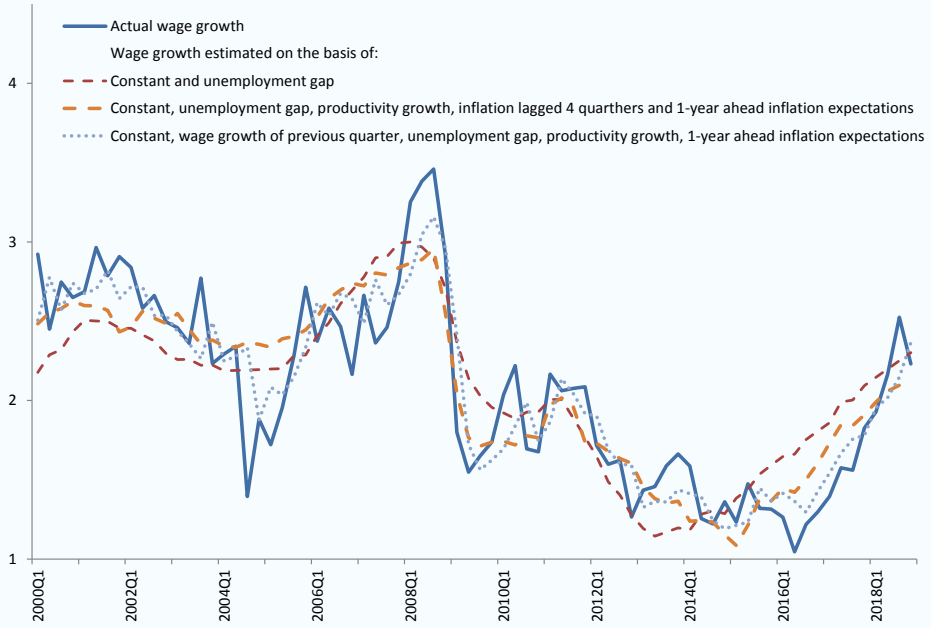
Box (continued)

Table 2 Phillips curve estimate for wage growth over the period 2000Q1-2018Q4

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Wage growth lagged 1 quarter							0.49*** (0.08)
Inflation lagged 4 quarters				0.18** (0.09)	0.24*** (0.08)	0.17** (0.07)	
Inflation expectations						0.49*** (0.13)	0.29** (0.13)
Unemployment gap	-0.39*** (0.03)	-0.33*** (0.03)	-0.34*** (0.04)	-0.35*** (0.03)	-0.37*** (0.03)	-0.29*** (0.03)	-0.16*** (0.04)
Productivity growth trend (HP of productivity growth)			0.43*** (0.17)	0.52*** (0.17)	0.56*** -0.17	0.52*** (0.16)	0.29** (0.13)
Constant	2.2*** (0.04)	2.3*** (0.05)	2.0*** (0.13)	1.7*** (0.19)	1.5*** (0.17)	0.8*** (0.29)	0.5* (0.29)
Dummy after 2013Q1		-0.24*** (0.10)	-0.22*** (0.09)	-0.11 (0.10)			
R-squared adjusted	0.67	0.68	0.71	0.72	0.72	0.75	0.81

White heteroskedasticity-consistent standard errors & covariance

The Graph below reports the fit of wage growth for the specifications in columns 1, 6 and 7



2. LABOUR MARKET DEVELOPMENTS IN MEMBER STATES

Labour markets continued to improve in most countries in 2018 and the first half of 2019. In most Member States, employment levels surpassed pre-crisis levels. Employment rates were supported by both the fall in unemployment – more rapid than would have been expected on the basis of output growth – and the rise in activity rates. At the same time, some countervailing forces are also emerging, stemming either from population dynamics or from a slowdown in the rate of growth. In some countries, significant labour market reserves remain, including discouraged and involuntary part-time workers.

Developments in activity and unemployment rates partly reflect long-term demographic trends. In particular, higher activity rates in the last two decades were boosted by higher education rates and higher participation of women. The link between demographic change and unemployment appears to be more complex. While a "mechanical" composition effect of a lower share of young people would lead to a lower unemployment rate, there seems to be no systematic relationship between falling youth shares and falling unemployment rates across EU Member States. Among EU15 Member States, the statistical relationship appears to be the opposite.

Wage growth continued to gain pace in 2018 and the first half of 2019. Nominal wages increased in all Member States in 2018 while real wages increased in almost all. Nominal wage growth was fastest in some Central and Eastern European Member States, contributing to wage convergence. Over the last three years, real wages grew roughly in line with productivity on average, with some variability across countries.

In 2018, labour cost developments continued to be broadly consistent with the external rebalancing needs in the euro area. Unit labour costs continued to grow faster in countries characterised by a current account surplus before the crisis ('surplus countries') than in countries with previous current account deficits ('deficit countries'). At the same time, external competitiveness did not responded to current account imbalances in all countries of the euro area.

2.1. INTRODUCTION

To what extent do Member States share the same labour market trends? While the previous chapter looked at labour market and wage developments at the level of the EU and the euro area as a whole, this chapter looks into developments in Member States, identifying common trends and the degree of variety across them.

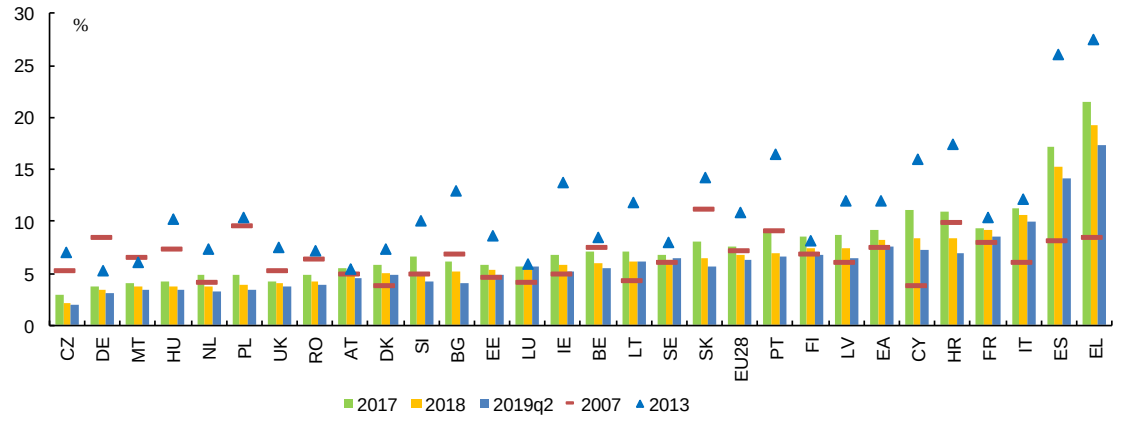
The chapter starts with an analysis of developments in unemployment (Section 2.2), employment, activity, and hours worked (Section 2.3). Fluctuations in job creation and job destruction behind unemployment developments are reviewed in Section 2.4. Wage and productivity developments are analysed in Section 2.5. Section 2.6 focuses on external competitiveness and how labour market outcomes relate to external balances and adjustment needs. Section 2.7 concludes.

2.2. UNEMPLOYMENT RATES

In 2018, unemployment rates continued to fall in all Member States in 2018, despite the slowdown in economic growth. The unemployment rate reached 2% in Czechia and fell below 4% in Germany, Hungary, Malta, the Netherlands and Poland. At the same time, it was still above 10% in Italy, 15% in Spain and 19% in Greece. The annual decrease exceeded 2 pps in some Member States with a high unemployment rate, such as Croatia, Cyprus, Greece, Portugal and Spain (Graph I.2.1). Accordingly, the dispersion of unemployment rates, which had reached its peak in 2013, fell further in 2018 (Graph I.2.2).

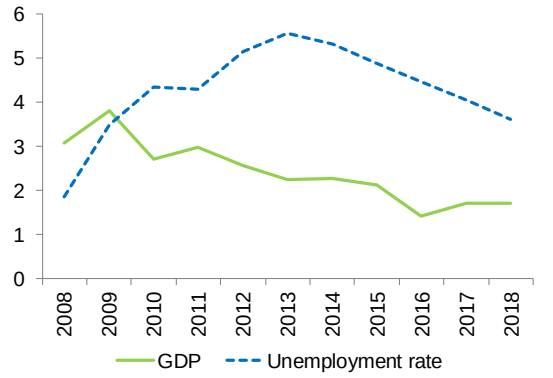
Almost all Member States registered further decreases in unemployment in the first semester of 2019. The fastest reductions continued to be in Member States with the highest levels of unemployment, including Croatia, Cyprus, Greece, and Spain by at least 1 percentage point as compared to the 2018 average. Meanwhile, unemployment slightly rose in Luxembourg and Sweden.

Graph I.2.1: **Unemployment rate, 2007, 2013, 2017 and 2018**



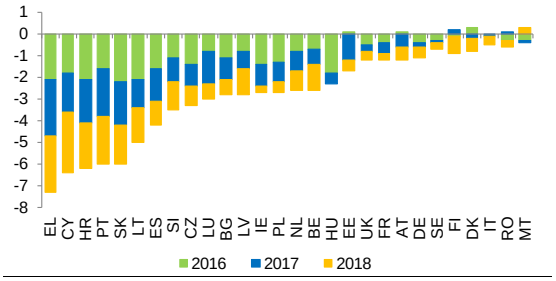
(1) Countries are ranked by ascending order of unemployment rate in 2018.
Source: Eurostat, Labour Force Survey.

Graph I.2.2: **Dispersion in GDP growth and unemployment rates**



(1) Standard deviation; 2018 based on Commission forecast; For 2015, the Ireland is excluded due to revision in the measurement of GDP.
Source: Eurostat, National Accounts, Ameco database.

Graph I.2.3: **Changes in the unemployment rate unexplained by GDP growth, 2015-2018, pps**



(1) The graph shows the gap between the actual change in the unemployment rate and the change predicted on the basis of the relationship with GDP growth estimated for the period 1995-2007 on a panel of EU28 countries, with country specific fixed-effects. Negative values mean that the unemployment rate declined faster (or increased by less) than predicted on the basis of GDP growth. (2) A 1 pp of GDP growth reduces the unemployment rate by 0.22 pps, based on regression estimates with country fixed effects.
Source: European Commission based on Eurostat data.

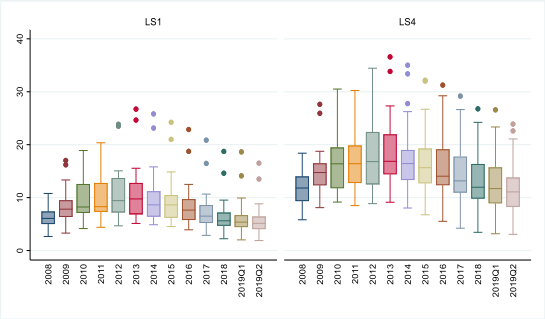
Unemployment continued to fall at a faster rate than expected based on the pace of economic growth. The labour market recovery that had started in 2013 has been "job-rich". Since 2016, on average unemployment fell by 3 percentage points faster than could be expected based on the historical relationship between economic growth and unemployment (Graph I.2.3). The unexpected component in the fall in unemployment was more significant in some countries that still had double-digit unemployment rates in 2016 (Cyprus, Greece, Spain, and Portugal). In a few countries, the gap was less than 1 percentage point (Sweden, Finland, Denmark, Italy, Romania, and Malta).

Current unemployment rates are influenced by country-specific demographic trends. The role of demography in affecting unemployment rates is explored in Box 2.1, with a focus on the links between unemployment rates and the falling share of active population 15-24 years over the period 1995-2017. In a "mechanical" composition effect, falling youth population lowers the overall unemployment rate as unemployment is higher among younger cohorts than other age groups. Between 1995 and 2007, this composition effect reduced the unemployment rate especially in Italy, Spain and Croatia, while it increased it in Finland and Sweden.

However, the regression analysis in Box 2.1 shows that this is not the only effect in operation. For the fifteen Member States that first joined the EU, a fall in youth population over the sample period is associated to bigger increases in unemployment. Conversely, the opposite seems to be true for the 13 Member States that became members in or after 2004, even though the effect is not statistically significant.

Broader measures of labour reserves are falling, yet differences across countries remain substantial. Since 2013, supplementary indicators of labour reserves (or 'labour market slack') have been falling and so has their dispersion across countries. Graph I.2.4 shows, over time, the dispersion of a narrow measure of labour reserves (LS1, based on the standard unemployment definition) and of a broader measure, including discouraged workers and underemployed part-time workers (LS4). In 2018, this broadest measure of labour slack fell in the EU slightly below its pre-crisis level (13.7%), and in the first half of 2019 to 13.1%. In the second quarter of 2019, Poland, Hungary and Czechia recorded the lowest values, while the labour market slack remained above 20% in Greece, Spain and Italy.

Graph I.2.4: **Dispersion of measures of labour market reserves ('slack'), EU28**



(1) LS1 is unemployment as percentage of the extended labour force. LS4 adds to the unemployed those available to work but not seeking, those seeking work but not immediately available, as well as the involuntary part-time workers (underemployed); LS4 is in percentage of the extended labour force (i.e. the sum of the labour force and all previous components).
(2) Boxes represent the middle half of the distribution; the mark inside the box is the median. Dots are outliers. The upper and lower whiskers around the boxes show the minimum and maximum values excluding outliers.
Source: European Commission based on Eurostat LFS.

2.3. EMPLOYMENT, ACTIVITY RATES AND HOURS WORKED

2.3.1. Employment and activity rates

In 2018, the employment rate increased in all Member States. The most rapid increases were recorded in Cyprus (3.0 pps), Malta (2.2), Finland (2.1) and Lithuania (2.0), as compared to the EU average growth rate of 1 pc (Table I.2.1). Compared to 2013, the employment rate in the EU grew by 4.5 percentage points, with the highest increases recorded in Ireland (11.1 pps), Malta (9.2 pps), Portugal (9.1 pps) and Lithuania (8.7 pps). In some cases, employment rates were boosted by double-digit employment growth (Malta, Luxembourg, Ireland, Hungary, Portugal and Spain). In Spain and to a lesser extent the UK, they were outpacing the growth of the working-age population.

Improvements continued in the first semester of 2019. They were particularly strong in Belgium, Bulgaria, Luxembourg and Malta, with slightly negative developments only in Denmark, Estonia, Sweden and Latvia. In the second quarter of 2019, the seasonally unadjusted EU average, up to 69.3 %, was higher than the average of the previous year (Table I.2.1).

Increasing activity rates continued to support employment growth. In 2018, the EU activity rate went up by 0.4 pp, with the Netherlands now joining Sweden at above 80 per cent. Annual increases higher than 1 percentage point were registered for Malta, Lithuania, Cyprus and Finland, while the indicator declined in Spain, Croatia and Greece (Table I.2.1). Over the last five years, activity rates grew significantly in all Member States with the exception of Spain. The highest increases were recorded in Malta (7.9 pps) and Hungary (7.2 pps).

Higher female participation and educational levels are the main drivers of increases in activity rates. Box 2.2 presents the results of a statistical decomposition exercise for the period (2000-2017). Changes in activity rates have been mostly driven by changes in socio-demographic factors in Belgium, Bulgaria, Cyprus, Greece, Ireland, Italy, Lithuania, Latvia, Poland, Portugal, Slovakia and the UK. Higher education levels contributed substantially, while the impact of

Table I.2.1: **Employment and activity rates and shares of marginally attached and discouraged workers over all inactive workers, various time periods**

	Employment rate				Activity rate				Share of marginally attached workers		Share of discouraged workers	
	2013	2017	2018	2019Q2	2013	2017	2018	2019Q2	2013	2018	2013	2018
SE	74.4	76.9	77.5	77.6	81.1	82.5	82.9	83.6	10.4	7.2	1.9	1.5
NL	73.6	75.8	77.2	78.1	79.4	79.7	80.3	80.8	15.5	11.9	3.7	2.3
DE	73.5	75.2	75.9	76.5	77.6	78.2	78.6	78.9	8.3	8.8	1.2	1.0
DK	72.5	74.2	75.4	75.0	78.1	78.8	79.4	78.8	12.4	14.9	0.3	0.4
EE	68.5	74.1	74.8	74.8	75.1	78.8	79.1	78.9	15.5	19.2	2.8	2.7
CZ	67.7	73.6	74.8	75.0	72.9	75.9	76.6	76.5	5.0	3.9	0.5	0.3
UK	70.5	74.1	74.7	75.0	76.4	77.6	77.9	77.9	14.6	11.6	0.3	0.2
AT	71.4	72.2	73.0	73.4	75.5	76.4	76.8	76.9	20.4	19.3	0.5	0.2
LT	63.7	70.4	72.4	73.0	72.4	75.9	77.3	77.9	4.7	4.4	1.7	1.2
FI	68.9	70.0	72.1	73.7	75.2	76.7	77.9	79.9	12.0	13.5	4.1	2.8
MT	62.2	69.2	71.9	73.1	66.3	72.2	74.7	75.7	14.3	11.8	1.2	0.4
LV	65.0	70.1	71.8	72.0	74.0	77.0	77.7	77.0	20.1	14.0	5.9	2.6
SI	63.3	69.3	71.1	72.5	70.5	74.2	75.0	75.7	13.1	9.6	2.8	1.0
PT	60.6	67.8	69.7	70.4	73.0	74.7	75.1	75.3	14.7	11.3	14.6	12.5
HU	58.1	68.2	69.2	70.0	64.7	71.2	71.9	72.4	11.7	8.5	4.8	2.2
EU28	64.1	67.6	68.6	69.3	72.0	73.3	73.7	74.0	12.3	10.9	4.0	2.8
IE	61.7	67.7	68.6	69.1	71.8	72.7	72.9	73.1	11.0	23.1	3.9	2.2
CY	61.7	65.6	68.6	71.2	73.6	73.9	75.0	76.3	13.3	6.7	4.9	1.9
BG	59.5	66.9	67.7	70.7	68.4	71.3	71.5	73.8	12.2	7.2	9.4	4.2
SK	59.9	66.2	67.6	68.1	69.9	72.1	72.4	72.2	5.9	5.4	0.7	1.3
PL	60.0	66.1	67.4	68.2	67.0	69.6	70.1	70.6	15.3	11.9	4.8	2.4
EA19	63.5	66.4	67.3	68.0	72.2	73.1	73.4	73.6	11.9	11.5	4.3	3.3
LU	65.7	66.3	67.1	68.3	69.9	70.2	71.1	72.2	18.4	17.1	1.1	0.8
FR	64.0	64.7	65.4	65.7	71.1	71.5	71.9	71.5	6.0	7.1	1.9	1.7
RO	60.1	63.9	64.8	66.4	64.9	67.3	67.8	69.1	12.0	5.3	8.2	4.0
BE	61.8	63.1	64.5	65.6	67.5	68.0	68.6	69.3	7.3	8.7	3.7	2.4
ES	54.8	61.1	62.4	63.5	74.3	73.9	73.7	73.9	13.8	10.1	4.8	2.6
HR	52.5	58.9	60.6	61.8	63.7	66.4	66.3	65.8	14.0	9.4	5.6	4.6
IT	55.5	58.0	58.5	59.4	63.4	65.4	65.6	66.0	19.5	19.5	9.2	7.9
EL	48.8	53.5	54.9	57.1	67.5	68.3	68.2	68.9	4.6	5.3	1.3	1.5

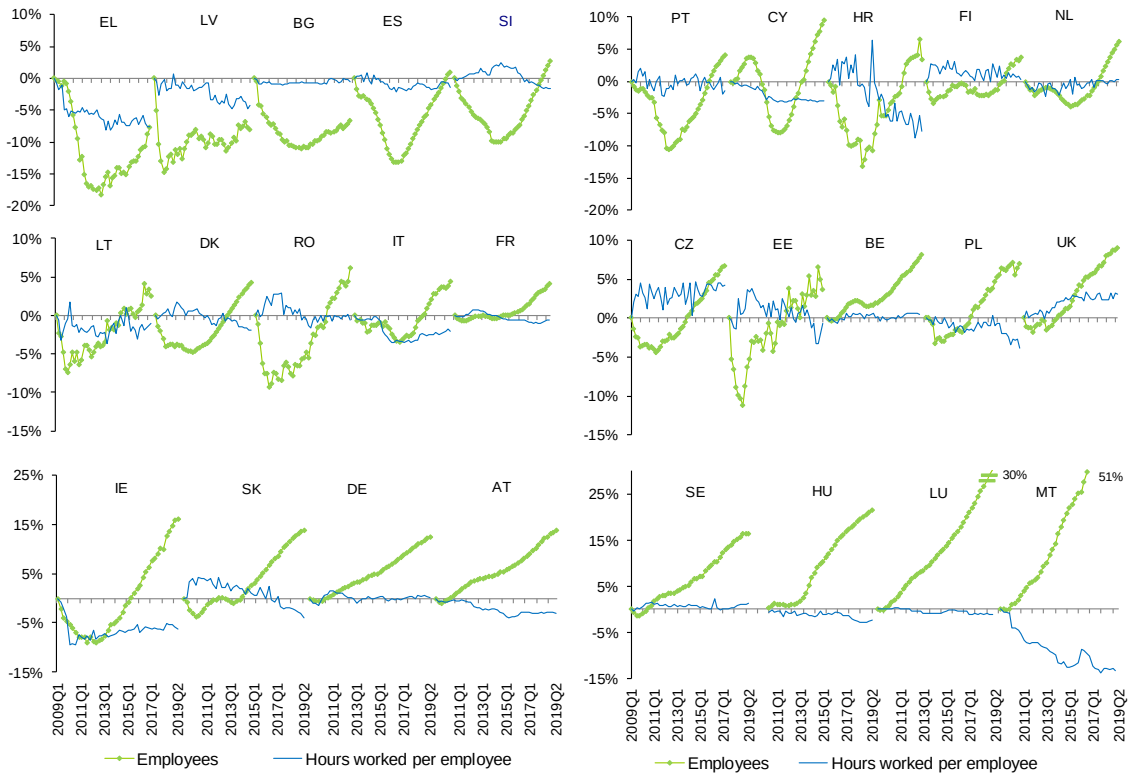
(1) Marginally attached workers are defined as inactive persons (aged 15-74) who are available to work but are not actively searching for a job, expressed as a share of the total inactive population.
(2) Discouraged workers are marginally attached workers who are not seeking employment because they think no work is available. Employment is based on the resident concept. Employment and activity rates refer to age group 15-64.
(3) Countries are ranked by descending order of the employment rate in 2018.
(4) Break in time series: IE in 2016, BE, DK, IE in 2017.
Source: Eurostat, Labour Force Survey.

ageing is smaller and ambiguous. On the other hand, changes in the probability of being active for the various socio-demographic groups – especially women – played a major role in Denmark, the Netherlands, Germany, France, Luxembourg, Austria and Spain.

As the recovery progressed, more inactive people started to search for a job. In the five years to 2018, the number of people not searching for a job, despite being available ('marginally attached workers'), dropped considerably from 16.5 to 14.4 million. Their numbers fell substantially in the UK, Romania, Poland, Spain and Italy, while increased in a few countries, including France, Ireland and Bulgaria. Table I.2.1 reports information on the share of the marginally attached as a share of the inactive population (15-74 years). Major reductions (of at least 5 pps) occurred in Romania, Latvia, Cyprus and Bulgaria. At the same time, the share of marginally attached workers increased in seven countries, in particular in Estonia (due also to a fall in the inactive population), Denmark, Finland and Belgium.

The share of discouraged workers also fell. Discouraged workers are those marginally attached workers who are not searching for a job because they think no jobs are available for them (See Table I.2.1). The share of discouraged workers is lowest in Austria and the UK (0.2% of inactive) closely followed by Czechia and Denmark. Their share among inactive workers exceeds 12% in Portugal and is close to 8% in Italy.

Graph I.2.5: **Change in number of employees and hours worked per employee, cumulative % change since the first quarter of 2009**



(1) Countries are ranked by ascending order of % change in the number of employees between 2009q1 and 2018q4. Values for number of employees for Luxembourg and Malta are out of scale (+30 and +51%). Due to break in the series of hours worked data from HU are shown relative to 2010Q1.
Source: Eurostat, National Accounts.

2.3.2. The adjustment of hours worked

Hours worked remained flat and in many countries below pre-crisis levels. In the EU, the drop in hours worked during the crisis compounded an already existing trend (European Commission 2017a,). In the period 2000-2007, hours had already fallen in most of the countries and by more than a cumulative 4 pps in Austria, Malta, Latvia and the Czech Republic. The cumulative loss more than doubled in the subsequent period 2008-2012 (4.3 pps in the euro area) and for several countries, the yearly pace was higher than 1 percent point (Hungary, Malta, Ireland). Starting from the cyclical low in the first quarter of 2013, developments in hours worked remained overall flat and often well below pre-crisis levels (Graph I.2.5). Since 2013, average hours worked increased in twelve countries. The increase was particularly strong in Ireland, Czechia, Italy, Germany and Spain.

2.3.3. Employment developments at sectoral level

Job creation is particularly high in services. During the period 2013-2018, the strongest growth of employment occurred in the market services (9.4%) and in public administration, health and education (5.9%). Double-digit growth in industry was recorded in Portugal, Slovakia, Ireland, Slovenia, Poland, Hungary, the Czech Republic and Cyprus (Table I.2.2). Strong divergences emerge in the construction sector, with some countries showing record growth rates (such as Ireland) and others showing negative growth rates (such as Czechia, Italy and France).

The occupational structure of employment is changing. The recovery brought about an acceleration in the change of the professional structure of the employment. In 2018, more than 80 per cent of the overall increase in EU employment occurred in two broad socio-

economic groups: professionals and technicians and associate professional employees. In the euro area, employment growth was also sustained for the group of managers and for clerks and skilled service employees. It was milder for skilled industrial employees while both small entrepreneurs and unskilled workers registered a contraction. More than 60% of the increase in employment over the period 2013-2018 involved professionals and technicians, whose overall share has now passed from 32.7% to 34.4%, with much higher shares than the average in Luxemburg, the Nordic Member States and the Netherlands. In the same time span, small entrepreneurship contracted on average by 5.8% (1.3 million) with losses concentrated in Romania, Italy, Germany, and Poland. ([39])

Table I.2.2: **Employment growth in different sectors, cumulative % change over the years 2013-2018**

	Industry	Construction	Market services	Public admin, health, education
MT	3.5	21.0	41.5	23.7
IE	12.8	67.3	17.1	15.5
LU	3.6	13.4	19.1	17.5
HU	11.2	21.6	22.5	10.3
CY	11.3	23.5	20.2	5.4
ES	9.2	18.6	13.5	8.8
PT	14.0	7.9	21.6	5.5
SK	13.2	4.3	12.1	6.7
SI	12.4	7.4	12.7	8.1
SE	-1.3	19.6	11.1	10.7
HR	8.5	6.1	17.9	16.3
EE	6.0	5.1	14.6	2.0
UK	4.9	16.0	9.5	3.5
DK	6.0	16.5	10.9	2.6
NL	2.6	1.9	12.4	0.9
CZ	9.5	-5.9	6.6	9.8
EU28	4.8	6.0	9.5	5.9
AT	4.8	7.5	7.3	9.0
EA19	3.2	3.6	9.0	6.1
LT	7.8	1.0	7.9	5.6
DE	3.7	4.1	6.1	9.7
PL	11.3	3.8	9.3	4.2
EL	0.1	0.7	10.1	5.1
BE	-2.9	1.0	8.2	5.8
IT	0.3	-6.3	8.2	2.8
FR	-3.0	-4.2	7.3	2.4
FI	-3.2	13.9	5.1	2.7
BG	4.7	2.9	6.1	0.3
LV	-4.9	7.6	4.5	0.5
RO	8.4	7.4	17.2	7.3

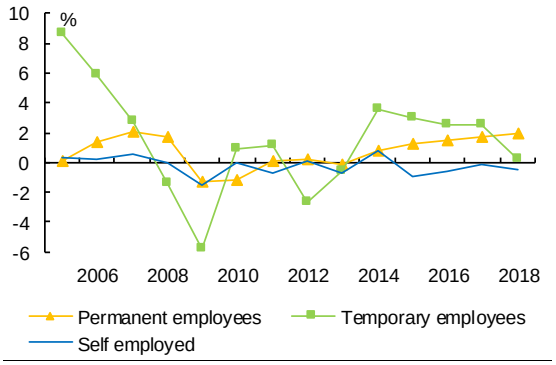
(1) Countries are ranked by descending order of cumulative employment growth over the period 2013-2018.
Source: Eurostat, National Accounts.

([39]) Chapter II.1 analyses trends in job polarisation and skills mismatches in detail.

2.3.4. Employment developments by contract type

Permanent employment continues to grow, mostly boosted by full-time positions. Employment growth in permanent positions overtook that in temporary contracts in 2018 in the EU (Graphs I.2.6). In 2018, permanent employment increased in all countries except Italy, with an average growth rate of 1.9% (1.7% in the euro area). Its increase was strongest in Cyprus, Denmark, Slovakia and Slovenia (Graph I.2.7). The share of permanent workers in total employment slightly increased in the EU (by 0.4 pp in 2018) and in a majority of Member States (Table I.2.3). The increase reached 1.5 pps in Denmark, Poland, Slovakia and Slovenia. The share of permanent workers fell in a few countries, exceeding 0.5 pps in Estonia, Italy and Malta. Self-employment continues to follow a declining path in most countries.

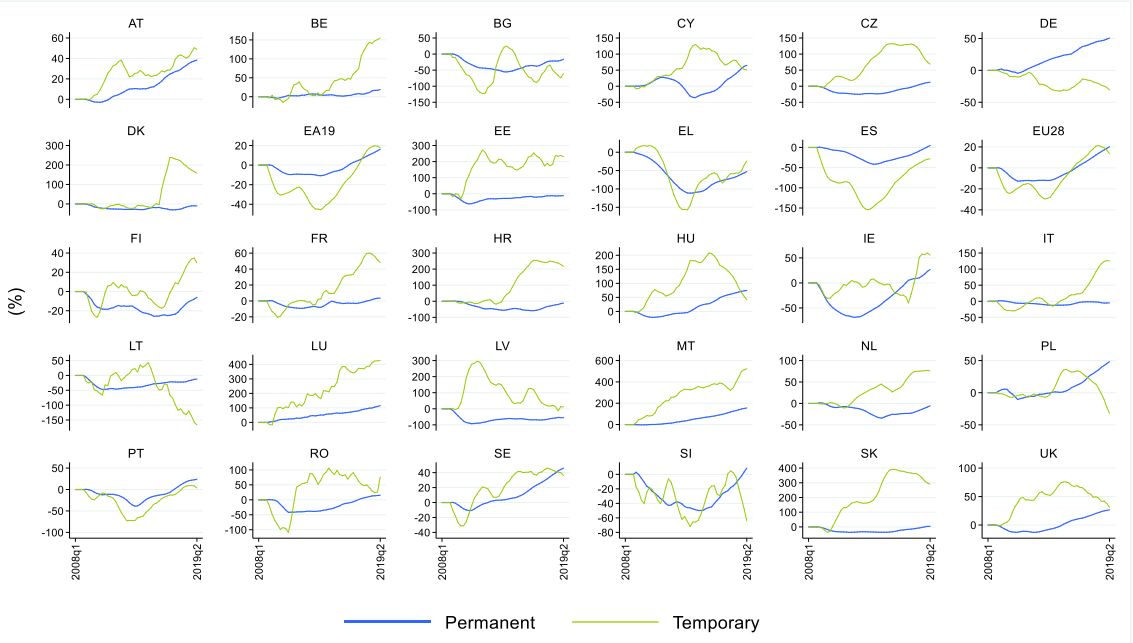
Graph I.2.6: **Employment growth by contract type, EU 28, 2004-2018, %**



(1) Age group: 15-64.
Source: Eurostat, Labour Force Survey.

In 2018, part-time employment accounted for less than one fifth of total employment. Compared to pre-crisis levels, the EU average went up from 18% to 20%, with increases of more than 3 pps in Finland, Greece, Cyprus, Italy, the Netherlands, Austria and Estonia. Under-employment - involuntary part-time work - as a share of employment (3.6% in the EU) is still slightly above its pre-crisis level, and grew in almost all Member States, in particular the Netherlands (3.3 pps), Cyprus (3.9 pps) and Greece (4.3 pps). In a few cases, however, it dropped, most notably in Sweden (-1.7 pps) and Germany (-3.5 pps).

Graph I.2.7: **Employment growth by contract type, 2008-2019Q2, cumulative % change since the 2008Q1**



(1) Age group: 15-64.
Source: European Commission based on Eurostat data, Labour Force Survey.

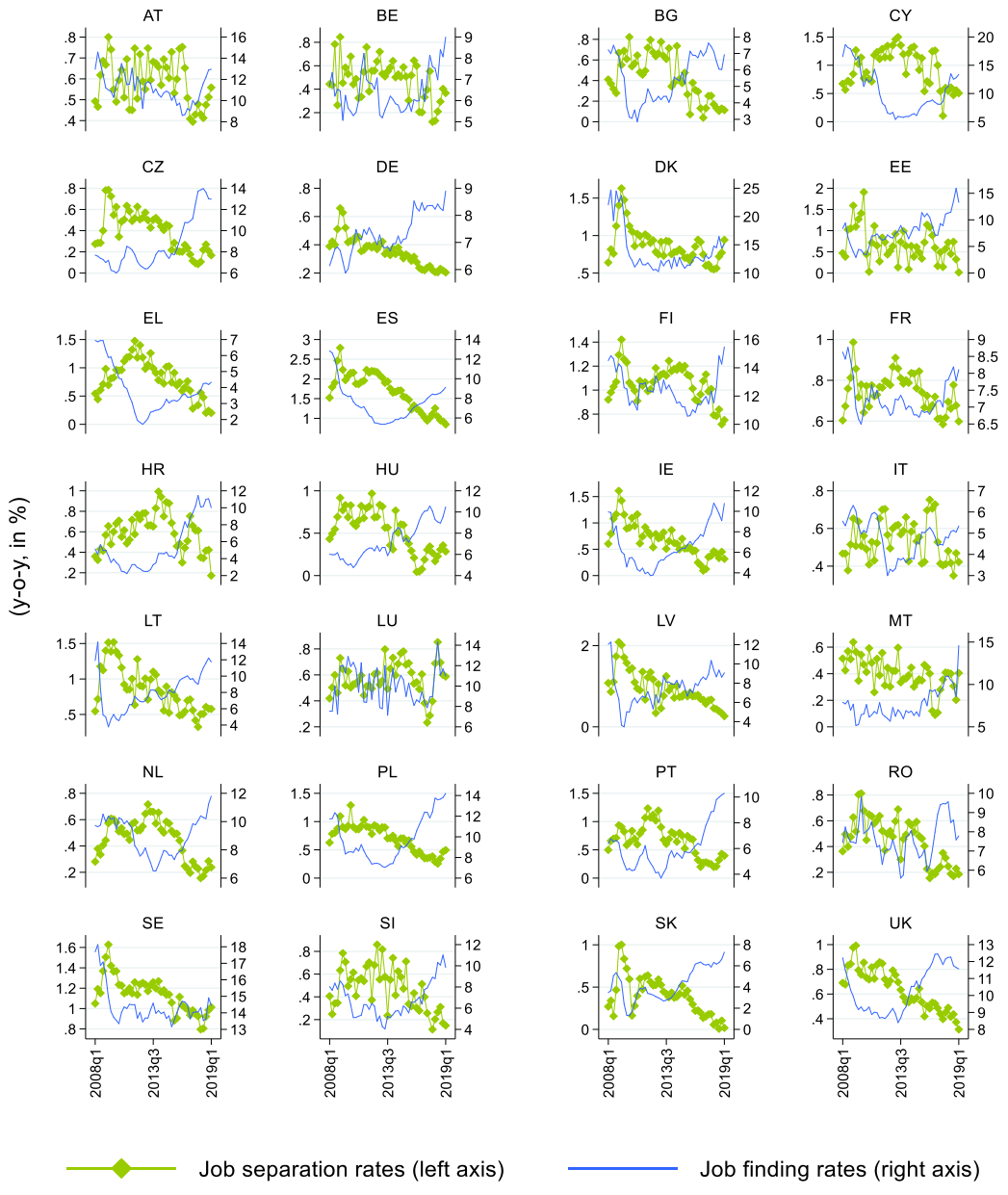
Open-ended contracts remain the predominant form of employment. As displayed in Table I.2.3, in Luxembourg, Hungary, the Baltic and two of the Nordic countries, the shares on total employment are the highest – ranging from about 82% to 89%. Temporary contracts, on the other hand, are most widespread in Spain (21.9%), Poland (19.2%), Portugal (17.9%) and Croatia (17.3%). Finally, for five countries (Greece, Bulgaria, Romania and Italy, Poland), self-employment remains quite significant with shares above 20%.

Table I.2.3: **Distribution of contract types among the employed, 2018, % and pps.**

	Open-ended contracts		Temporary contracts		Self employed	
	2018	chg	2018	chg	2018	chg
LU	88.5	*-0.4*	5.5	*0.5*	6.0	*-0.1*
LT	86.9	*0.4*	1.4	*-0.1*	11.7	*-0.3*
EE	86.2	*-0.8*	3.0	*0.3*	10.8	*0.5*
LV	86.0	*1.3*	2.3	*-0.2*	11.7	*-1.1*
HU	84.6	*1.2*	6.2	*-1.4*	9.2	*0.2*
DK	84.2	*1.5*	9.7	*-1.5*	6.1	*-0.1*
SE	82.4	*0.6*	13.7	*-0.5*	3.9	*-0.2*
MT	81.3	*-1.9*	6.6	*1.5*	12.1	*0.3*
UK	80.4	*0.4*	4.5	*-0.1*	15.1	*-0.2*
AT	80.2	*0.5*	7.6	*-0.1*	12.1	*-0.4*
DE	80.2	*0.6*	10.4	*-0.3*	9.4	*-0.2*
SK	79.5	*1.5*	7.2	*-1.2*	13.3	*-0.3*
CZ	79.1	*1.1*	6.7	*-0.9*	14.2	*-0.1*
CY	77.4	*1.2*	11.2	*-1.1*	11.4	*-0.2*
IE	76.2	*-0.3*	8.5	*0.7*	15.3	*-0.4*
FR	75.7	*0.2*	14.1	*-0.1*	10.2	*0.0*
RO	75.1	*1.1*	0.8	*-0.1*	24.0	*-1.1*
FI	75.0	*-0.4*	13.5	*0.3*	11.5	*0.0*
BE	74.2	*-0.4*	9.1	*0.4*	16.7	*0.0*
EU28	73.9	*0.4*	11.4	*-0.1*	14.7	*-0.3*
EA19	73.1	*0.1*	12.9	*0.1*	14.0	*-0.3*
BG	70.9	*1.0*	3.1	*-0.3*	26.0	*-0.7*
HR	70.2	*0.9*	17.3	*-0.6*	12.6	*-0.3*
SI	68.2	*1.9*	12.7	*-1.8*	19.1	*-0.1*
PT	68.2	*0.4*	17.9	*0.1*	13.9	*-0.5*
NL	67.3	*0.6*	16.3	*-0.3*	16.4	*-0.3*
IT	64.2	*-0.9*	11.9	*1.2*	23.8	*-0.3*
ES	64.0	*0.1*	21.9	*0.3*	14.1	*-0.4*
EL	60.6	*0.4*	6.8	*0.0*	32.6	*-0.4*
PL	60.6	*1.5*	19.2	*-1.4*	20.2	*-0.1*

(1) Countries are ranked by descending share of open-ended contracts in 2017.
(2) "Change" refers to the change in the share compared with the previous year (in pps).
Source: European Commission based on Eurostat LFS data.

Graph I.2.8: **Job finding and job separation rates, 2008-2018, quarterly data**



Source: European Commission based on Eurostat data.

2.4. JOB MARKET FLOWS

2.4.1. Job finding and separation rates

In 2018, job finding and job separation rates improved further. For the large majority of Member States, job-finding rates – a measure of the probability that an unemployed person finds a job within the next month – have increased or hovered around 2017 values (Graph I.2.8). Several Member States (including Czechia, Finland, Ireland, Malta, the Netherlands, Poland, Portugal, Slovenia) further improved on their already high finding rates, while the separation rate – a measure of the probability that an employed person becomes unemployed in the next month – continued on a declining path. For another group of countries (including Cyprus, Denmark, Estonia, Luxembourg), job finding rates improved while the downward trend in the job separation rate softened or changed sign.

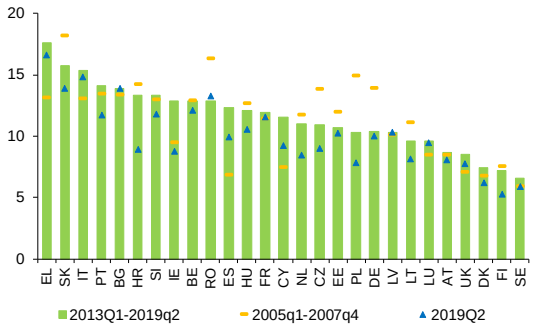
2.4.2. The Beveridge curve and labour market matching

The relation between unemployment and labour market tightness suggests both a decline in structural unemployment and a tightening labour market. ([40]) From the end of 2016, the indicator of labour market tightness increased rapidly. In some cases, such as Czechia, Germany, Slovakia and Spain, it reached a peak during 2018. In Southern Member States, such as Greece, Italy, Portugal and Spain, the shape of the Beveridge curve was flatter for a long time, before recently steepening in Greece and Spain as the tightness indicator increased. In other countries, mostly in Central and Eastern Europe (including Bulgaria, Poland, Slovenia and Slovakia), the labour market has been tightening since 2013. With the slowdown of economic growth, unemployment continued dropping, suggesting a decline in the structural unemployment.

([40]) The Beveridge curve is the relationship between unemployment and an indicator of labour market tightness (i.e. the abundance of job vacancies). Graphs A1.1 and A.1.2in the Annex of this Chapter rely on a proxy for the vacancy rates, namely an indicator of labour market tightness, as calculated from the EU Business Survey. It is the share of manufacturing firms reporting that labour is a "factor limiting production".

Long-term unemployment fell significantly. In 2018, the number of long-term unemployed – those who are looking for a job for at least more than a year – fell from 8.3 to 7.2 million, with notable improvements in Spain, France, Greece, Poland and Italy. The overall reduction since 2013 was significant, more than 5 million in the EU (3.3 in the euro area), mainly driven by a reduction in Spain (1.5 million), Poland, the UK, Germany and Portugal.

Graph I.2.9: **Average length of unemployment spells, 2005-2019Q2, quarterly data, months**

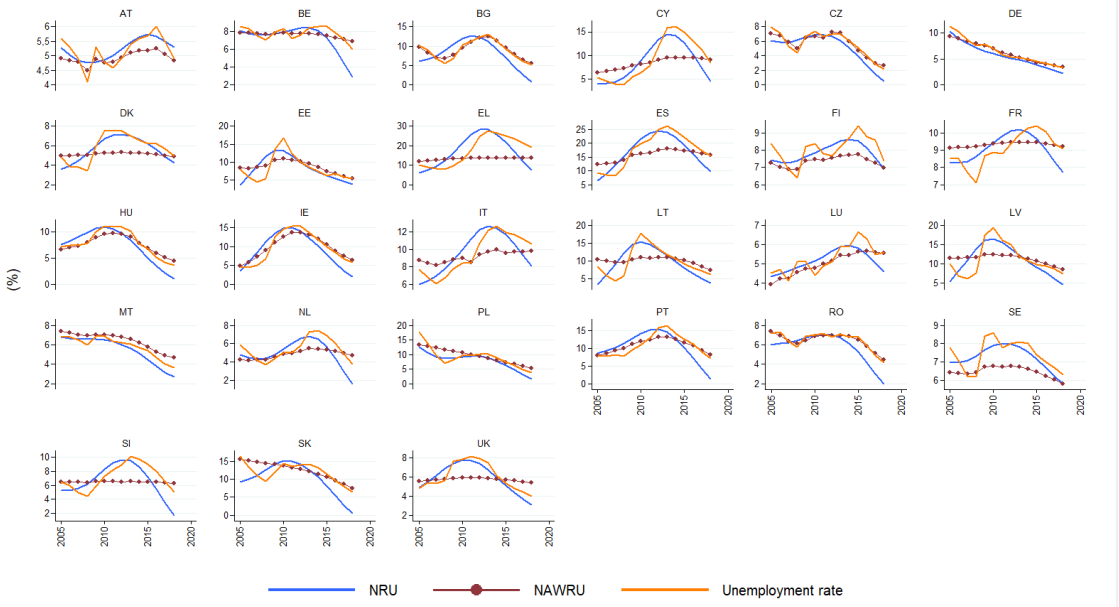


(1) Data for Malta are not available.
Source: European Commission based on Eurostat data.

In some countries, the duration of unemployment remains high. It is inversely related to job finding rates and has been constantly improving, although it remains high (Graph I.2.9). In 2018, the average duration of unemployment rose – with increases in Belgium, Bulgaria, Estonia, Latvia, Romania and the UK – thus remaining higher (7.6 months) than the pre-crisis value (7.1 months). ([41]) Wide differences, therefore, persist and have even increased. Some Member States (i.e. Poland, the Czech Republic, Croatia, Romania, Slovakia, Lithuania and Germany) recorded significant improvements even over their initial 2005-2007 high averages; others (Greece, Spain and Italy) are still far from their pre-crisis values. In 2018, the Scandinavian countries feature both much lower durations of unemployment and long-term unemployment ratios. On the other hand, Bulgaria, Greece, Italy and Slovakia have significantly higher values for both indicators. The most recent data (2019Q2) point to a general reduction of the durations,

([41]) However, the median value fell by almost 1 month, to 10 months, and further down to 9.7 in the second quarter of 2019

Graph I.2.10: **Unemployment rates and structural unemployment rates in the EU**



(1) Information is missing for Croatia for data availability.
Source: Ameco and Commission services calculations based on LFS.

especially in Slovakia, Belgium the Netherlands and Croatia.

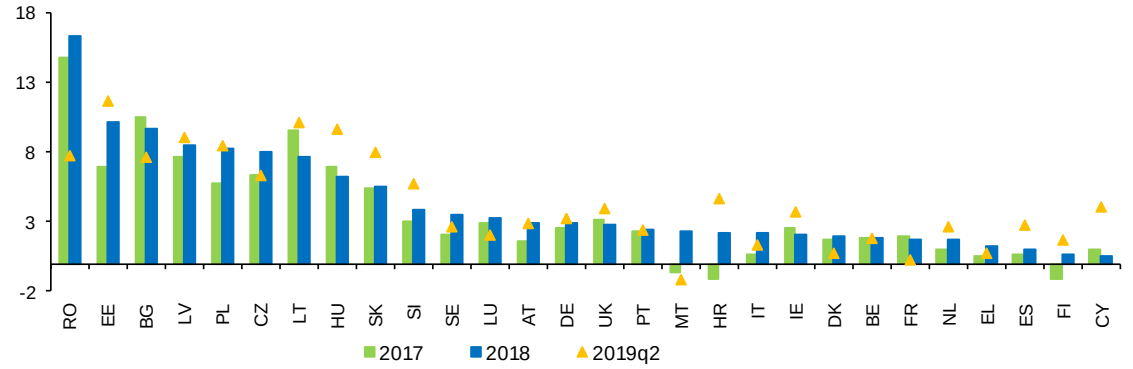
The fall in unemployment partly reflects improvements in structural features of the labour markets. Graph I.2.10 compares three indicators: the unemployment rate, an estimate of structural unemployment (NAWRU) and the unemployment rate consistent with current job finding and separation rates (a measure of 'frictional' unemployment, NRU). According to Commission estimates, the NAWRU for the EU peaked in 2009 (8.9%) and has kept falling since 2013 at a rapid pace, reaching 7.2% in 2018. ([42]) Country heterogeneity in the EU is reflected both in the wide differences in levels – in some cases the NAWRU is even up to three times the median of 6.1% – and in the temporal evolution of the indicator. For Belgium, Germany, Malta, Poland and Slovakia the peaks well pre-dated the crisis; for Austria, Greece, Spain, Luxemburg, Cyprus and Italy they occurred after 2013. For all the others, they were reached in the period 2010-2013.

In most of the countries, frictional unemployment peaked earlier and fell faster than actual unemployment. Since 2013, the largest decreases in the frictional unemployment can be observed in countries where both the increases in finding rates and reductions in separation rates were stronger, especially where initial values were particularly unfavourable (Greece, Croatia, and Spain). Elsewhere (Nordic countries and Luxemburg), job finding rates were already quite high so that their marginal increase could not translate into further significant reductions of frictional unemployment. In 2018 the difference between the current unemployment rate and the NAWRU was closed (Graph I.2.10 and Graphs A1.3 and A1.4 in the Annex) or virtually so for the great majority of countries. In several countries, including Belgium, Malta, the Netherlands, and the UK, the current unemployment rate fell below the structural unemployment. ([43]) In the case of frictional

([42]) In European Commission (LMWD, 2018b), econometric evidence suggested that an improvement in matching of vacant jobs with unemployed people explains part of the decline in the structural unemployment in a large number of countries. In some cases, other factors seem to have played a role, such as reforms increasing real wage flexibility or technological changes and automation in Denmark.

([43]) Besides Greece (5.6 pps), the gap is higher than half a percentage point in Sweden and Italy.

Graph I.2.11: **Nominal compensation per employee, 2017, 2018 and 2019Q2, annual % change**



(1) Wages are measured by the indicator "Nominal compensation per employee", which is calculated as total compensation of employees divided by the total number of employees. The total compensation is defined as the total remuneration, in cash or in kind, payable by an employer to an employee in return for work done by the latter during the accounting period and it has two components: i) Wages and salaries payable in cash or in kind; and ii) Social contributions payable by employers. (2) All the data used are national accounts data. The indicators are based on national currency values. Aggregates are weighted averages. (3) Countries are ranked in descending order of nominal compensation growth in 2018.
Source: European Commission, AMECO database.

unemployment, instead, and with the exception of Austria, the gap remains open at around 3 pps (it is marginal only in the Nordic countries and the UK).

2.5. TRENDS IN WAGES AND LABOUR COSTS

2.5.1. Nominal wage developments

Nominal wage growth rose in many Member States despite the weakening of economic growth. For the first time since 2008, wages increased in all Member States in 2018. In 2017, nominal wages registered a decrease in Finland and Croatia. The increases in 2018 ranged from 0.5% in Cyprus to 16.3% in Romania (Graph I.2.11). ([44])

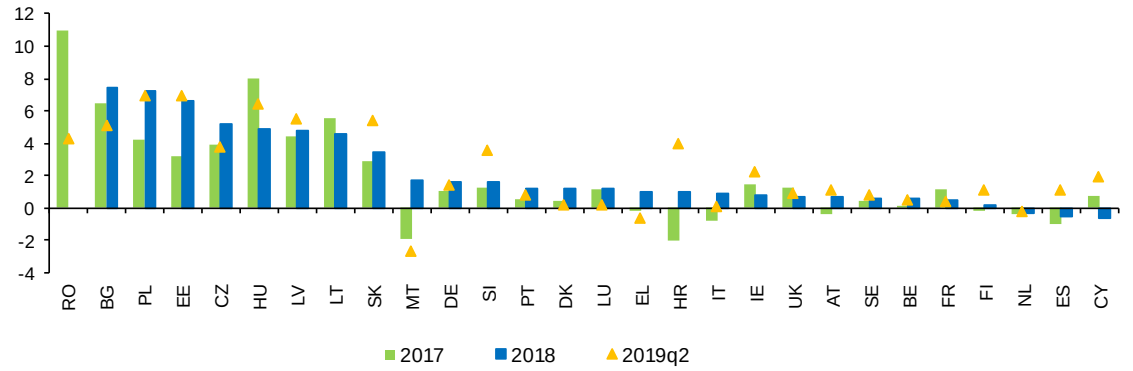
In 2018, nominal wage growth was fastest in some Central and Eastern European Member States, contributing to wage convergence. Romania registered the most rapid growth in nominal compensation per employee; the increase was even greater in gross wages and salaries, which exclude employer contributions, because of a tax shift from employees to employers. Other Member States with rapid nominal wage growth include Bulgaria, Czechia, Estonia, Hungary, Latvia, Lithuania and Poland, all above 6%. In contrast, nominal wage growth was slowest, below 2%, in some Member States with comparatively high unemployment, including Cyprus, Greece and Spain.

Average wage growth in the first semester of 2019 was close to that in 2018, with some variation across countries. Growth in nominal compensation per employee appears to have slowed somewhat in some countries with fast wage growth, such as Czechia, Hungary, and Romania but gained pace in Bulgaria, Cyprus, Latvia, Spain, Ireland and Slovakia. In contrast, it appears to have almost stagnated in countries with the slowest wage growth.

In many countries, nominal wage growth has been rising as unemployment fell, but the relationship is not uniform. In the past few years, nominal wage growth has been below what could be expected based on the past relationship between wage growth and unemployment (the so-called Phillips-curve relationship) in the euro area (see Chapter I.1). There is, however, a variety of patterns across countries (see Graphs in Annex of this chapter). In some Member States, including Belgium, Finland, the Netherlands and Spain, wage growth indeed appears to be below the pace that could be observed at similar levels of unemployment before 2008. In other countries, including Austria, France, and Germany, wage developments appear to be in line with the pre-

([44]) Wages refer to compensation per employee; it includes gross wages as well as employer contributions, thus it is a useful concept of labour cost. It is also not sensitive to shifts of the tax and contribution burden between employers and employees

Graph I.2.12: **Real wages per employee, 2017, 2018 and 2019Q2, annual % change**



(1) Real gross wages and salaries per employee, deflator private consumption. (2) Countries are ranked by descending order of real wage growth in 2018. (3) Real wage growth in Romania in 2018 (30,4%).
Source: European Commission, AMECO database.

crisis relationship. In Greece and Italy, wage growth is modest but above the historical Phillips curve.

2.5.2. Real wage developments

In 2018, real wages increased in almost all Member States, supporting the employees' purchasing power. As nominal wage growth increased ahead of inflation, real wages increased except in Cyprus, the Netherlands, and Spain (Graph I.2.12). As compared to 2017, real wage growth turned positive in Croatia, Italy, and Malta.

Real wage growth continued to be fastest in some Central and Eastern European Member States. It was fastest in Romania (the 2018 growth rate of nearly 30% is not shown in the graph as it is due to the effect on gross wages of a tax shift from employees to employers), followed by Bulgaria, Hungary, Poland, Estonia, and Czechia (all above 5%).

In contrast, the group of countries with low real wage growth is heterogeneous. It includes countries with comparatively high unemployment rates (such as Cyprus and Spain), but also those with low (such as Austria and the Netherlands) and intermediate rates (France and Sweden).

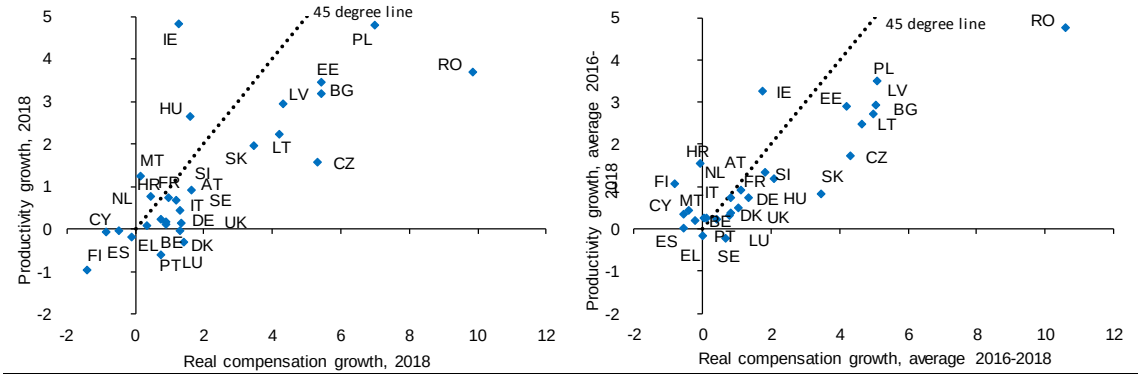
In the first semester of 2019, real wage growth increased in most countries. As nominal wage growth continued to rise and inflation declined, real wages strengthened in the first two quarters of 2019. Real wage growth was fastest in the Baltic countries, Bulgaria, Slovakia, Hungary and Romania, while it was lowest in Belgium, Denmark, Italy, and even negative in the Netherlands, Greece, and Malta.

2.5.3. Wages, productivity, unit labour costs

In 2018, real wages grew faster than productivity in a majority of Member States. This included notably some Eastern European Member States, such as Romania (where real compensation per employee growth exceeded productivity growth by almost 8 pps) and to a lesser degree in Czechia and Bulgaria (Graph I.2.13, left panel, countries furthest below the diagonal line). In Denmark, moderate wage growth was coupled with negative productivity growth. Among large euro-area Member States, wages grew in line with productivity in France and Spain, but somewhat ahead (by about a pps faster than productivity) in Germany and Italy. In contrast, wages grew slower than productivity in Cyprus, Hungary, Ireland and Malta in 2018 (countries above and to the left of the diagonal line).

Over the last three years, real wages grew roughly in line with productivity on average, with some variability across countries. Comparing wages and productivity over a longer time period has the advantage that one-off events and unexpected economic shocks have a smaller effect than in individual years. This is borne out in Graph I.2.13 as the variability between countries is smaller on average over the last three years (right panel) than in 2018 alone (left panel).

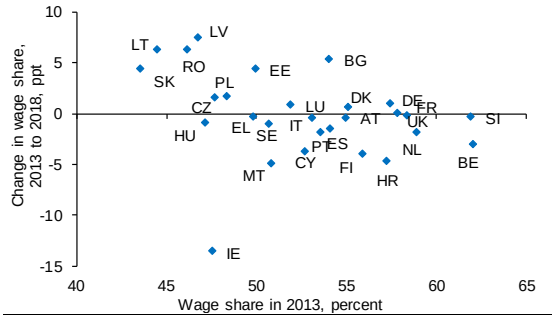
Graph I.2.13: **Real compensation per employee and productivity, 2018 (left panel) and the average over 2016-2018 (right)**



(1)Real compensation is nominal compensation per employee deflated with the GDP deflator.
(2) On the 45 degree line, real wage growth equals productivity growth. Point above the line represent countries where productivity growth is above real wage growth; the opposite for points below the line.
Source: European Commission based on Eurostat data.

Real wage growth over three years exceeded productivity growth in some Central and Eastern European Member States. This occurred in particular in Romania (by almost 6 pps on average) followed by Bulgaria, Czechia, Hungary, Latvia, Lithuania, Poland and Slovakia (by 2 pps or more). In contrast, wage growth remained below productivity growth by at least 1 percentage point per year in Croatia, Cyprus, Finland, Ireland and Malta.

Graph I.2.14: **Change in the wage share 2013-2018**

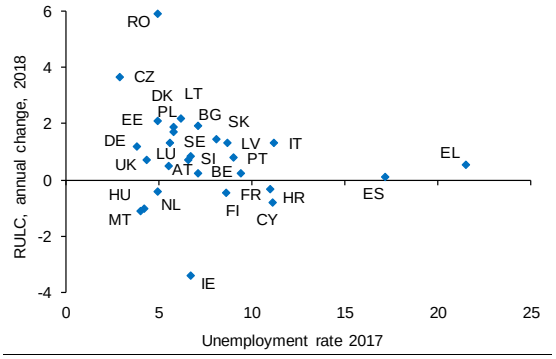


Source: AMECO database of the European Commission; Adjusted wage share; total economy; as percentage of GDP at current prices [ALCD0].

Consequently, the wage share has increased in some Eastern European Member States, where it was low. When real wages grow faster than productivity, the wage share (the share of national income paid to labour) increases. This is the case in a number of Eastern European Member States in which the labour share was comparatively low (including Bulgaria, Latvia, Lithuania, Romania and Slovakia), since the onset of the labour market recovery in 2013 (Graph I.2.14). In contrast, the wage share has receded in countries in which wages grew slower than productivity including in Belgium, the Netherlands and Slovenia, where its level was comparatively high. It remained fairly constant in large euro-area countries such as France and Italy (slight decrease) while it increased in Germany. In Ireland, the wage share decreased because of a revision of GDP statistics in 2015.

The gap between developments in real compensation and productivity is weakly negatively related to unemployment. The relationship is expected to be negative: wages may lag behind productivity in countries in which excess unemployment needs to be absorbed, while they may grow ahead of productivity in countries with low unemployment and labour shortages. In 2018, like in previous years, the relationship was weakly negative (Graph I.2.15). Wages grew most ahead of productivity in some countries with a comparatively low unemployment rate and developing labour shortages (Czechia, Hungary, Romania). In contrast, wages rose in line with productivity in some countries with a comparatively high unemployment rate (Spain, Croatia), lagged behind productivity in Cyprus, and grew somewhat ahead of productivity in Greece and Italy.

Graph I.2.15: **Unemployment rate (2017) and change in real unit labour costs (RULC, 2018)**



Source: European Commission based on Eurostat data.

Table I.2.4: **Decomposition of the annual percentage change of nominal and real unit labour costs (NULC and RULC), 2018**

	Compensation per employee	Labour productivity	NULC	GDP deflator	RULC
RO	18.4	3.9	14.0	5.9	7.7
CZ	8.0	1.6	6.3	2.5	3.7
HU	9.6	2.7	6.7	4.5	2.1
LT	8.0	2.4	5.4	3.3	2.0
DK	2.0	-0.3	2.3	0.6	1.7
PL	7.8	4.8	2.8	1.1	1.7
EE	8.8	2.6	6.1	4.6	1.4
SK	5.4	2.1	3.3	2.1	1.2
IT	2.0	0.1	1.9	0.8	1.1
DE	3.0	0.1	2.8	1.9	1.0
PT	2.0	-0.2	2.2	1.4	0.8
SE	3.4	0.5	2.9	2.2	0.7
UK	2.7	0.2	2.5	1.9	0.6
EL	1.3	0.2	1.1	0.5	0.5
BE	1.7	0.1	1.6	1.1	0.4
FI	1.4	-0.8	2.3	2.0	0.3
LV	7.8	3.1	4.6	4.2	0.3
FR	1.8	0.8	1.0	0.8	0.2
SI	4.0	1.5	2.5	2.3	0.2
HR	1.9	0.2	1.7	1.7	0.0
AT	2.5	1.0	1.5	1.6	-0.1
ES	0.8	0.1	0.8	1.0	-0.2
NL	1.7	0.0	1.8	2.2	-0.4
LU	2.1	-1.1	3.3	3.8	-0.5
BG	5.6	3.2	2.4	3.6	-1.2
CY	0.1	-0.2	0.3	1.6	-1.3
MT	2.1	1.3	0.7	2.2	-1.4
IE	2.1	4.8	-2.6	0.8	-3.4

(1) Countries are ranked in descending order of Real Unit Labour Costs (RULC). (2) The annual percentage change of Nominal unit labour costs (NULC) is calculated as the difference between the growth rate of nominal compensation per employee and labour productivity. The annual percentage change of Real Unit Labour Costs (RULC) is calculated as the difference between the growth rate of NULC and the GDP deflator.
Source: European Commission, AMECO database.

At the same time, wages lagged behind productivity in some Member States characterised by a comparatively low unemployment rate, including Ireland, Luxembourg and Malta and, to a lesser extent, Austria and the Netherlands. Table I.2.4 provides an overview of the components of real unit labour costs by country.

2.5.4. Wage developments by sector

In most countries with comparatively rapid wage growth in 2018, public sector wages increased ahead of the private sector. This was the case in Bulgaria, Lithuania and Romania and to a lesser extent in Czechia and Latvia. In contrast, public sector wage growth lagged behind the private sector in Estonia and Hungary (Graph I.2.16).

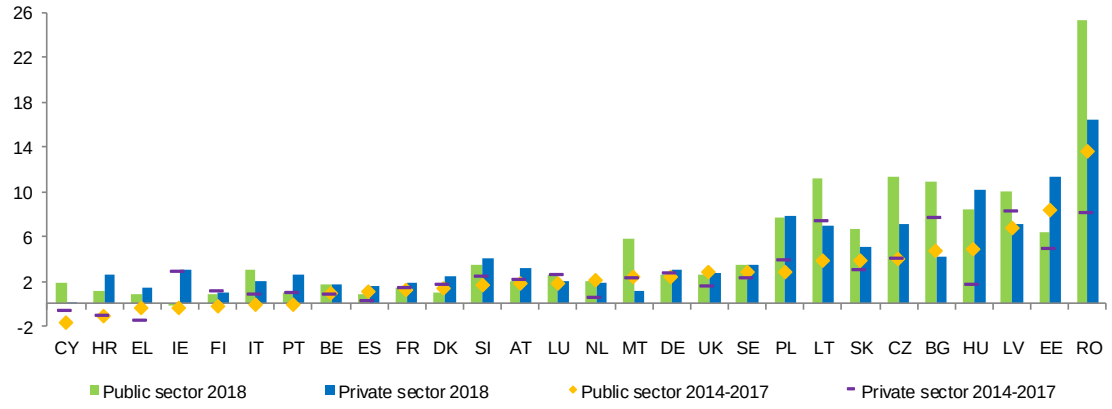
These patterns have not been constant over the last years. Over the average of 2014-2017, public sector wage growth was faster than wage growth in the private sector in Estonia, Hungary and Romania (by 3 pps per year on average or more), but slower in Bulgaria, Latvia and Lithuania.

In most countries with slow wage growth, public sector wages grew slower than wages in the private sector. The gap was more than 1 percentage point in Croatia, Denmark and Portugal and it exceeded half a percentage point in Greece and Spain. In contrast, public sector wages grew faster than in the private sector in Cyprus and Italy in 2018. Looking at the longer period of 2014-2017, public wages lagged behind private wages in most countries with comparatively slow wage growth, including in Cyprus and Italy (Graph I.2.16).

In some countries with high current account surpluses, public wage growth has been slower than wage growth in the private sector. This is the case in Denmark, Germany and Slovenia (both in 2018 and on average between 2014 and 2017). In Malta, public wages substantially outpaced private wage growth in 2018 after growing at the same pace for the previous four years. Finally, in the Netherlands, public sector wage growth outpaced that in the private sector wages since 2014, although the gap closed in 2018.

In 2018, private sector wage growth was fastest in market services. In most countries, wage growth in market services was faster than overall wage growth (Graph I.2.17). Exceptions were Bulgaria, Cyprus, and Malta, where wage growth was driven by industry. Wages in the construction sector grew ahead of overall wage growth in a few

Graph I.2.16: **Compensation per employee in public and private sectors, 2018 and average over 2014-2017, % change**



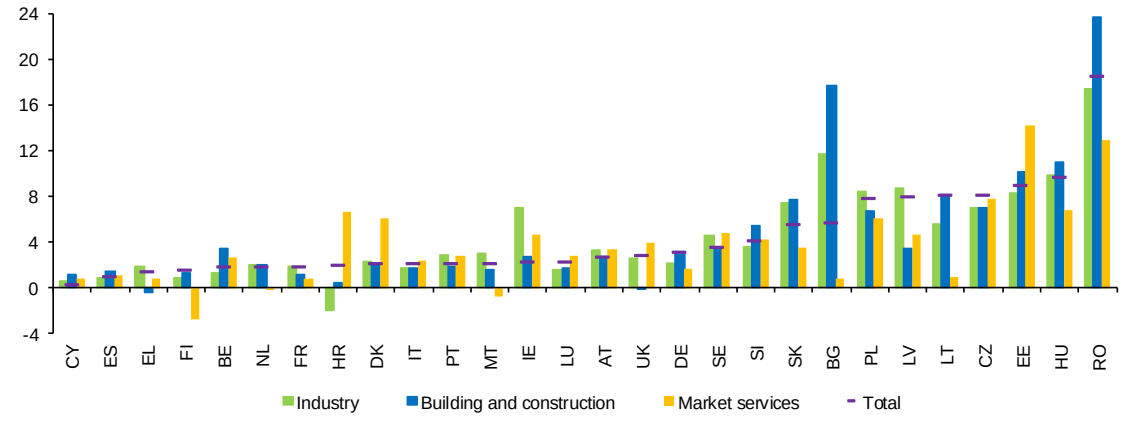
(1) The public sector is defined as public administration and defence, education, health and social work, personal service activities. (2) Countries are ranked by ascending order of growth of compensation per employee in the public sector in the period 2014-2017.
Source: Eurostat.

countries, including Bulgaria and Romania and, to a lesser extent, Estonia and Ireland, suggesting emerging labour shortages in construction in these countries. In contrast, construction wages lagged far behind general wage developments in Croatia, Latvia and the UK.

2.5.5. Contribution to inflation

Wages had a modest but increasing contribution to inflation in 2018. Table I.2.5 breaks down how various components contributed to the final demand deflator, an indicator of inflation based on National Accounts. In 2018, the contribution of nominal unit labour costs (NULC) was positive in all countries, but remained moderate in most, indicating that wage growth has not yet translated into inflation pressures (European Commission, 2019a). In two thirds of the Member States, the contribution of NULC remained below 1% while it exceeded 2% only in Romania. Among the larger euro-area Member States, it reached 1.1% in Germany, and 0.9% in Italy, but remained at 0.5% in France and 0.3% in Spain. In an analysis looking at higher-frequency data, the ECB (2019) documents that NULC's contribution to inflation (in particular, the GDP deflator) was increasing in the course of 2018, partly counterbalanced by a falling contribution from profits (gross operating surplus).

Graph I.2.17: **Nominal compensation per employee by sector, 2018, annual % change**



(1) Countries are ranked by ascending order of changes in average compensation per employee (total economy) in 2018.
Source: Eurostat.

Table I.2.5: **Contributions to the final demand deflator, 2018, annual % change**

	Import prices	NULC	Indirect taxes	Gross oper. surplus	Final demand deflator
IE	0.6	-0.5	-0.2	1.1	0.8
CY	0.0	0.1	0.4	0.5	0.9
FR	0.5	0.5	0.2	0.0	1.1
CZ	-0.3	1.8	0.0	-0.3	1.2
IT	0.6	0.9	0.0	-0.2	1.3
DK	1.0	0.9	0.2	-0.7	1.4
ES	0.7	0.3	0.2	0.2	1.5
HR	0.4	0.6	0.4	0.1	1.5
PT	0.7	0.8	0.4	-0.2	1.6
PL	0.9	0.9	0.4	-0.5	1.7
EL	1.3	0.4	-0.2	0.2	1.8
DE	0.5	1.2	0.1	0.1	1.8
AT	0.7	0.5	0.0	0.5	1.9
BE	1.4	0.5	0.2	-0.1	2.0
UK	0.7	1.1	0.1	0.2	2.2
SK	1.1	0.8	0.2	0.1	2.2
FI	0.9	0.9	0.3	0.3	2.3
MT	1.4	0.1	0.2	0.6	2.3
NL	1.0	0.6	0.2	0.5	2.3
SI	1.1	0.9	0.0	0.4	2.4
LU	1.2	0.6	0.1	0.5	2.5
EE	0.8	1.9	0.5	0.2	3.0
LV	0.5	1.5	0.4	0.7	3.1
BG	1.1	0.8	0.5	0.9	3.4
SE	1.8	1.0	0.2	0.3	3.4
LT	2.0	1.5	0.2	0.2	3.9
HU	1.7	1.7	0.6	0.1	4.2
RO	1.1	4.7	0.6	-1.2	5.2

(1) Countries are ranked by ascending order the final demand deflator.
Source: European Commission.

2.5.6. The tax wedge

In 2018, the total tax wedge at the average wage ranged from 25.9% in Malta to 52.7% in Belgium. The tax wedge is defined as the ratio of all the taxes and benefits paid on wages to total labour cost. Its significance is that it drives a wedge between the net wages (relevant for workers) and total labour cost (relevant for firms). Table I.2.6 shows this indicator of the total tax burden on labour, evaluated at the average wage in 2018, as well as its breakdown into various components and the changes of these components over one year and the last ten years.

Eleven countries reduced their tax wedge from 2017 to 2018. Most significant changes occurred in Romania (-4.7 pps) and Estonia (-2.5 pps), countries with below-median levels in the first place (the median was 40.7 in 2018). In the former, the reduction was the result of a large shift from employers' to employees' social contributions, while in the latter it was a direct consequence of a reduction in the personal income tax. Lower reductions in the tax wedge were recorded in Hungary and Belgium (-1.1 pps). The average increase in the tax wedge for the remaining countries was moderate (around 0.2 pp), with Bulgaria recording the largest increase (0.6 pp).

Some convergence across Member States can be observed in the tax wedge since 2008. Over the last ten years, the tax wedge at the average wage has decreased in a majority of Member States. At the same time, it tended to decrease most in countries with high initial levels and vice versa. The largest decrease was recorded in Hungary (-9.1 pps) followed by Romania (-4.1 pps), Belgium (-3.2 pps) and Denmark (-2.9 pps). Of these countries, Belgium and Hungary had some of the highest levels in 2008. At the other end of the spectrum, the tax wedge increased by more than 3 pps in countries (Ireland, Luxembourg, Malta and Portugal) where it was comparatively low in 2008.

2.6. COST COMPETITIVENESS AND EXTERNAL ADJUSTMENT

2.6.1. Real effective exchange rate developments

Competitive developments have continued to reflect the catching-up process in low-wage countries. Since 2016, Central and Eastern European Member States with rapid wage growth experienced an appreciation of their real effective exchange rates, an indicator of cost competitiveness based on the developments of real unit labour costs as compared to main trading partners (Graph I.2.18). The magnitude of real appreciation depends on which deflator is used. In the case of Czechia, Estonia, Hungary and Romania, real appreciation is much milder with a deflator based on export prices than with a deflator based on unit labour costs. This suggests that firms in these countries are not able to pass labour cost increases on to their export prices, which may compress profit margins.

Table I.2.6: **Decomposition of tax wedge**

	Total Tax Wedge 2018	Of which			Difference 2017 - 2018				Difference 2008 - 2018			
		Personal Income Tax	Social Contributions Employee	Social Contribution Employer	Total Tax Wedge	Personal Income Tax	Social Contribution Employee	Social Contribution Employer	Total Tax Wedge	Personal Income Tax	Social Contribution Employee	Social Contribution Employer
MT	25.9	12.4	6.7	6.7	0.4	0.4	0.0	0.0	3.1	3.7	-0.3	-0.3
UK	30.9	12.6	8.5	9.8	-0.1	-0.1	0.0	0.0	-1.9	-2.2	0.2	0.1
IE	32.7	19.3	3.6	9.8	0.1	0.0	0.0	0.1	4.5	3.9	0.6	0.1
BG	34.9	7.2	11.6	16.1	0.6	-0.1	0.3	0.4	-0.2	0.0	0.8	-1.0
DK	35.7	35.7	0.0	0.0	-0.2	-0.1	0.0	0.0	-2.9	-2.9	0.0	0.0
PL	35.8	6.3	15.3	14.1	0.1	0.1	0.0	0.0	1.1	0.0	-0.2	1.2
EE	36.5	10.0	1.2	25.3	-2.5	-2.5	0.0	0.0	-1.9	-2.9	0.7	0.3
NL	37.7	15.6	11.6	10.4	0.3	0.2	-0.2	0.2	-1.5	1.6	-4.1	0.9
LU	38.2	15.1	10.8	12.3	0.4	0.4	0.0	-0.1	3.5	1.3	-0.1	2.3
RO	38.3	6.9	29.2	2.2	-4.7	-4.0	15.8	-16.5	-4.1	-2.6	16.9	-18.4
ES	39.4	11.5	4.9	23.0	0.1	0.1	0.0	0.0	1.4	1.5	0.0	-0.2
HR	39.5	7.7	17.1	14.7	0.2	0.2	0.0	0.0	:	:	:	:
LT	40.6	10.0	6.9	23.8	-0.4	-0.4	0.0	0.0	-1.0	-5.6	4.6	0.0
PT	40.7	12.6	8.9	19.2	-0.7	-0.7	0.0	0.0	3.8	3.8	0.0	0.0
EL	40.9	8.1	12.8	20.0	0.1	0.1	0.0	0.0	-0.6	1.0	0.3	-1.9
SK	41.7	8.0	10.3	23.5	0.1	0.3	0.0	-0.1	2.9	0.5	-0.4	2.7
FI	42.3	16.6	8.1	17.6	-0.4	-0.2	0.4	-0.6	-1.5	-2.9	3.1	-1.7
LV	42.3	14.0	8.9	19.4	-0.6	-1.3	0.4	0.3	1.0	-0.6	1.6	0.0
SE	43.1	13.8	5.3	23.9	0.1	0.1	0.0	0.0	-1.8	-1.2	0.0	-0.6
SI	43.3	10.3	19.0	13.9	0.3	0.3	0.0	0.0	0.4	1.0	0.2	-0.8
CZ	43.8	10.2	8.2	25.4	0.4	0.4	0.0	0.0	0.3	1.9	-1.1	-0.6
HU	45.0	12.4	15.3	17.4	-1.1	0.3	0.3	-1.7	-9.1	-3.4	2.7	-8.3
AT	47.6	11.6	14.0	22.1	0.2	0.3	0.0	-0.1	-1.4	-1.0	0.0	-0.4
FR	47.6	12.3	8.8	26.5	0.0	1.4	-1.9	0.5	-2.1	2.5	-0.8	-3.9
IT	47.9	16.7	7.2	24.0	0.2	0.2	0.0	0.0	1.2	1.5	0.0	-0.3
DE	49.5	16.0	17.3	16.2	-0.1	0.1	-0.1	0.0	-1.8	-1.7	0.0	-0.1
BE	52.7	20.3	11.0	21.3	-1.1	-0.4	0.1	-0.8	-3.2	-1.5	0.3	-1.9

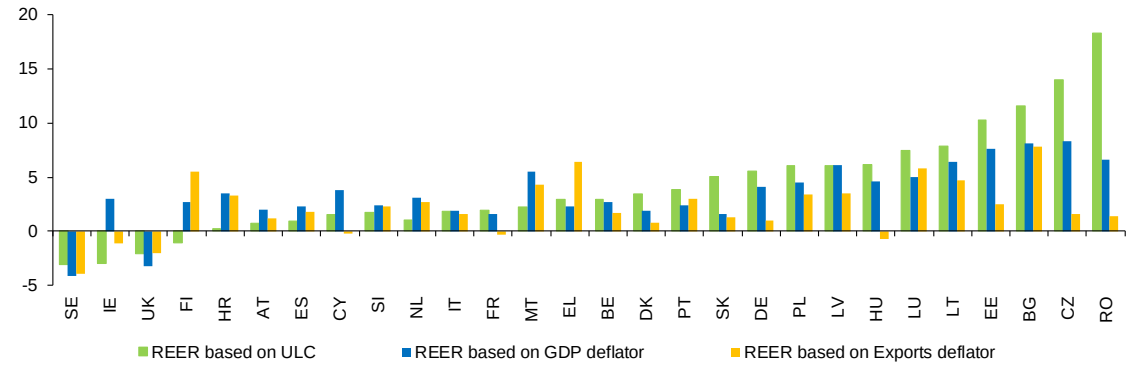
(1) The tax wedge data refer to a single person, without children, earning the average wage.
(2) Countries are ranked by ascending order of the tax wedge in 2018.
(3) Data for Cyprus not available; data for Croatia not available before 2013.
Source: European Commission based on OECD tax-benefit models.

Some Member States recorded competitiveness gains in terms of real depreciation. In Sweden and the UK, real depreciation was supported by the exchange rate, more than counterbalancing the effect of wage growth. In Finland and Croatia, real appreciation was held in check by low wage growth, while in Ireland comparatively strong wage growth was counterbalanced by strong productivity growth.

2.6.2. Competitiveness and adjustment in the euro area

In 2018, labour cost developments continued to be broadly consistent with rebalancing needs in the euro area. In the post-crisis period, nominal unit labour costs (NULC) have continued to grow faster in countries characterised by a current account surplus before the crisis ('surplus countries') than in countries with previous current account deficits ('deficit countries'). The

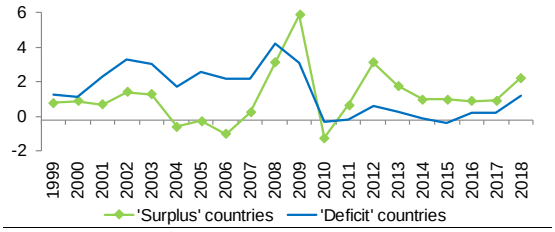
Graph I.2.18: **REERs based on various deflators, cumulative % change over the period 2016-2018**



(1) Countries are ranked by ascending order of the variation in the ULC-based REER in 2016-2018.
Source: European Commission based on Eurostat data.

divergence narrowed in 2016 but widened again in 2017 and remained above 1 percentage point while NULC gained pace in both groups of countries (Graph I.2.19). In particular, in 2018, nominal NULC growth increased to 2.4% in 'surplus countries' (from 1.1% in 2017) and to 1.4% in 'deficit countries' (from 0.4% in 2017).

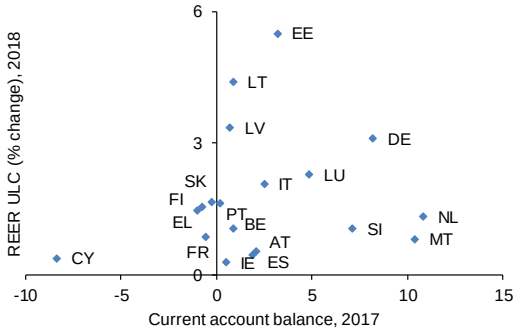
Graph I.2.19: **NULC in deficit and surplus countries within the euro area, weighted average, 1999-2018, annual % change**



(1) Surplus countries are Belgium, Germany, Luxembourg, the Netherlands, Austria and Finland. 'Deficit' countries are all other euro area Member States. This classification is based on the current account situation around 2008.
Source: European Commission based on Eurostat data.

At the same time, changes in external competitiveness were not systematically linked to current account imbalances in the euro area in 2018. While Germany's real effective exchange rate appreciated more than that of most other euro area members, this has not happened in other Member States with large current account surpluses in 2017 (Graph I.2.20).

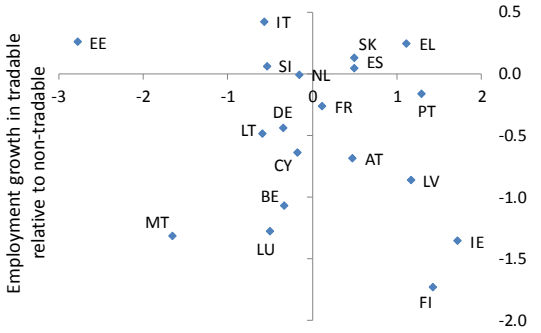
Graph I.2.20: **Real appreciation in 2018 and current account balance in 2017, euro area countries**



Source: AMECO.

Member States with a significant real appreciation of the real effective exchange rate in 2018 did not have current account deficits in 2017. The Baltic Member States experienced the most significant real appreciation in 2018 based on unit labour costs (Graph I.2.20). All three had a current account in a low (Latvia, Lithuania) or moderate surplus (Estonia close to 5% of GDP). In contrast, Cyprus, the only Member State with a significant current account deficit, had a stable real effective exchange rate.

Graph I.2.21: **Wage and employment growth differential between tradable and non-tradable sectors in the euro area, average annual % change, 2016-2018**



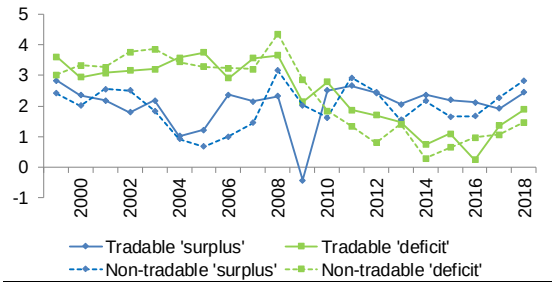
Source: European Commission based on Eurostat data.

In the past three years, employment and wage developments in tradeable sectors outperformed those in non-tradeable sectors in Greece, Slovakia and Spain. ([45]) In the case of Greece and Spain, this is in line with external rebalancing needs in the wake of the euro area crisis. In Portugal, there were similar patterns in wage developments, but employment growth was somewhat stronger in the non-tradable sector. In Slovakia, the strong performance of tradable sectors occurred in the context of a tightening labour market and strong wage growth. In contrast, non-tradeable sectors outperformed tradeable ones both in employment and in wage developments in Ireland and Malta and to a lesser extent in Belgium, Cyprus, Germany, Lithuania and Luxembourg (Graph I.2.21). In Ireland, strong employment and wage developments in construction were among the drivers.

([45]) Tradable sectors include: agriculture, forestry and fishing; industry (except construction); wholesale and retail trade, transport, accommodation and food service activities. Non-tradable sectors include: construction; information and communication; financial and insurance activities; real estate activities; professional, scientific and technical activities; administrative and support service activities; public administration, defence, education, human health and social work activities; arts, entertainment and recreation; other service activities; activities of household and extra-territorial organizations and bodies.

In some countries, employment and wage developments in tradeable and non-tradeable sectors moved in opposite directions. In Estonia and Lithuania, employment growth was somewhat stronger in tradeable sectors, but wage growth in non-tradeables. The opposite pattern can be seen in Latvia, Finland and Austria. The different patterns in the Baltic Member States appear to reflect, at least to some degree, the situation in construction. For instance, Latvia recorded comparatively fast employment growth in construction in the last five years (see Table I.2.2), while lagged behind general wage developments in 2018 (see Graph I.2.212). In contrast, employment growth was slower in the construction sector in Estonia in the last five years, while wage pressures seem to have appeared in the sector in 2018. When employment and wages move in the opposite direction (at least in comparative terms), it is possible that outcomes are driven by constraints in labour supply, causing labour shortages, in some sectors.

Graph I.2.22: **Compensation per employee, tradable and non-tradable sectors, in 'deficit' and 'surplus' countries: 1999-2017, annual % change**



(1) Surplus countries are Belgium, Germany, Luxembourg, the Netherlands, Austria and Finland. Deficit countries are all other euro area Member States. This classification is based on the current account situation around 2008.
(2) Data for some deficit countries (Greece, Italy) for 2016 are not available.
Source: European Commission based on Eurostat data.

Wages in tradeable and non-tradeable sectors had on aggregate similar dynamics in 'surplus' and 'deficit' countries in 2018. Between 2017 and 2018, nominal compensation per employee picked up across both country groups and both sectoral aggregates (Graph I.2.22). Tradeable and non-tradeable sectors showed very similar wage growth in both country groups in 2017 and 2018. However, the small differences between sectors are conducive to rebalancing. For the first time in years, wages in 'surplus countries' grew faster in non-tradeable than in tradeable sectors. In turn, tradeable-sector wage growth in 'deficit countries' returned to be slightly ahead of that in non-tradeable sectors in 'deficit countries'.

2.7. CONCLUSIONS

Six years after the start of the economic recovery, the improvement of European labour markets is continuing. In most of the countries, employment levels are now above pre-crisis levels. Both the fall in unemployment – on a faster track than would had been expected on the basis of output growth – and the rise in activity rates have boosted employment rates. In the large majority of Member States, job-finding rates have further increased. In services, employment growth has been particularly dynamic. At the same time, in some countries some countervailing forces are also emerging, stemming either from population dynamics or from a slowdown in the rate of growth.

Average hours worked are below the pre-crisis levels in almost all countries. The recovery is accompanied by a significant process of structural change in employment, generally reducing the weight of sectors with higher shares of full-time work in favour of sectors and professions with a higher concentration of part-time work. However, in 2018, average hours rose, boosted by the increase in the employment with permanent contracts and in full-time positions, and in the average number of usual hours worked by part-timers.

Large differences persist in the magnitudes and forms of remaining labour market reserves (slack) across countries. Both short- and long-run unemployment fell significantly. After peaking in 2013, the dispersion of unemployment rates fell further. Beveridge curves suggest a general decline in structural unemployment. In some Member States, however, supplementary indicators of labour market slack point to significant labour market reserves, with discouraged workers still a significant share among the inactive population, while the recent reduction of underemployed involuntary part-time workers was concentrated in just a few countries.

Current developments in activity and unemployment rates also reflect long-term demographic trends. Since 2000, higher activity

rates have been boosted by higher education rates and higher participation of women in particular. The link between demographic change and unemployment appears to be more complex. While a mechanical composition effect of fewer young people would lead to a lower unemployment rate, there seems to be no systematic relationship between falling youth shares and falling unemployment rates across Member States in the last two decades. Among the EU15 Member States, the statistical relationship appears to be the opposite.

Wage growth continued to gain pace in 2018 and the first quarter of 2019, affected by differences in unemployment and, to some extent, external imbalances across countries. Nominal wages increased in all Member States in 2018 while real wages increased in almost all. Overall, wages made a modest but increasing contribution to inflation in 2018. Over the last three years, real wages grew roughly in line with productivity on average, with some variability across countries. Since the start of the recovery in 2013, the wage share is increasing the most in countries where it was the lowest.

In most countries with comparatively rapid wage growth in 2018, public sector wages increased ahead of the private sector. The opposite was the case in countries with slow wage growth. In some countries with high current account surpluses, public wage growth was slower than wage growth in the private sector. In the private sector, wage growth was comparatively faster in market services than in industry.

In 2018, labour cost developments continued to be broadly consistent with external rebalancing needs in the euro area. In the post-crisis period, nominal ULC have continued to grow faster in countries characterised by a current account surplus before the crisis ('surplus countries') than in countries with previous current account deficits ('deficit countries'). At the same time, external competitiveness did not systematically responded to current account imbalances in the euro area in 2018.

Box I.2.1: The impact of demographics on unemployment rate

The age structure of the EU labour force has changed significantly during the last two decades, mainly due to declining fertility trends and increase in longevity. The percentage of the active population aged 15-24 years of age in the euro area fell from 14.9% in 2000 to 12.5% in 2017 (Table 1). All countries experienced a drop in the share of young: yet, the size of this decline and its dynamics differ across countries (Bodnàr 2018). It is comparatively small (below 2.5 pps) for Austria, Belgium Germany, Finland, France, Luxembourg, and the Netherlands. Larger declines (exceeding 4 pps) are seen in the Southern, Central and Eastern European Countries (except Croatia). In Bulgaria and the Baltic States, the fall in the young population got sharper after 2010, mirroring the combined effect of ageing and outmigration of young cohorts. This Box quantifies the impact of these effects on total and age-specific unemployment rates.

Table 1. Active population 15-24 years, shares

	1995	2000	2007	2017
AT	15.3	13.8	14.3	13.0
BE	15.7	14.7	14.5	13.9
BG		16.6	15.3	10.7
CY		17.3	15.3	14.0
CZ		17.8	15.2	11.2
DE	12.9	12.9	13.6	12.0
DK	16.2	14.1	13.8	15.2
EA19		14.9	13.9	12.5
EE		17.1	17.2	11.6
EL	16.2	16.5	13.6	11.4
ES	19.7	17.1	13.4	11.5
EU28			14.7	12.8
FI	14.6	15.2	14.6	13.3
FR	16.2	15.4	15.3	14.2
HR			14.5	13.1
HU		18.3	14.8	12.7
IE	22.9	21.7	18.9	15.5
IT	16.5	13.8	11.9	11.3
LT		17.6	17.6	13.4
LU	14.8	14.0	14.2	14.4
LV		17.4	18.2	11.1
MT		18.8	17.1	13.5
NL	16.4	14.6	14.8	14.8
PL		18.7	17.9	12.5
PT	19.9	17.2	13.8	12.3
RO		19.5	17.5	12.9
SE	17.2	14.1	15.5	14.2
SI		17.3	14.7	11.2
SK		21.0	18.8	13.3
UK	15.6	14.5	15.6	14.1

Demographic change affects the unemployment rate directly and indirectly. An increase in the share of older workers reduces total unemployment directly, as younger cohorts - whose unemployment rate is several times higher than the unemployment rate of older age groups - become smaller. Moreover, higher educational levels may also modify the age structure of the active population. Indirectly, aging of the population reduces the labour supply of the young and increases that of older workers. According to the crowding hypothesis (Easterlin, 1966), the baby-boom generation has high risk of becoming unemployed if the increase in the labour supply is not matched by a comparable increase in labour demand ([1]): consequently, a "baby-bust", as it was experienced by many Member States in the 1980s and 1990s, would reduce youth unemployment. Yet, Shimer (2001) finds that firms have stronger incentives to create jobs in countries with younger populations. The effect on unemployment depends on how fungible are workers of different age and on the wage response to changes in labour supply (e.g. Biagi and Lucifora, 2008). Long-term trends, e.g. skill-biased technological change, may also affect the labour demand of young and old individuals differently.

The direct effect is quantifiable by looking at the gap between the actual unemployment rate and its "counterfactual" obtained by holding fixed (at a base year) the age composition of the labour force (Perry 1970, Flaim 1979, Fuchs 2016). ([2]) By construction, the gap reflects the composition effect, i.e. how much of the change in unemployment is due to demographics. The underlying assumption of building a counterfactual unemployment rate is that changes in the age structure of the labour force do not affect the age specific

([1]) See "Easterlin hypothesis" in the New Plagrave Dictionary of Economics, 2018, Macmillian Publishers.

([2]) Fuchs, M. and Weyh, A. 2014. "Demography and unemployment in East Germany: how close are the ties?," IAB Discussion Paper 2014 26.

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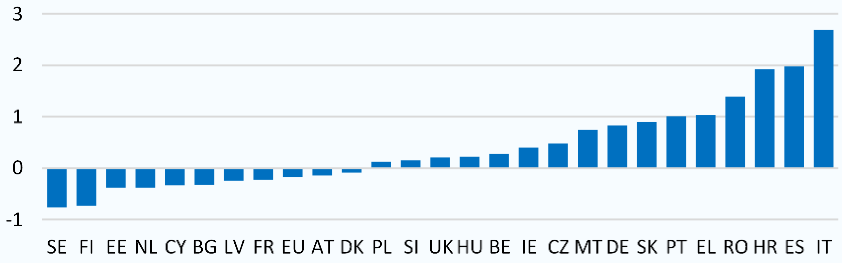
Box (continued)

counterfactual unemployment rate is that changes in the age structure of the labour force do not affect the age specific unemployment rates. The indirect effect can be inferred only empirically. In principle, both effects can offset each other, i.e. ageing has no effect on total unemployment rate, even if it modifies age specific unemployment rates.

Graph 1 shows the direct effect by country. ([3]) A negative (positive) gap means that demographic change contributed to keep high (low) the unemployment rate. For example, in Sweden and Finland, had the age structure of the population remained unchanged, unemployment would have been lower than actual unemployment. Conversely, in Italy, Spain, Croatia, Romania, Greece and Portugal the unemployment outlook is less positive than indicated by the current unemployment. In these countries, the impact of demographic change on the size of the age groups with higher unemployment rates mitigates the increase in unemployment. For example, Italy would have an unemployment rate almost 3 pps higher had the age structure of the population remained unchanged at the 1995 level. For Germany, on the other hand, there is no difference until 2001. From that year onward, demographic change explains about 1 percentage point of the almost 5 pps decline in the German unemployment rate.

Graph 1. The effect of ageing on the 1995-2017 change in the unemployment rate (15-59 years of age)



Note: The chart shows the gap between the actual unemployment rate and the simulated change in unemployment keeping fixed the structure of the active population. Due to data availability the starting year is 1996 for HU and SI; 1997 for CZ, PL and RO; 1998 for EE, LV and SK; 2000 for BG, CY; 2002 for HR; 2007 for MT.

The indirect effect can be quantified only econometrically, by estimating how much of the change in age specific unemployment rates is due to changes in the share of young in total population. Table 2 presents the results. Across different specifications, the share of young workers has no statistically significant effect on total unemployment (Table 2, column 1). Yet, consistent with evidence of Chart 1, the relationship varies across countries.

For the EU15, an increase in the share of the youth by 1 per cent reduces the total unemployment rate between 1.3 and 1.5 percent (Table 2, Panel a, column 1), which is close to the estimate obtained by Shimer 2001 for the US States. This evidence is also consistent with the findings of Skans (2005) for Sweden and Ochsen (2009) for Germany; yet, they differ from Biagi and Lucifora (2008) who focus on a panel of 10 European countries only. Column 3 shows the effect of changes in the share of young on the unemployment rate of the young and older workers' unemployment rates. An increase in the youth population is associated with a decline in the unemployment rates for both the young and the older cohorts, with a stronger effect on the unemployment rate of the older age group. Consistently with Shimer (2001), this implies that the unemployment rate of young relative to older workers rises when the share of young in the active population rises. The estimates in column 1 assume changes in the young population are exogenous, while in practice they also reflect mobility decisions. When estimates net out the effect of mobility decisions on the youth population (column 2), estimates remain statistically significant and even stronger in size. ([4])

For the EU13 (Table 2, Panel b), on the contrary, an increase in the share of youth in the population by 1 per cent increases the unemployment rate of those aged 25 and above more than it would for the 15-24 cohort.

([3]) Since EU LFS data are not available for all countries from the same year, the reference is the first year for which data are available. Five years age-groups are considered starting from 15-19 until to 55-59 years of age.

([4]) The share of young individuals in the labour force depends both on current migration decisions and past fertility rates; in order to isolate the effect of ageing, the fertility rate of 15 to 24 years earlier is used as instrument for the share of young in the labour force. In fact the fertility rate explains 84% of the variation within countries in the population of young and is an excellent predictor of the population about twenty years later and doesn't influence mobility decisions.

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Box (continued)

This suggests that an increase in the youth population rises the unemployment rate of young relative to that of older cohorts. Nonetheless, the effects are imprecisely estimated and it cannot be excluded that they are different from zero.

Table 2. Effect on unemployment rate of 1% increase in the share of young workers

Dependent variable	OLS (1)		IV (2)	
Total unemployment rate	-0.06	[-0.16]	-0.46	[-1.06]
Unemployment rate young	0.27	[0.67]	-0.06	[-0.13]
Unemployment rate 25 plus	-0.16	[-0.40]	-0.49	[-1.06]
			EU15	
Total unemployment rate	-1.27**	[-2.77]	-1.54***	[-3.0]
Unemployment rate young	-0.92*	[-1.93]	-1.14**	[-2.09]
Unemployment rate 25 plus	-1.34**	[-2.83]	-1.57**	[-2.85]
			EU13	
Total unemployment rate	1.11	[1.03]	0.78	[0.66]
Unemployment rate young	1.39	[1.31]	1.35	[1.30]
Unemployment rate 25 plus	0.96	[0.90]	0.92	[0.88]

Panel estimates for 28 Member States from 1995 to 2017. All regressions include country and year fixed effects and a 25-54 *dummy*; t-statistics in parentheses; variables in logs. The instrument is the fertility rate computed as ten year average of the fertility rate lagged from 15 to 24 years earlier. Standard errors are clustered at country level. *** p>0.01, ** p>0.05, * p>0.1.

These findings suggest that there is a link between demographic change and unemployment, working both directly and indirectly. Aging exerts a positive cohort crowding effect, meaning that it is associated with higher relative unemployment for the young age groups. However, this effect appears only for the EU15 member states; conversely, no significant effect is found on average for the EU13.

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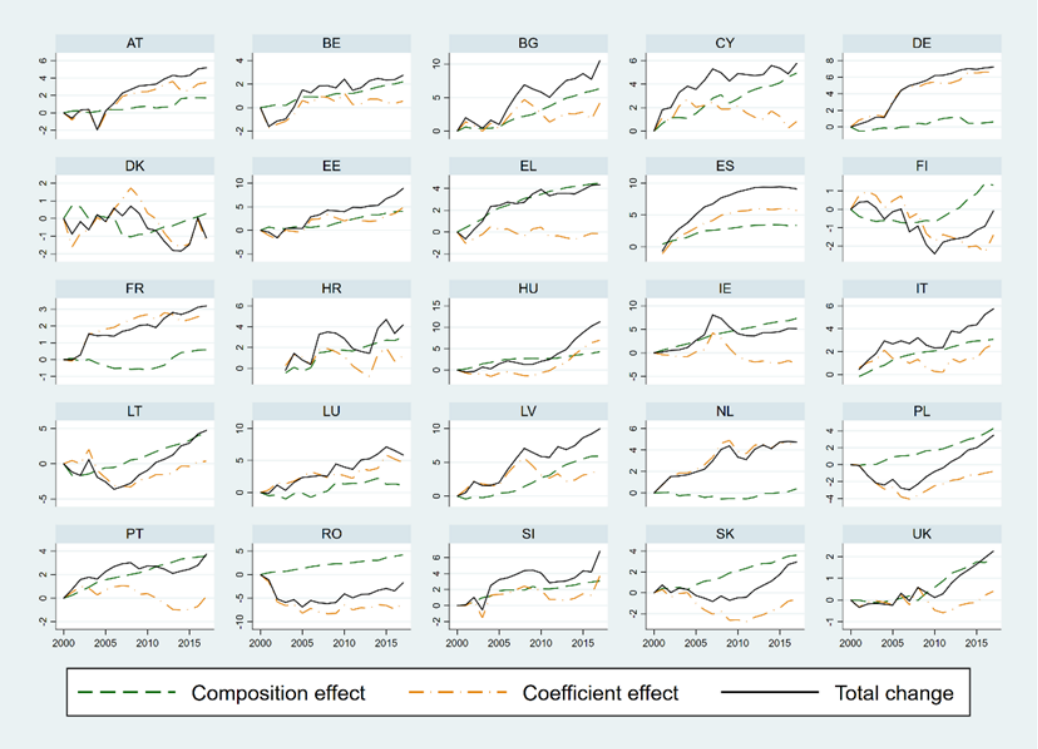
Graph 2. The unemployment rate and demographic change

Box I.2.2: **The dynamics of labour force participation rates in the EU**

This box analyses how shifts in the composition of the population, in particular increasing education and average age, affect the evolution of labour market participation (or activity) rates between 2000 and 2017. For each Member State, the analysis decomposes the change in the activity rate for the age group 15-64 into a component driven by changes in the average socio-demographic characteristics of the population (*"composition effect"*) and a part that represents changes in the probability of participating for the various socio-demographic groups (*"coefficient effect"*). The analysis is based on individual-level data obtained from the 2000 to 2017 EU Labour Force Survey. Labour market participation of individuals is explained, in a so-called logit model, by individual characteristics (gender, age and educational level). The Oaxaca-Blinder decomposition method allows breaking down changes in the activity rate into a composition effect and a coefficient effect.

Graph 1 presents the breakdown of the cumulated change in the activity rate between 2000 and 2017 for each Member State. There are several findings worth noting. First, the activity rate increased in the last decade in almost all Member States except Denmark and Finland. The increase was the largest in countries with initial low levels (e.g. Hungary, Bulgaria and Spain). Second, the composition effect is positive in all Member States. The composition effect was comparatively low in France, Germany and the Netherlands.

Graph 1. Decomposition of the cumulative change in the activity rate between 2000 and 2017 – total, composition and coefficient effect (in pps)



Third, the composition effect is the main driver of trends in the activity rates in about half of the Member States. In a number of countries, including Belgium, Greece, Lithuania, Portugal, and the UK, shifts in the composition of the population explain about the total increase in activity rate. In Denmark, Ireland, Poland, Romania and Slovakia, the composition effect even exceeds the total increase in the activity rate. This is possible if the activity rate of some groups fell while population shares shifted towards groups with higher labour market participation rates (older and more educated groups). On the other hand, changes in the population's composition explain less than half of the overall increase in activity rates in Estonia, Slovenia, Hungary, Spain, Austria, France, Germany, and the Netherlands.

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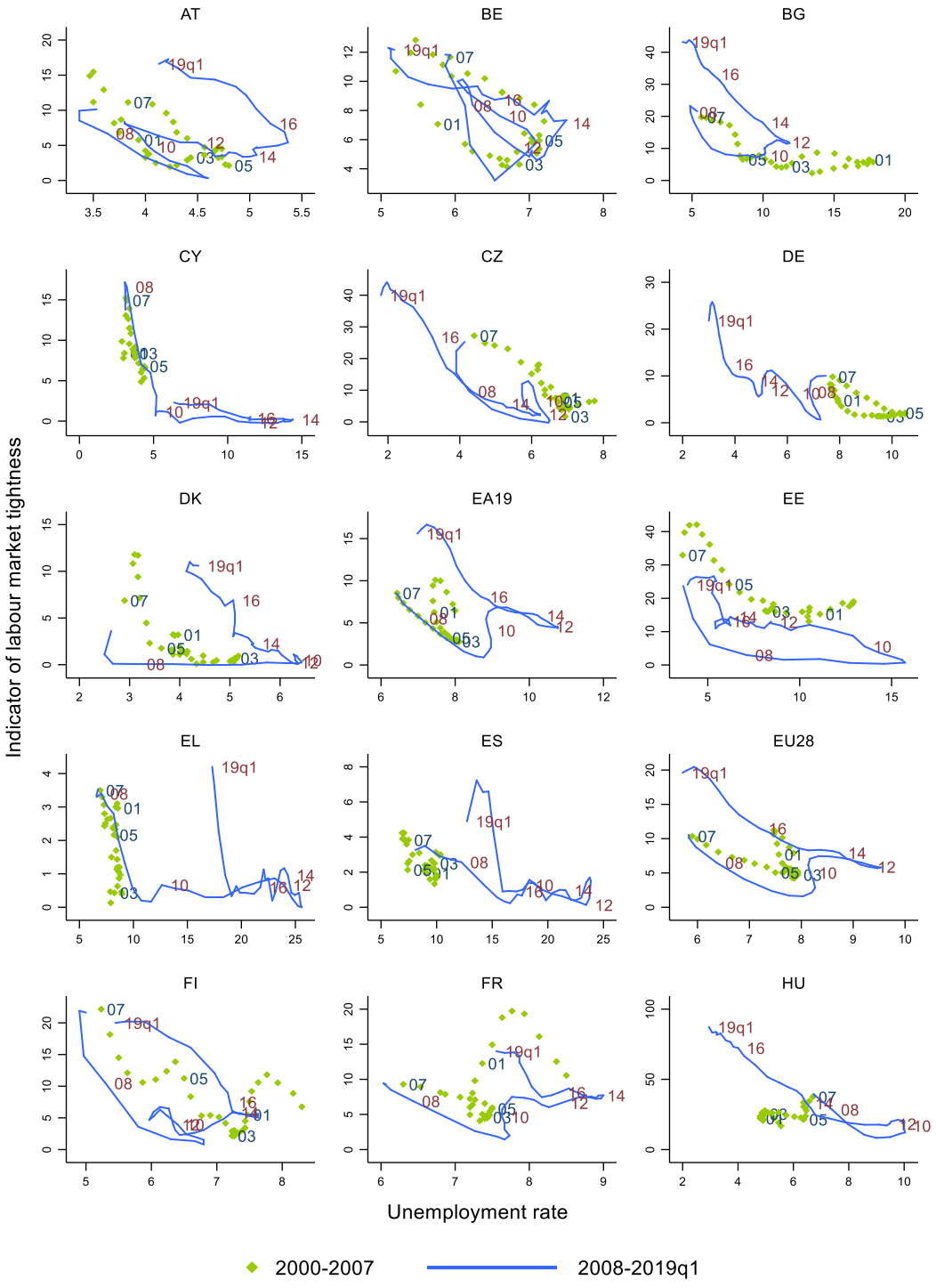
Fourth, and consistent with the findings of De Philippis (2017) on selected EU countries, the composition effect is mostly driven by increased education, while the ageing impact is smaller and ambiguous in sign: increased educational attainment is by far the most important component of the positive trend in the composition effect (Graph 2). The effect of ageing is smaller and more ambiguous. In Belgium, Denmark, Finland, France, and the Netherlands, ageing of the population has a negative effect on labour market participation. The opposite is observed in the case of Bulgaria, Germany, Spain, Greece, Hungary and Romania. Unsurprisingly, there is almost no effect of changes in the gender composition of the population (the percentage of women in the population is indeed constant over time).

Graph 2. Decomposition of the cumulative change in activity rate between 2000 and 2017 - composition effect (in pps)

Finally, the coefficient effect represents the combined effect of structural reforms and trends, and the impact of the business cycle. It explains a big deal of the change in the activity rate in Denmark, the Netherlands, Germany, France, Luxembourg, Austria, Spain and Hungary. In Italy, it drives most of the fluctuations in participation after 2008. In almost all Member States, the main driver of the composition effect has been increased labour participation of women. The impact of age is close to zero in most Member States as the increased participation rate of older workers is counterbalanced by a decline in the participation for young workers.

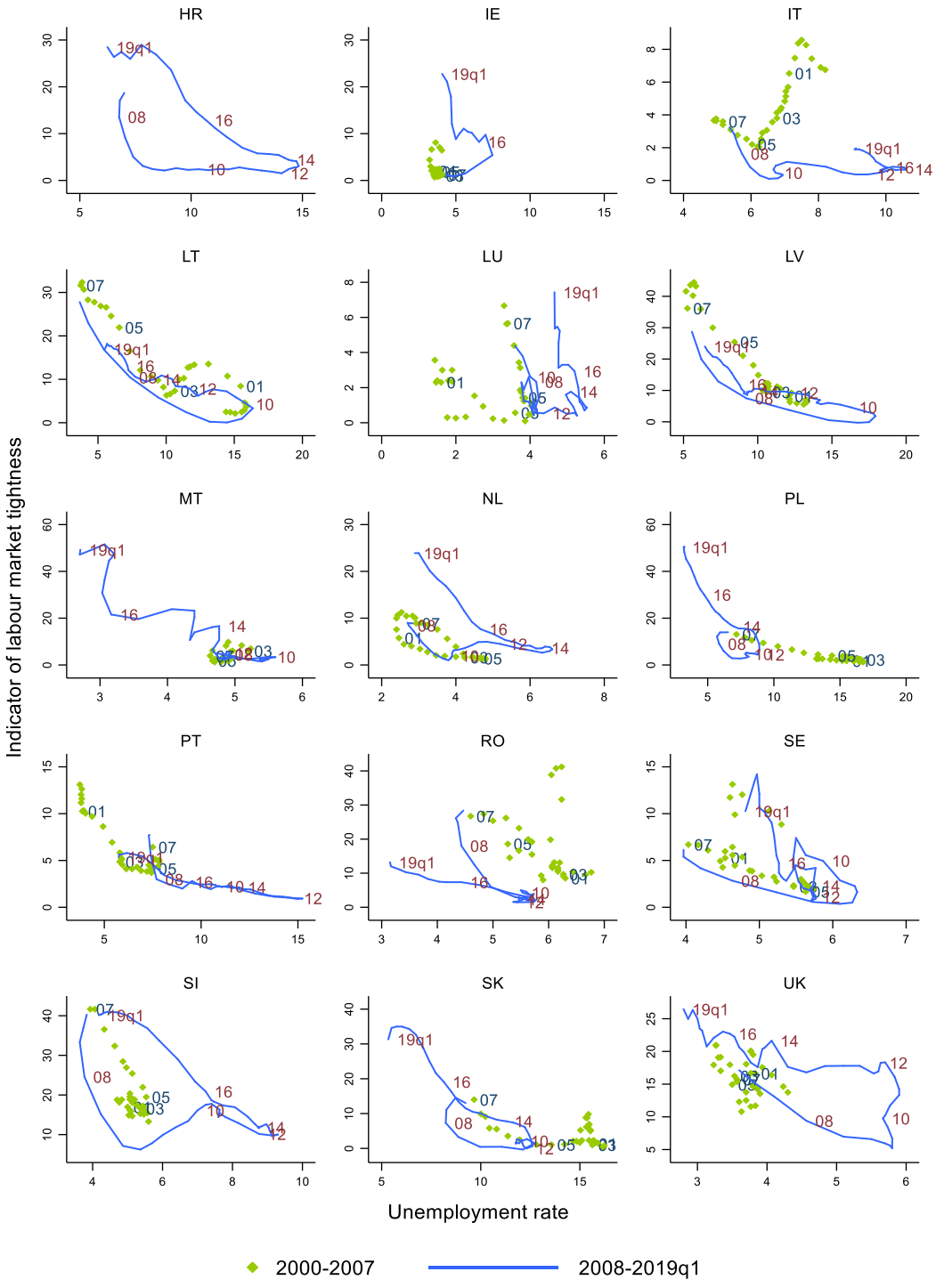
APPENDIX 1

Graph I.2.A1.1: **The Beveridge curve in EU Member States, 2000q1-2018q4, quarterly data**



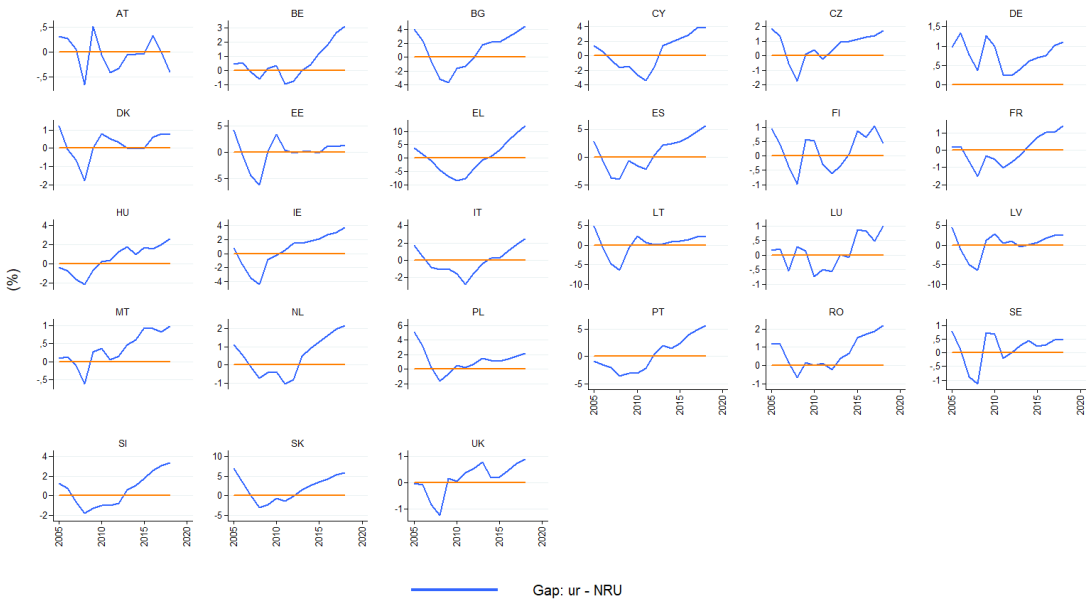
(1) Share of manufacturing firms indicating that labour is a "factor limiting production", EU-Business and Economic survey.
Source: European Commission based on Eurostat data.

Graph I.2.A1.2: **The Beveridge curve in EU Member States, 2000q1-2018q4, quarterly data, cont.**



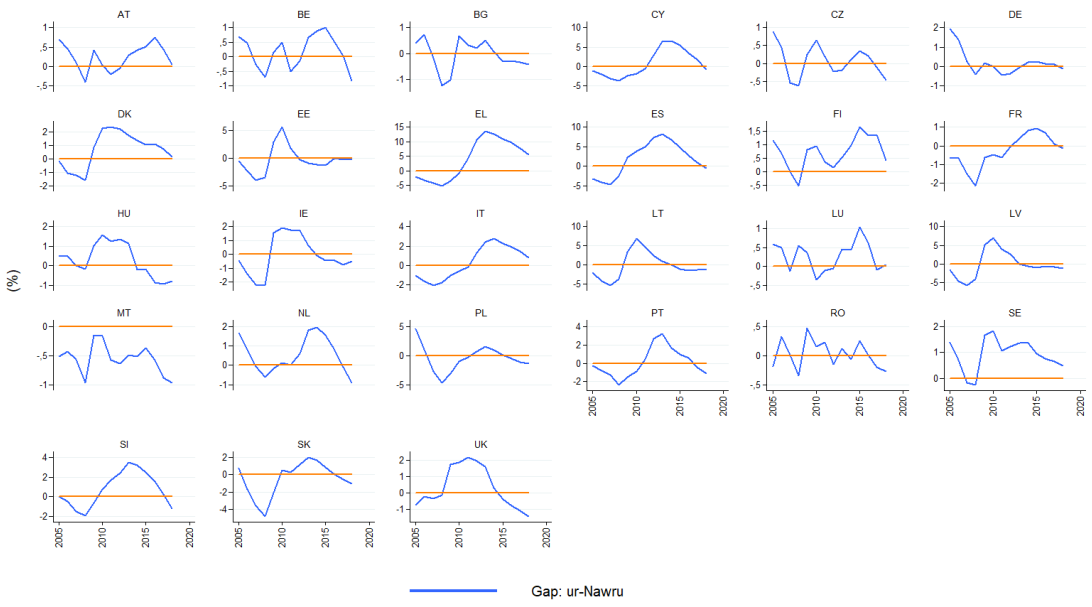
(1) Share of manufacturing firms indicating that labour is a "factor limiting production", EU-Business and Economic survey.
Source: European Commission based on Eurostat data.

Graph I.2.A1.3: **The gap between actual unemployment and NRU**



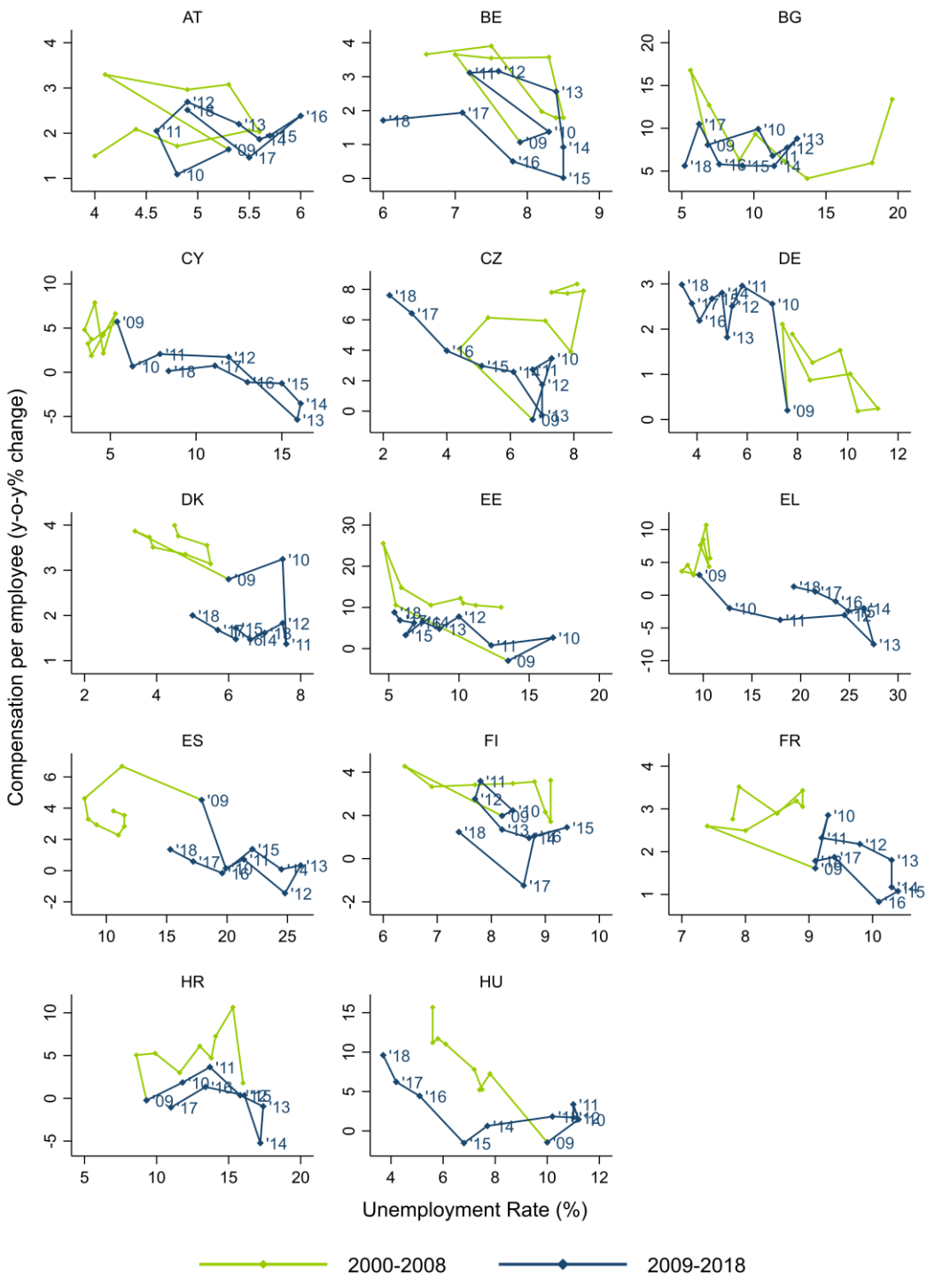
(1) NRU: A measure of frictional unemployment. In particular, it is the rate of unemployment consistent with current job finding and separation rates.
Source: Ameco and Commission services calculations based on LFS.

Graph I.2.A1.4: **The gap between actual unemployment and the NAWRU**



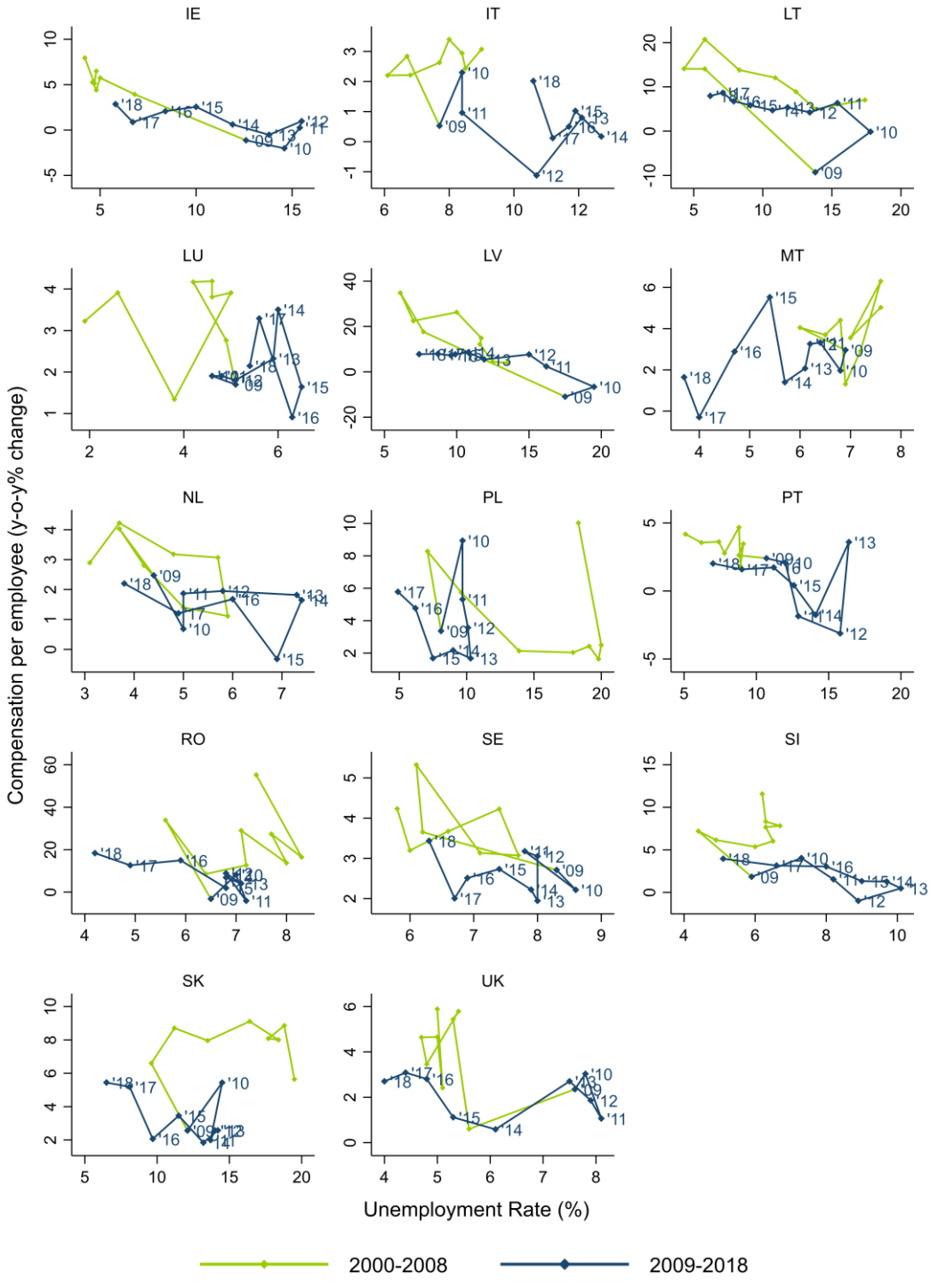
(1) NAWRU: Non-accelerating wage rate of unemployment, an estimate of structural unemployment consistent with economic equilibrium.
Source: Ameco and Commission services calculations based on LFS.

Graph I.2.A1.5: **The Phillips curve for EU countries: compensation per employee growth and unemployment rate, 2000-2018, Panel A**



Source: Eurostat, LFS and National Accounts.

Graph I.2.A1.6: **The Phillips curve for EU countries: compensation per employee growth and unemployment rate, 2000-2018, Panel B**



Source: Eurostat, LFS and National Accounts.

3. POLICY DEVELOPMENTS: THE POVERTY-REDUCING EFFECTS OF SOCIAL TRANSFERS

Total social protection expenditure as a percentage of GDP rose after the 2008 crisis. This pattern is common to spending components that are relatively stable over the economic cycle and to those that move opposite to the cycle (counter-cyclical).

The cyclical response of spending to unemployment benefits increased on average after the 2008 crisis, in spite of social expenditure developments being pro-cyclical in 2012. Nonetheless, spending on unemployment as a percentage of GDP started to fall earlier than the unemployment rate. This reflects the persistence of the crisis combined with the limited duration (and, in some cases, the limited coverage) of unemployment benefits.

Social spending contributes to smoothing cyclical fluctuations. This contribution increased after the 2008 crisis. High income countries stabilise a higher proportion of GDP shocks, which might reflect their higher spending on some counter-cyclical items and more effective spending institutions.

Overall, social benefits reduce the incidence of poverty by about one third and its depth by more than one half. On average, family benefits have the largest effect on the poverty rate (17%), followed by sickness and disability benefits (15%) and unemployment benefits (10%). Nordic countries tend to be more effective in reducing both the at-risk-of-poverty rate (the incidence of poverty) and the poverty gap (depth of poverty). Unemployment benefits only play a limited role in reducing the poverty rate and poverty gap; their effect is larger whenever coverage and generosity are higher and the incidence of long-term unemployment is lower. Social inclusion benefits have a stronger effect on the poverty gap. For all benefits, reforms increasing their generosity are associated with a higher poverty-reducing effect. However, reforms that make unemployment benefits more generous have a temporary reducing effect on poverty.

The analysis shows that, in most Member States, the policy changes in the tax and benefit system introduced between 2008 and 2018 were progressive, and in particular were able to protect those at the bottom of the income distribution. Only in Spain, Ireland and Portugal, policies protected rather the middle-income brackets from the extreme effects of the crisis. Finally, in Hungary and, to a lesser extent, the UK, significant losses were observed at the lower end of the income distribution. However, the poverty gap still deepened in almost half of the Member States, indicating a worsening of the living conditions of the poor population.

Social policy spending impacts relative poverty and material deprivation; yet, its quantitative relevance varies across different poverty indicators. An increase in social protection spending reduces severe material deprivation and the at-risk-of-poverty rate with the poverty threshold held constant.

3.1. INTRODUCTION

During the 2008 crisis, poverty and social exclusion in the EU increased significantly. Between 2008 and 2012, the number of people at risk of poverty or social exclusion in the EU rose by 6.4 million. ([46]) This reflects the surge in *material deprivation* and in the number of persons in low work-intensity households. Although *relative* poverty did not increase much, low-wage earners experienced serious economic and financial hardships. At the end of 2012, nearly one in four persons was at risk of poverty or social exclusion (123.7 million people). ([47])

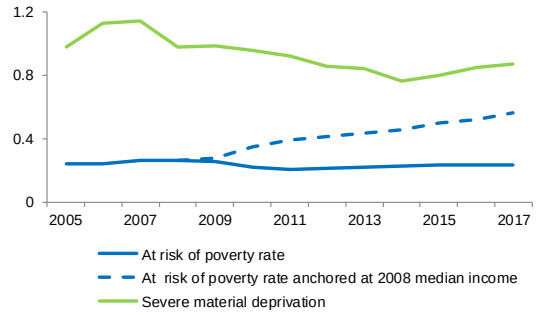
The at-risk-of-poverty rate has declined, but improvements have been uneven across countries. The number of people at risk of poverty stabilised in 2015 and 2016 and fell in 2017. At the end of 2017, the number of people at risk of poverty or social exclusion was below the pre-crisis levels (Joint Employment Report, 2017).

([46]) See Box I.3.2.

([47]) Between 2008 and 2012, the *AROP rate* increased from 16.6% to 16.8%; this small increase took place in the context of a drop of median incomes, quite substantial in some countries. When median incomes are anchored at their 2008 level, the *AROP rate* rises from 16.6% to 19.4%. The dispersion in the anchored measure rises also when the countries with the lowest and the highest rates are excluded from the sample.

There are signs that the trend continued in 2018, with less than 85 million people being at risk of poverty by the end of the year. Yet, the dispersion of the at-risk-of-poverty (AROP, thereafter) rate with median income anchored at the 2008 level increased considerably (Graph I.3.1). ([48]) In several Member States, a sizeable portion of the population remains at risk of poverty and social exclusion.

Graph I.3.1: **Dispersion of measures of monetary and material poverty (coefficient of variation)**



(1) The coefficient of variation is defined as the ratio of the standard deviation to the mean.
Source: Own calculations based on Eurostat.

These differences across countries reflect developments in household disposable incomes. The number of people at risk of poverty or social exclusion had increased during the 2008 crisis, declining only when the economic recovery was broad and stable and improvements in the jobless rate and disposable incomes became persistent. Yet, disposable income did not increase equally for all families in all countries, despite the economic recovery being broad-based and stable. In particular, the median AROP gap – i.e. the distance between median income of the poor and the at-risk-of-poverty threshold – continued to rise until 2016, in particular in Southern European countries. ([49]) Moreover, the dispersion across countries around this higher average was larger compared to the pre-crisis period.

Certain features of the labour market and emerging trends made poverty particularly reactive to the increase in unemployment. The increase in poverty was mainly driven by cyclical factors. It was exacerbated by characteristics of the labour market (e.g. the divide between temporary and permanent contracts) or emerging trends (e.g. labour market polarisation, new forms of work) that exposed the most vulnerable workers more strongly to poverty risks.

Policies to tackle the increase in poverty and social exclusion may not have been equally effective for all countries. The crisis also highlighted that not all countries were prepared to cope with the consequences of a prolonged and deep recession for households' incomes (Figari et al., 2011; OECD, 2014). It became more challenging for social policies to provide support to those living in households without income from work. In response to this, the focus shifted from reforms aiming at improving labour market adjustment to reforms enhancing social safety nets and adapting social policy settings to smoothly respond to change (European Commission, 2016). The European Pillar of Social Rights – proclaimed by EU leaders in Gothenburg in November 2017 – was adopted to support upward convergence in Europe and address the social implications of the crisis, by reinforcing social rights and responding to economic and social insecurity.

Against this background this chapter focuses on the role of social spending to alleviate poverty and exclusion. Social protection systems smooth and redistribute incomes over the life cycle. They protect individuals against the financial implications of major risks, such as job loss and social exclusion, old age or poor health. Social protection systems may support incomes during a recession. By raising the quality of human capital, social policies can also foster economic growth (Barr, 2012). ([50]) That is why social protection systems, together with education policies, are important determinants of an economy's resilience: they cushion economic shocks in the short-term and foster inclusive growth in the long-term by investing in people. Spending on social protection, although not uniquely a guarantee that programmes will meet their objectives, represents

([48]) Excluding catching up countries does not alter the picture, but the increase in the dispersion of severe material deprivation starts earlier (in 2010). The EU AROP rate increased from 2009 to 2014 and started to fall thereafter.
([49]) The poverty gap is a measure of the depth of poverty. In 2017, the median income of the poor was about one fourth lower than the threshold; it was one fifth before the crisis.
([50]) The insurance principle suggests that both too little and too much risks are harmful for growth. Social protection and welfare policies ensure that risks are shared efficiently (Barr, 2012).

a metric by which it is possible to assess Member States' commitments to coping with social risks, including for vulnerable groups. Obviously, spending is not the only tool at the disposal of authorities to alleviate such risks. The design of the tax and benefit systems may have an impact on disposable income and therefore on poverty and exclusion. More broadly, poverty and social exclusion are a multidimensional problem calling for a comprehensive strategy. It requires enabling policies – such as education and training, early childhood intervention, stable home environments, and access to health care – to ensure access to more and better jobs. These latter aspects, although important, will not be discussed in this chapter.

Section 3.2 sets the scene by describing trends in social spending by type of expenditure and across countries. Subsequently, it looks at the response of social spending to GDP and the ability of different spending categories to smooth output shocks. Section 3.3 reviews the main policy changes enacted after the crisis. The effectiveness of social transfers in relieving poverty may differ across categories of spending, as they cover very different risks and benefits can be awarded subject to different eligibility conditions. How effective social transfers are in reducing poverty is a question investigated in Section 3.4 by comparing measures of poverty before and after policy intervention. The effectiveness of social transfers in reducing poverty documented in Section 4 may reflect both differences in labour market conditions and changes in policy settings. Section 3.5 disentangles these two effects with the help of statistical methods that exploit the cross-country dimension of the data. Section 3.6 identifies, with the help of microsimulation models, whether the reforms of tax and benefit systems enacted after the crisis are more effective in delivering social outcomes, compared to the pre-crisis setting. Section 3.7 and Section 3.8 dig deeper into the role of spending on social protection, and in particular to what extent different categories of spending contribute to reducing monetary poverty and severe material deprivation.

3.2. TRENDS IN SOCIAL EXPENDITURE BY EXPENDITURE CATEGORIES

Social spending varies in response to the cycle, long-term trends and policy changes. It should be noted that only some schemes provide greater assistance during a recession. Higher spending is expected for programmes where eligibility depends on the employment or income status, e.g. unemployment benefits or family benefits. ([51]) Conversely, to the extent that the cycle does not significantly impact health conditions and retirement decisions, health, disability or retirement benefits are presumably less responsive to the cycle. Likewise, housing programmes may not entail an automatic increase in spending during a recession, if caseloads are constrained by limited financial resources. ([52]) Nonetheless, programmes with a-cyclical spending – i.e. with spending moving independently of the overall state of the economy – can still be income stabilising, if they protect those workers who are more likely to be the beneficiaries of a specific spending item during a recession. ([53]) Long-term trends (e.g. ageing or the expansion of welfare programmes) have also a direct bearing on social spending. Moreover, reforms that improve labour market functioning (e.g. reduce unemployment, accidents at work) indirectly affect the spending-to-GDP ratio. Finally, reforms phased in only gradually modify spending not only in the year in which the change occurred, but also in subsequent years.

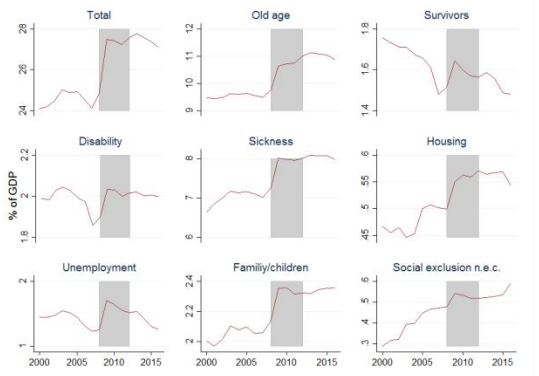
This section first describes the main spending patterns of social protection over time and across countries. ([54]) Subsequently, it identifies whether their cyclical response and ability to smooth GDP shocks changed after the 2008 crisis.

([51]) As for family benefits, this is the case to the extent that their eligibility is based on income or employment status.
([52]) Although in almost all countries access to social housing is subject to means-testing, most of them have also some queuing system; see Andrews et al. (2011).
([53]) See for example Fatas (2019). A-cyclical means moving independently of the overall state of an economy.
([54]) In the European System of integrated Social Protection Statistics (ESPROSS), social protection includes public or private interventions intended to relieve households and individuals of the burden of a set of risks or needs. These are: old age, survivors, disability, sickness/health care, housing, unemployment, family/children, social exclusion not elsewhere classified (n.e.c.). Benefits included are cash payments, reimbursements of expenditure or goods and services directly provided.

3.2.1. Analysis of trends and patterns

Total social protection expenditure as a percentage of GDP increased after the 2008 crisis. During a recession the spending-to-GDP ratio rises as governments increase their efforts to protect the most vulnerable and/or because GDP declines. At the outbreak of the 2008-2009 recession, governments put in place large stimulus packages that included resources for social measures (European Commission, 2009; OECD, 2013). As a result, total social protection expenditure as a percentage of GDP increased from 24% in 2008 to 27.5% in 2010 (Graph I.3.2). It hovered at this level throughout 2016, mirroring the pattern of spending after the economic shocks of the early 1980s and 1990s. ([55])

Graph I.3.2: **Social Protection expenditure, 2000-2016 (as % of GDP)**



(1) Shaded area represents the 2008-2012 period. For definition of the variables see Manual.
Source: ESSPROS and National Accounts.

Most categories of social expenditure shared this pattern. Transfers paid typically to working-age individuals (unemployment, housing, family and social exclusion benefits) account for one sixth of total social protection expenditure. Yet, consistent with the weakening of the cycle, they accounted for about one third of the increase in total spending between 2008 and 2010. Old age is the largest expenditure category, accounting for 40% of spending. Relative to GDP, old age spending increased after 2008 and remained at a high level throughout the recovery. This increase embodies the compound effect of the recession on GDP, of the increase in spending due to ageing and, in particular, of the indexation of pension benefits to prices. ([56]) A similar pattern is observed for sickness – the second highest expenditure item – and for family and housing benefits. ([57]) Although the increase in spending on family and housing reflects the higher cash transfers in countries where benefits are income-tested, the fact that after 2013 it did not decline as a percentage of GDP may also be the outcome of reforms that have extended the support to vulnerable groups. Finally, reforms tightening access to disability may have stabilised the respective spending-to-GDP ratio after its drop during the pre-crisis period.

During the crisis, spending on unemployment as a percentage of GDP fell before the unemployment rate started to decline. After the initial increase in 2008-2009, spending on unemployment benefits relative to GDP started falling well before the decline of unemployment (Graph I.3.2). With the lengthening of unemployment spells, a larger number of individuals exhausted their entitlements while existing social assistance schemes provided only limited coverage. ([58]) Other factors that may have contributed to driving down the coverage of unemployment benefits include the shortening of job tenures due to the rise of temporary employment during the recovery and the strengthening of activation measures to boost participation of individuals with limited work experience (OECD, 2018). Yet after the crisis, as documented in the next section, several countries took measures aimed at extending the coverage of unemployment insurance and/or introduced more

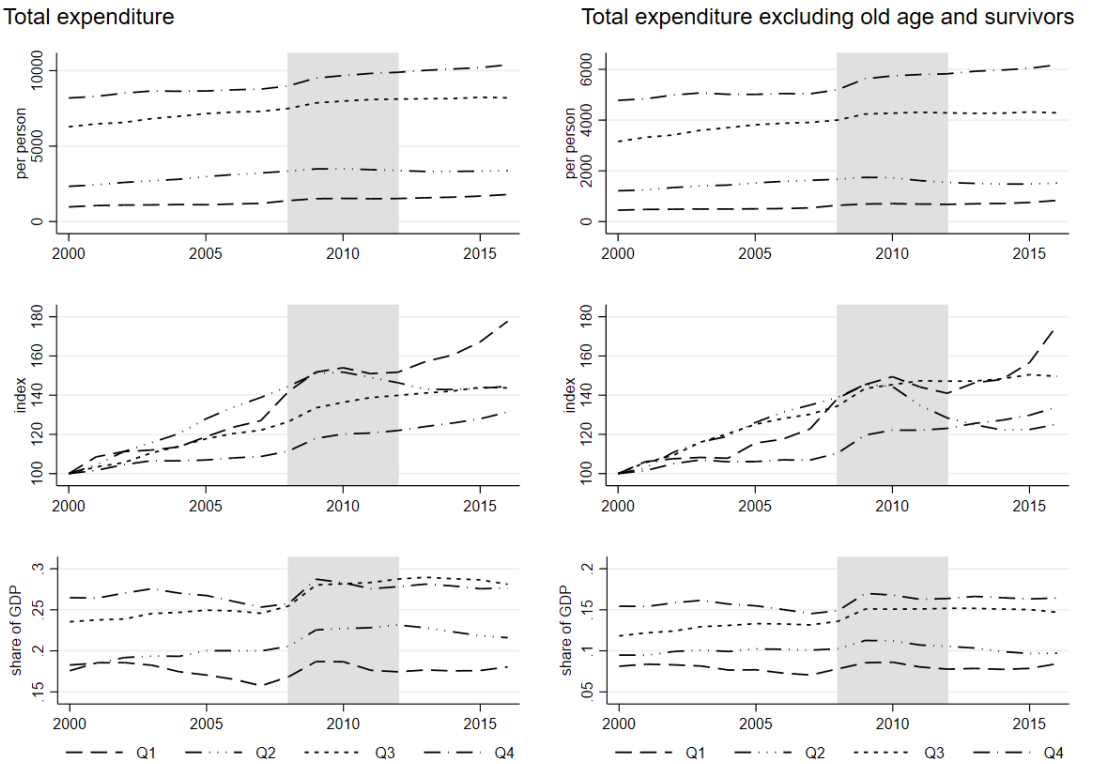
([55]) However, during the recession that hit the EU economy in 2012, "social protection went on an adjusting downward path despite a worsening output gap" ESDE 2015 Cap III.2. OECD (2012); Adema et al (2014).

([56]) Between 1998 and 2008, the old age dependency ratio increased by 3.5 pps; between 2008 and 2018, it rose by 4.8 pps to 31.7%. Although reforms reduced incentives for early retirement, this option was used where recessionary pressures forced job cuts on employers (Eurofound. 2013). For an analysis of indexation see ESDE (2015).

([57]) Sick and old age expenditure absorbs a larger amount of resources because benefits are partly insurance-based and accrue also to middle- and higher-income individuals rather than just to those with low incomes.

([58]) The EU unemployment rate peaked in 2013; the long-term unemployment rate continued to increase until 2015. For the 2007-2014 period, unemployment rose more strongly than benefit recipients (OECD, 2018).

Graph I.3.3: **Social expenditure by quartile of GDP per capita**



(1) Member States are clustered in four quartiles based on their average income per capita over the period 1996-2016, in PPS. Bulgaria and Croatia are excluded due to lack of data. See Annex 1.
Source: Own calculations based on ESSPROS.

comprehensive unemployment and social assistance systems. ([59])

Countries with higher GDP per capita spend more on social protection than countries with low GDP per capita. ([60]) Graph I.3.3 shows the evolution of total expenditure clustering countries on the basis of their GDP per capita. ([61]) Real spending per capita is positively correlated with the level of GDP per capita. ([62]) At the end of 2016, per capita spending in high-income countries was more than five times higher than in low-income countries (EUR 10000 vs. about EUR 1800). ([63]) Between 2008 and 2009, the spending-to-GDP ratio increased for all clusters. ([64])

There is convergence in real per capita spending between the richest and the poorest

([59]) Unemployment insurance benefits are intended to smooth income by replacing a portion of an eligible worker's lost wages attributable to unemployment. Unemployment assistance benefits are intended to reduce poverty spells among low-income families when unemployment occurs. While both make payments occasioned by unemployment, the former goes to persons as a matter of right while the latter is paid only to families with unemployed whose income and assets fall below certain thresholds.

([60]) The *Wagner law* predicts that the demand of social protection rises in richer societies. Wealthier countries spend more on social protection either because the demand for social services rises with income or because richer countries are more open economies and subject to external shocks, which rises the demand for social protection.

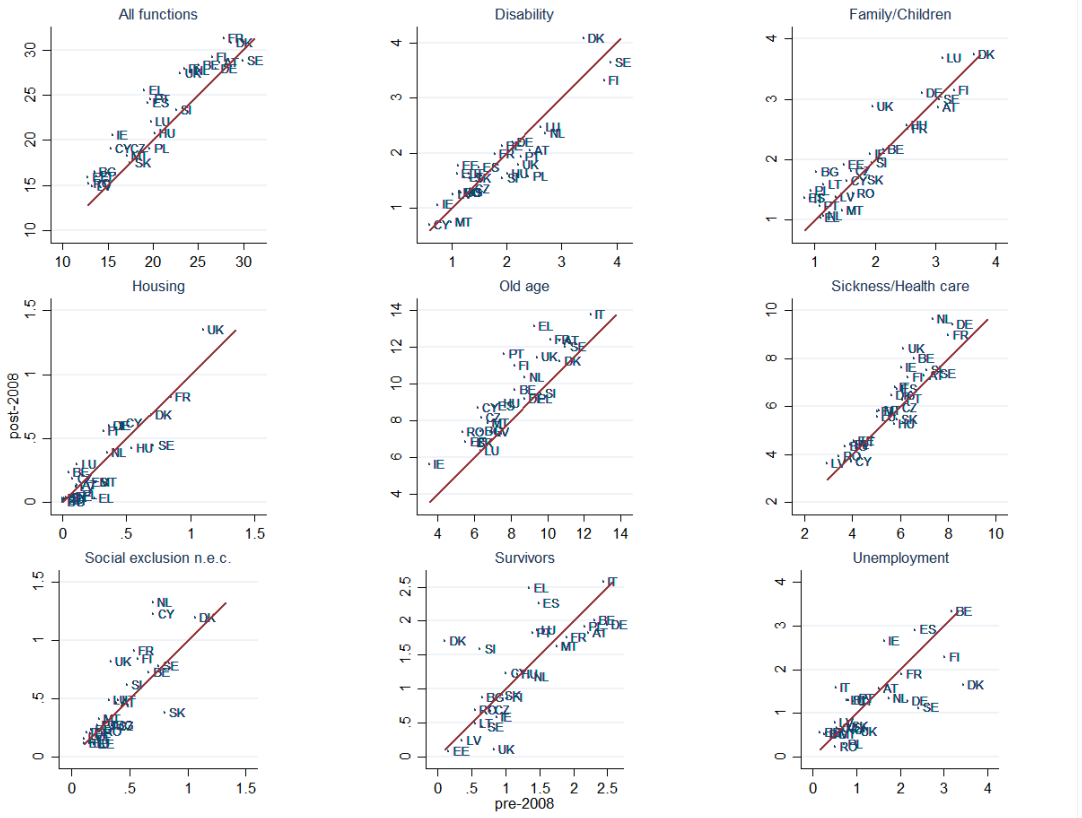
([61]) The composition of each cluster is fairly stable over time. Annex 1 reports selected socio-economic characteristics of each cluster.

([62]) Similar results are found for the US (Isaacs, 2004). This pattern does not change if spending on old age and survivors are excluded.

([63]) This gap is slightly reduced if old-age and survivor expenditures are excluded.

([64]) Human capital and effective institutions, two key determinants of total factor productivity growth, are positively associated with GDP per capita and social protection expenditure (European Commission, 2019c, *Employment and Social Developments in Europe*).

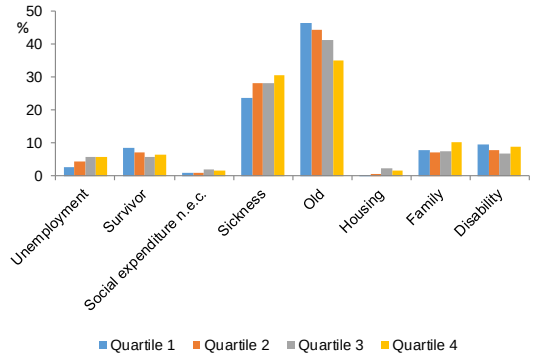
Graph I.3.4: **Share of social expenditure category on GDP before and after 2008 in percent**



(1) Horizontal axis pre-crisis average; vertical axis post-crisis average.
Source: Eurostat and DG EMPL calculations.

EU countries. Real social expenditure increased in all countries, but more in the low-income group (Graph I.3.3), where it went from EUR 975 in 2000 to almost EUR 1800 per capita in 2016 – an increase of more than 80 percent. ([65]) After 2008, the rate of convergence slowed down as spending per capita kept rising in rather high-income countries ([66]) while it dropped or grew at a slower pace respectively in the low- and middle-income countries (i.e. those belonging to the second and third quartiles). Nonetheless, in the less wealthy countries (see Graph quartile 1) the spending ratio increased rapidly, due to the dynamism of expenditure on old age, sickness and family benefits.

Graph I.3.5: **Composition of social protection spending by quartile of GDP per capita**



(1) Percentage of total social expenditure. Countries are clustered in four quartiles based on their average income per capita over the period 1996-2016, in PPS. See Annex 1.
Source: Own calculation based on ESSPROS and Eurostat.

The composition of social spending varies with the level of GDP per capita. When total expenditures are disaggregated into specific categories, it turns out that richest Member States allocate a relatively lower proportion of the total

([65]) Data suggests that most of this increase is due to old age, sickness and, to a lesser extent, family spending; conversely, the drop of the spending ratio in the second quartile is mostly attributed to sickness spending.
([66]) Real spending also increased in the US (Moffitt, 2012).

social expenditure to old age than poorer ones and a higher proportion on sickness, family and unemployment benefits (Graph I.3.5). This is consistent with the view that the optimal composition of total spending shifts toward health as income grows (Hall and Jones, 2007) or that more open economies tend to be richer and demand more protection against risks than poorer and more closed ones (Rodrick, 1998). ([67]) Differences are small for the other spending categories. This remains valid also after 2008.

Aggregate figures mask considerable differences across countries. In 2016, aggregate spending varied from less than 15% of GDP in Romania to more than 30% in France (Graph I.3.4). Compared to the pre-crisis period, all countries experienced an increase in the spending-to-GDP ratio, in particular Greece (6.4 pps), Ireland (5 pps), Portugal (4.8 pps), Spain (4.7 pps) and Italy (4.4pps). ([68]) It declined only in Sweden, from a ratio above the average. While resources allocated to *old age* increased in all countries after 2008, those for *survivors* and *disability* dropped in almost all (Graph I.3.4). ([69]) For *sickness*, the spending-to-GDP ratio grew everywhere – except Hungary, Cyprus and Slovakia – in particular in countries with a high share before the crisis. More heterogeneity across countries is observed for *housing*. In a first group, where spending is extremely low, it rose in Belgium and Luxembourg and fell in Poland, Malta and Greece. ([70]) In a second group with intermediate spending, it increased in Finland, Germany, Ireland and Cyprus and decreased in Hungary and Sweden. In general, spending on *family and children* increased in countries that allocated relatively few resources to this category before 2008. ([71]) The *unemployment* expenditure to GDP ratio increased in few countries, including Italy - as an effect of the 2015 reform of the unemployment benefit system - and in Ireland and Spain, where the high jobless rate may have contributed to higher spending after 2008. Finally, for *social exclusion*, spending increased mainly in Member States that traditionally put more resources in this type of spending category.

([67]) See also footnote 15.
([68]) In countries hit hard by the 2008 crisis, the increase in the spending ratio reflects both a more moderate or a drop of social expenditure and a stronger decline of GDP.
([69]) Exceptions are Denmark, where both items increased, and Slovenia, Greece, Spain, Portugal and Luxembourg, where only spending on survivors grew. However, there is a break in spending for Denmark in 2007 and for Greece in 2000.
([70]) There is a break in the data in 2000 and 2015 for Greece and Hungary.
([71]) However, spending as a percentage of GDP fell in Malta and Romania. It also increased in Luxembourg and the UK, where it absorbed a higher share already before the 2008 crisis.

3.2.2. The cyclicality of social expenditure

Prima-facie evidence suggests that after 2008 social expenditures move counter-cyclically. Table I.3.1 shows the correlation between the growth of different spending items and business cycle indicators. Over the period 1990-2016, changes in aggregate social spending are uncorrelated with changes in unemployment and GDP growth, i.e. social spending is a-cyclical. This is also valid for all spending categories except sickness and unemployment. Spending on unemployment is anti-cyclical, i.e. it rises during downturns and falls during upturns, and therefore it contributes to stabilising income. The relation with the cycle has become stronger after 2008. This is mainly due to spending on old age, social exclusion and unemployment; spending on disability becomes countercyclical after 2008.

Table I.3.1: **Correlation of growth of social protection spending with GDP growth and unemployment**

	GDP growth			Unemployment rate changes		
Expenditure growth for	Full sample	before 2008	after 2008	Full sample	before 2008	after 2008
All functions	-0.01	0.17	-0.11	0.02	-0.09	0.13
Disability	0.05	0.09	-0.07	-0.10	-0.10	0.10
Family/ Children	0.05	0.17	-0.04	-0.04	-0.07	0.01
Housing	0.00	-0.04	0.08	0.02	0.09	-0.09
Old age	0.05	0.16	-0.14	0.09	-0.09	0.20
Sickness/Health care	0.23	0.27	0.23	-0.25	-0.25	-0.28
Social exclusion n.e.c.	-0.03	-0.04	-0.13	0.09	0.07	0.17
Survivors	0.04	-0.01	-0.07	-0.05	-0.02	0.04
Unemployment	-0.48	-0.14	-0.57	0.57	0.24	0.55

(1) Median correlation between the growth of different categories of expenditure and GDP growth/ unemployment rate change. A positive (negative) correlation with unemployment rate changes (GDP growth) means that spending rises (falls) during downturns (upturns). The median is not affected by extremely high or extremely low values. Results are unchanged for the mean correlation.
Source: Eurostat and DG EMPL calculations.

Spending trends vary significantly across different categories. The growth of each spending item reflects factors that are either country-specific or common to all countries. Among the latter are demographic trends or common policy responses, e.g. the expansionary measures put in place in the aftermath of the 2008 recession or the fiscal

tightening of the early 2010s. In contrast, factors such as preferences toward redistribution are country-specific and vary less over time. Econometric models allow disentangling the effect of the business cycle from trends in expenditure, while controlling for factors that account for differences across countries in the growth of spending. ([72]) Graph I.3.6 reports the growth of real spending for each category after netting out the effect of the cycle and controlling for country specific components of expenditure growth. ([73]) Hence, it shows the variation over time of the component of social spending common to all EU countries. A number of stylised facts can be identified:

- Between the second half of the 1990s and the first half of the 2000s, *social expenditure* grew at about 2% per year (i.e. close to the average of GDP growth over the period). When the crisis hit, expenditure reacted in an anti-cyclical fashion: total social spending expanded at a rate higher than that of GDP, therefore exercising a stabilising effect on the economy. However, in 2012, social expenditure growth dropped significantly. ([74])

- As GDP growth resumed in 2013, the growth of social expenditure picked up again although at a lower rate. A similar pattern is detected for spending on *family* and *children*, although it grew on average less than GDP over the whole period. From 2008, the increase in expenditure growth also reflects the reform intensity in this policy area (see next section).

- In line with the increase in life expectancy, spending on *old age* increased throughout the period. The growth of spending is above that of GDP, except for the last three years. From the early 2000s onwards, the intensity of pension reforms in the EU was particularly strong and further accelerated during the 2008-2009 crisis (Carone et al., 2016). These changes influenced the growth rate of old age spending, which, relative to GDP, first stabilised in 2009 before falling from 2013 onwards. ([75])

- The declining trend in *disability* spending is linked to reforms implemented in several Member States to reduce incentives for employers to move workers to disability schemes (e.g. Denmark, Estonia, Sweden), to increase gate keeping (Austria, Italy, Germany, Finland and the Netherlands) and enhance prevention and health care, including through occupational health-and-safety at work (Austria and Germany). ([76])

- Over the period 1992-2011, spending on *unemployment* increased in line with the expansion of the coverage of unemployment benefits. With the lengthening of unemployment spells after the 2008 crisis, many jobless people lost access to benefits, which led to a decline of spending in real terms, including during the 2012 recession. As documented in chapter 1, the job destruction rate started to fall in the first half of 2011, while the job finding rate remained low until the second half of 2013. Thus, the non-cyclical component of spending on unemployment continued to fall until the share of long-term unemployed started to decline at the end of 2014. It is only in 2015 that the fall of this spending component came to a halt. This reflected both the drop of long-term unemployment and the effect of reforms broadening the scope and coverage of unemployment benefits and social assistance. ([77])

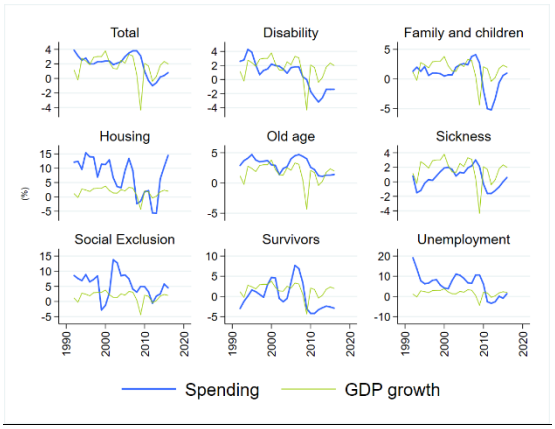
- In response to the expansion of means-tested programmes, spending on s*ocial exclusion* rose continuously. The crisis-related measures taken between 2011 and 2013 were accompanied by a flattening of the growth rate of spending in real terms, which nonetheless continued to be

([72]) This is done by estimating the effect of GDP growth on the growth of different spending items, controlling for country and year fixed-effects.
([73]) The graph shows for each spending type, the year fixed effects of the panel regression in Table I.3.2.
([74]) See ESDE 2015 Chapter III.2.
([75]) Pension reforms typically preserve acquired rights of current pensioners and are implemented only gradually over time. This implies that their effects on spending is only gradual. Yet some policy changes, e.g. in the statutory retirement age, may have a more immediate impact on aggregate old age spending.
([76]) Boheim and Leoni (2015).
([77]) Non-contributory and means-tested public schemes providing minimum entitlements in the case of unemployment are included in ESSPROS in social spending in the unemployment functions.

higher than that of GDP. Thus, the increased spending on social exclusion after 2008 represents a shift towards measures aimed at alleviating poverty in a period of lengthening unemployment spells.

- As in the case of unemployment, the component of spending on *housing* adjusted for the cycle increased from 1992 to 2008. The spending-to-GDP ratio stabilised until 2012 and, after a temporary decline in 2013, kept growing again in the subsequent years.

Graph I.3.6: **Growth of social expenditure categories and GDP growth**



(1) The graph shows year fixed effects from regression in table 3.2. GDP is the EU aggregate.
Source: Own calculations based on regression in Table 3.2.

The cyclical response of the different spending categories varies over time. For the total and for specific categories, table I.3.2 investigates the cyclical response of expenditure, while controlling for underlying trends. Over the period 1991-2016, total expenditure is a-cyclical (i.e. doesn't follow the economic cycle). Spending on sickness is highly pro-cyclical, with a stronger response to GDP growth before the 2008 crisis; yet, its effect is statistically insignificant after 2008. Unemployment is the only category of spending which is counter-cyclical and features a higher response to GDP growth after the 2008 crisis. A decline of GDP growth by 1% is on average associated with an increase in spending on unemployment by 1.6% before the crisis and by almost double that amount after 2008.

3.2.3. The capacity of social spending to smooth GDP shocks: regression analysis

The extent to which GDP shocks are smoothed by social protection spending increased after the 2008 crisis. Output shocks do not necessarily translate into income shocks. Part of output shocks can be smoothed via financial markets or through government expenditure. For example, banks in one country may lend to borrowers in other countries and the flow of interest stabilises income in the lending country. Similarly, individuals save when working and dis-save when unemployed or retired. When consumption smoothing is not achieved via national or international *risk sharing* mechanisms, fiscal policy can intervene. Social protection spending is an important component of total public expenditure, accounting for about 40% of total public expenditure for the EU as a whole. Following a standard approach in the risk sharing literature (Asdrubali et al., 1996; Arreaza et al., 1998; Furceri, 2010; Darby and Melitz, 2008), the fraction of the output shock that is smoothed via social spending is measured by the fraction of the cross-sectional variance of GDP absorbed by government transfers. ([78]) In other words, the smoothing capacity of government expenditure is a measure of how much it attenuates the volatility of consumption and disposable income around average consumption growth in response to shocks to GDP growth relative to the average. Table I.3.3 reports the extent to which net disposable income is being smoothed via total social spending and specific social spending types over three different periods. In comparison, it also reports the extent of smoothing ensured by the overall government spending. ([79])

([78]) Formally, this is obtained by looking at the effect of GDP growth on the difference between growth of disposable income and the growth of disposable income inclusive of the government's transfers. Government transfers absorb GDP shocks, if the cross-section correlation between the disposable income inclusive of the transfers and GDP is lower than the correlation between the disposable income and GDP. In this case, the coefficient of a panel regression of the growth rate of disposable income minus the growth rate of the sum of disposable income and each categories of spending in the table on GDP growth should be positive (see Arreaza et al., 1998).

([79]) Results are shown using country-fixed effects and both time and country-fixed effects. In the specification with country and time-fixed effects, the latter are barely significant. For this reason, the preferred specification is without time-fixed effects.

Table I.3.2: **Responsiveness of the growth of social spending to changes in GDP growth**

Explanatory variables	Total expenditure	Disability	Family	Housing	Old age	Sickness	Social Exclusion s.o.e.	Survivors	Unemployment
					Whole sample: 1991-2016				
GDP growth	-0.019	-0.17	0.08	-1.44	-0.11	0.52**	-0.50	-0.37	-1.9***
	[0.19]	[0.24]	[0.26]	[1.47]	[0.22]	[0.21]	[0.52]	[0.67]	[0.61]
Observations	559	559	559	559	559	559	559	559	559
R-squared	0.19	0.21	0.16	0.086	0.147	0.2	0.06	0.06	0.37
					1991-2007				
GDP growth	0.2	-0.19	0.69	-5.04	0.28	0.74**	0.34	-1.64	-1.61*
	[0.32]	[0.34]	[0.51]	[5.01]	[0.35]	[0.35]	[1.69]	[2.24]	[0.81]
Observations	308	308	308	275	308	308	308	308	308
R-squared	0.442	0.361	0.267	0.120	0.391	0.415	0.072	0.086	0.248
					2008-2016				
GDP growth	-0.23	-0.23	-0.4	-0.16	-0.31	0.33	-0.59	-0.08	-2.8***
	[0.19]	[0.23]	[0.30]	[1.26]	[0.21]	[0.24]	[0.57]	[0.21]	[0.88]
Observations	251	251	251	250	251	251	251	251	251
R-squared	0.35	0.35	0.3	0.13	0.4	0.25	0.17	0.17	0.53

Estimation method: Panel regression including country and year-fixed effects. Robust standard errors in brackets. * Statistically significant at 10% level ** Statistically significant at 5% level *** Statistically significant at 10% level. Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1.
Source: European Commission.

Social protection spending contributes to stabilising disposable income. For the overall period 1995-2016, government spending smoothens about 9.4% of GDP shocks, which is in line with previous results of the literature (e.g. Furceri, 2010). After 2008, the proportion of GDP shocks absorbed by government spending increased to 18.7%. Turning to the role of social expenditure, the amount of smoothing provided by total social spending (6.5%) is slightly below the proportion of GDP shock that is smoothed by total government spending – i.e. government spending in social areas stabilises GDP shocks less than other items of total government expenditure. This implies that other public spending categories contribute to stabilise income, which is the opposite of what is found by Furceri (2010) for the period 1980-2003. ([80]) As concerns sub-categories of social spending, old age spending represents the category that accounts for the largest degree of smoothing in all periods. Among the other components, expenditure on unemployment benefits and sickness contribute the most to stabilising disposable incomes. Relative to the pre-crisis period, after 2008 all social spending items stabilise income more. The strongest increase in the amount of insurance from income shocks comes from spending on old age, family and unemployment benefits.

The ability of social spending items to insure against GDP shocks varies with the level of per capita income. Graph I.3.7 shows the stabilisation effect of social spending for different categories of spending clustering countries according to their per capita income. The chart reveals a number of findings. First, the richest Member States stabilise income shocks more, which is consistent with the findings of the literature. ([81]) This may surprise as one would expect wealthier countries to have other effective risk sharing mechanisms (e.g. credit markets), in addition to those provided by government spending. However, wealthier Member States have also larger welfare spending and possibly more effective policies, which allow them to rely more on social spending when needed. ([82]) Second, in all quartiles, the largest amount of stabilisation is provided by old age spending (slightly more in richer countries). Third, as compared to low income Member States, spending on unemployment benefits and sickness and disability provide a larger smoothing effect in high income countries.

([80]) Furceri (2010) finds for the period 1983-2003 that some items of government spending provide dis-smoothing and relate this to the higher cyclicality of unemployment benefits and the dis-smoothing of public investments. This study covers the pre-crisis period and therefore doesn't take into account the effect of the large and coordinated fiscal stimulus undertaken by the EU in 2009 (see European Commission, 2009, Public Finances in EMU, European Economy 5), nor the focus on unlocking investment of the Juncker plan for investments; See European Commission Investment plan results.

([81]) Furceri and Jalles (2015) show that fiscal stabilisation is positively associated with the level of economic development, financial deepening, trade openness, government size as well as political factors.

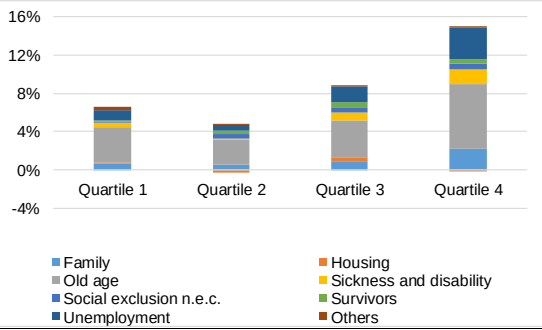
([82]) The correlation between social expenditure and GDP per capita is 0.29 (the max is 1); if Ireland and Luxembourg are excluded from the sample, the correlation reaches 0.78. The rank correlation is 0.7 and 0.8, if these countries are excluded from the sample.

Table I.3.3: **Smoothing capacity of social spending components**

	1995-2016		1996-2007		2008-2016	
	OLS	Country&time fixed effects	OLS	Country&Time fixed effects	OLS	Country&time fixed effects
Total Government Spending	0.094 ***	0.043	0.043	0.028	0.19***	0.09***
Total Social Protection Spending	0.065 ***	0.031***	0.029***	0.018***	0.12***	0.06***
Family	0.009 ***	0.005**	0.003	0.004	0.02***	0.011**
Housing	0.000	0.000	0.00	0.00	0.001	0.001
Old age	0.040 ***	0.021***	0.014**	0.012**	0.06***	0.034***
R&D Social Protection	0.000	0.000	0.000	0.000	0.000	0.000
Sickness and disability	0.006*	0.003	-0.004	0.00	0.015***	0.010**
Social Exclusion n.e.c	0.002**	-0.001	0.001	0.00	0.005***	0.000
Social Protection n.e.c.	0.002	0.000	0.004	0.004*	0.003*	-0.002
Survivors	0.004***	0.002**	0.001	0.002**	0.006***	0.002**
Unemployment	0.014***	0.006**	0.005**	0.002	0.026***	0.013**

(1) The table shows the coefficient of the panel regression: $\Delta\log(DNIi)$- $\Delta\log(DNIi+government\ spending)$ on the growth rate of GDP , where $\Delta\log(DNIi)$ is the growth rate of net disposable income of country i (see Arreaza, 1998 and Furceri, 2010). Cofog manual provides a detailed description of the different categories.
Source: Own calculations, based on COFOG and National accounts.

Graph I.3.7: **Stabilisation effect of social spending by categories and quartile of GDP per capita**



(1) The table shows the coefficient of the panel regression estimated for each quartile: $\Delta\log(DNIi)$- $\Delta\log(DNIi+x)$ on the growth rate of GDP , where $\Delta\log(DNIi)$ is the growth rate of net disposable income of country i and x is one of the spending items. The stabilisation effect is estimated for the group of countries that belong to the different quartiles; see Annex I. Sample period 1995-2016.
Source: Own calculations based on COFOG and National accounts.

3.3. POLICY TRENDS

Social protection systems offer benefits to individuals or families in order to protect them from major life-cycle risks. These benefits can be provided in cash, to replace or supplement income from labour, or in kind through the provision of services, such as job search assistance, childcare or training.

As highlighted in previous editions ([83]), several countries have implemented reforms in their social protection systems since the start of the 2008 crisis. In the immediate aftermath of the crisis, many countries increased the generosity of unemployment and other welfare-related benefits to protect the incomes of those newly unemployed and of vulnerable groups. Starting from 2010, the reform activity in the area of social protection became less intense; significant reforms were implemented to improve the adjustment capacity of the labour market (mainly in 2011 and 2012). Reforms aimed at reinforcing welfare systems – also in countries which were hit less hard by the crisis – were implemented from 2013/2014 onwards.

This section reviews the main social benefit reforms enacted after the 2008 crisis, making use of the LABREF database. ([84]) The focus is on the design of cash support in the following areas: social assistance and housing benefits, child and family benefits and unemployment benefits. ([85]) These areas have been selected for their potential in mitigating the effect of economic shocks on poverty.

3.3.1. Social assistance and housing benefits

All European countries have some type of social assistance. These schemes are aimed at helping individuals and households to obtain an adequate standard of living and alleviate the impact of poverty and social exclusion. Generally, they are

([83]) European Commission, 2017a and 2018b.

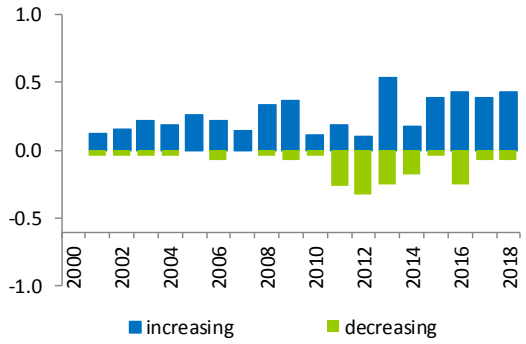
([84]) The LABREF database is an inventory of labour market measures adopted in the EU Member States since 2000. It is maintained by the European Commission and is available online at the link LABREF. The number of reforms is informative only of the policy stance.

([85]) The 2018 LMWD Report looked at reforms in the area of unemployment benefits. This section focuses on the poverty-reducing effects of unemployment benefits.

means-tested and non-contributory. There are large differences between Member States in the level of support provided by these schemes as well as other features of their design, such as their coverage and the conditionality rules attached to receiving the benefits. Most social assistance benefits are complemented by other means-tested benefits, such as rent and housing benefits and child or family allowances.

Reform intensity in the area of social assistance and housing benefits has been relatively high since the start of the crisis. The average number of annual measures increased during the first years of the crisis (2008-2009), as illustrated by graph I.3.8. Most of the reforms increased the generosity or coverage of benefits to cushion the impact of the crisis. After a drop in 2010, the average number of annual measures increased again in 2011 and 2012. Yet, most of the reforms made systems less generous, reflecting fiscal constraints, notably in vulnerable countries and in countries under financial assistance programmes. As of 2013, renewed reform efforts to improve the generosity and coverage of social assistance benefits are visible and reform intensity remains relatively high compared to the post-crisis period. These developments are also visible in the spending patterns discussed in the previous section. The increase in spending on social exclusion was mainly driven by the rise of income support measures, which at the end of 2016 accounted for about 56% of total spending in the social exclusion category compared to about 50% in 2008. ([86])

Graph I.3.8: **Social assistance and housing: average number of reform measures per country per year by direction of reform measures, EU28**



(1) Information for Croatia starts in 2012. Reform measures are classified as "increasing" ("decreasing") if they lead to an increase (decrease) of the generosity and/or coverage of benefits.
Source: European Commission, LABREF database.

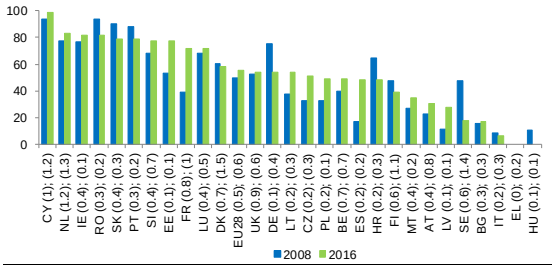
Since 2008, several Member States have implemented substantial reforms of their social assistance systems. New minimum income schemes have been introduced in Austria (2009), the United Kingdom (2012) Croatia (2013), Cyprus (2014), Greece (2016), Romania (2016), Luxembourg (2018) and Italy (2015, 2017 and 2018). The introduction of new schemes was also an opportunity to improve their delivery. Indeed, the new schemes were often merging several previous benefits into one scheme and in most cases aimed at combining poverty alleviation (through means-tested income support) with the provision of social services to support social inclusion and labour market integration. The responsibility for social assistance benefits has been decentralised to municipalities in both Lithuania (2012-2015) and the Netherlands (2013), with the aim to increase the effectiveness and efficiency. Similarly, Hungary created a new municipality benefit in 2014, for which municipalities were put in charge of the generosity and eligibility criteria.

Many Member States have increased the generosity of social assistance benefits by raising levels or extending their coverage. The level of social benefits was raised (sometimes temporarily) in several countries. For example, Cyprus increased the basic allowance of welfare recipients by 12% in 2009; the minimum income level in Slovenia was raised by over 25% in

([86]) As part of the implementation of the European Pillar of Social Rights, the European Commission adopted a proposal for a council recommendation on access to social protection. See Box "Access to Social protection".

2010. ([87]) A number of countries have provided one-off transfers targeted particularly at the poorest or most vulnerable groups (e.g. Italy in 2008, Greece and Slovenia in 2009, Bulgaria in 2013, Malta in 2014). Moreover, to improve coverage and incentives to work, several countries have raised the income threshold to be eligible for social assistance or excluded certain types of income, assets or other benefits from the means test (e.g. Sweden in 2012, Latvia in 2014, Malta in 2016, Slovenia in 2016, Finland in 2011 and 2013 and Latvia in 2017). In addition, in a number of countries, eligibility criteria were widened to support specific categories of people, such as part-time workers (Spain in 2013), young people (France in 2009), single parents (Malta in 2014) or the self-employed (the Netherlands in 2015). As shown in Graph I.3.9, income support measures have absorbed a rising share of total expenditure on social exclusion, including in countries where it accounted for a lower share of GDP in 2008.

Graph I.3.9: **Income support measures (as % of expenditure on social exclusion n.e.c.)**



(1) In parenthesis spending on social exclusion n.e.c. as percentage of GDP in 2008 and in 2016. Social exclusion n.e.c encompasses benefits in cash and in kind. The former includes incomes support and other benefits; the latter accommodation, rehabilitation of alcohol and drug abusers and other benefits in kind. For definition of the variables see Manual.
Source: ESSPROS.

In a few countries the generosity of social assistance benefits has been reduced via cuts in benefit levels or the introduction of more stringent eligibility criteria. The level of social assistance benefits was reduced in Cyprus (2011), Latvia (2012), Lithuania (2011), Portugal (2012) and Romania (2008 and 2011). In addition, Denmark (2016) placed a ceiling on the total amount of benefits. In the Netherlands, a norm for sharing costs was introduced in 2014, stipulating that an individual welfare benefit will decrease with each extra person living in a household. These measures were aimed at consolidating public finances and reducing disincentives to work. More stringent means testing was applied in the United Kingdom (2011) and Slovakia (2012), while stricter residence requirements were introduced as a condition to become eligible for social assistance benefits in Ireland (2014) and Denmark (2015). However, expenditure on income support as a percentage of GDP dropped slightly in only a few countries (e.g. Ireland and Romania).

Several Member States have implemented measures aimed at strengthening activation and incentives for job search. The obligation to work a minimum number of hours for those able to work has been introduced as a condition for receiving social assistance benefits in Portugal (2012), Denmark (2013) and the Czech Republic (2016). In addition, incentives for social assistance beneficiaries to participate in social inclusion or job-search programmes have been strengthened in several countries, either as obligatory requirements for the receipt of assistance (e.g. Romania in 2010 and 2018, Croatia in 2013, the Netherlands in 2014, Belgium in 2016 and Greece and Luxembourg in 2018) or by providing a special bonus or allowance in return (Slovenia and Slovakia in 2013).

Several countries have increased housing benefits. These benefits or subsidies were introduced or increased in several countries ([88]), often targeting vulnerable groups, such as youth, pensioners, families with children, people living in extreme poverty or people with long-term work-incapability. Moreover, some Member States took measures to improve incentives to work, for instance by making the withdrawal of housing benefits more gradual with increasing income or hours worked (e.g. Finland and Ireland in 2014). In addition, heating subsidies or allowances targeted at low-income households were (temporarily) introduced or increased in a few Member States (e.g. Greece, Italy and Hungary in 2008, Bulgaria in 2016). However, in a few countries, reforms

([87]) Other countries include Belgium (2008), Bulgaria (2009 and 2017), Denmark (2011), Estonia (2015), Ireland (2016 and 2017), France (2013), Latvia (2017), Lithuania (2017), Portugal (2016, 2017 and 2018), Slovenia (2018) and Finland (2012 and 2018).

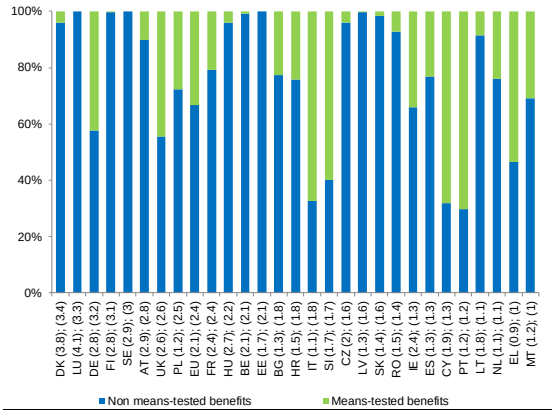
([88]) E.g.: France in 2011, Portugal in 2013, Greece in 2015, Sweden in 2013 and 2017, Denmark in 2008, Malta in 2016 and 2018, Lithuania and Poland in 2018.

were implemented to reduce the generosity of housing benefits. ([89])

3.3.2. Child and family benefits

Minimum income schemes are often complemented by social transfers in the form of family and child benefits. Family and child benefits play an important role in providing adequate income support to families and are associated with reduced risks of child poverty. Benefits can be means-tested or universal and their level and design differ across the EU. In most countries, family spending is not means-tested and accounts for between 1% of GDP in Malta and 3.4% of GDP in Denmark (Graph I.3.10).

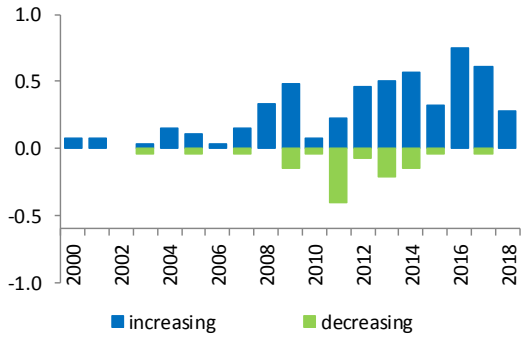
Graph I.3.10: **Spending on family and children (2016) : break-down between means-tested and non-means tested**



(1) Countries are shown in descending order of spending on family as percentage of GDP in 2016. In parenthesis spending on Family and children as percentage of GDP in 2008 and in 2016. For definition of the variables see Manual.
Source: ESSPROS.

The reform intensity in the area of family-related benefits has increased substantially since the start of the crisis and has remained relatively elevated in recent years. The average number of annual measures in this area has followed more or less the same pattern as for social assistance benefits (Graph I.3.11). An increase is visible in 2008 and 2009, with most reforms leading to an increase in the generosity or coverage of benefits. After a drop in 2010, reform intensity picked up again in 2011, although most reforms in that year were characterised by a 'decreasing' direction, indicating a reduction in the generosity and/or coverage of benefits. In the years 2012-2018, the average number of reforms remained relatively high and most of the measures taken led to an increase in the generosity and/or coverage of benefits. Nonetheless, spending as a percentage of GDP fell in a number of countries (see numbers in brackets of Graph I.3.10).

Graph I.3.11: **Family-related benefits: average number of reform measures per country, per year by direction of reform measures, EU28**



(1) Information for Croatia starts in 2012. Reform measures are classified as "increasing" ("decreasing") if they lead to an increase (decrease) in the generosity and/or coverage of family-related benefits.
Source: European Commission, LABREF database.

Since 2008, many Member States have increased their levels of child or family benefits. New means-tested child or family benefit schemes were introduced in Estonia (2012), Greece (2011 and 2018), Poland (2016) and Romania (2010), while Cyprus (2017), Slovenia (2018) and Lithuania (2018) introduced universal child benefits independent of family income. To provide adequate income support to families with children, the level of child or family allowances was raised in several countries. ([90]) Some countries raised the benefit level or introduced supplements particularly targeted at large families ([91]) or vulnerable groups, such as low-income families (Portugal in 2009, Malta in 2014 and 2018, Lithuania in 2018), single parents (Finland in

([89]) Ireland (2011), the UK (2012), Cyprus (2013), the Czech Republic (2016) and Finland (2017). Within this group, spending on housing as a percentage of GDP fell only in Cyprus (by 0.4 pps between 2008 and 2016).

([90]) Bulgaria (2009 and 2017), Germany (2008, 2009, 2016, 2017 and 2018), Estonia (2014 and 2015), Finland (2018), Greece (2018), Latvia (2013 and 2016), the Netherlands (2016), Poland (2012), Portugal (2016 and 2017), Romania (2014), Slovenia (2015), Slovakia (2016, 2017 and 2018), Sweden (2017) and the United Kingdom (2009).

([91]) E.g.: Estonia (2012 and 2016), Sweden (2016), Cyprus (2017), Latvia (2017), Lithuania (2018) and Poland (2014).

2008) or disabled children (Bulgaria in 2013, Malta and Hungary in 2018, Poland in 2012 and 2014). In addition, Germany introduced several education-related support measures for children (between 2008 and 2012). As a percentage of GDP, Poland, Italy and Bulgaria are the countries where social spending on families has increased the most (see numbers in brackets of Graph I.3.10).

Childcare benefits were raised in a number of countries. To improve participation of children in early childhood education and care services and also support labour market participation of parents, childcare benefits were raised in Malta (2009), the Netherlands (2015) and Slovakia (2010 and 2015). In addition, Belgium introduced means-tested subsidies for kindergarten expenses in 2008. To improve the affordability of early childhood education and care, Finland lowered early childhood education fees and Austria made childcare costs tax-deductible (both in 2017).

Only a few countries reduced the level of family or child benefits, or abolished existing schemes. The Czech Republic lowered the birth grant in 2010, while child benefit rates were cut in Ireland (2011 and 2012), Cyprus (2011), Latvia (2009) and Finland (2014). Poland decreased the tax credit for children in 2009. Childcare benefits were reduced in the Netherlands in 2013 and the United Kingdom cut the childcare cost subsidy in 2011.

Several countries changed eligibility criteria for family, child or parental allowances to improve coverage and incentives to work. The income threshold of means-tested child or family benefits was increased in Bulgaria (2016 and 2017), Cyprus (2017) and Poland (2012) and abolished in Slovenia (2018). Incentives to work were raised through changes in the design of these benefits in Ireland (2014), Hungary (2013 and 2015) and the Netherlands (2014) and Austria (2013). New rules to allow for combining parental allowances with (part-time) work were introduced in several countries. ([92]) In 2016, Belgium introduced a new flat-rate child benefit no longer dependent on the status of the parent, who previously had to be working or actively searching for work (applicable as of 2019).

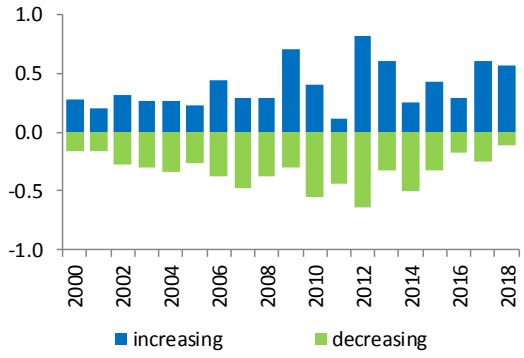
([92]) Bulgaria (2016), Germany (2014), Latvia (2013), Estonia (2013) and Romania (2014).

A few countries restricted eligibility criteria for family or child benefits, or introduced additional criteria. In Bulgaria (2013), the family allowance became dependent on regular school attendance of children. Estonia decided in 2009 to apply the child tax allowance only from the second child onwards. Ireland (2011) gradually reduced the upper age limit for receiving the One-Parent Family Benefit. An income ceiling was introduced for family benefits in Lithuania (2009), for the childbirth allowance in Poland (2012) and for child benefits in the United Kingdom (2013). Cyprus (2011) and Portugal (2011) decreased the income ceiling for child benefits.

3.3.3. Unemployment benefits

Unemployment benefits protect unemployed people and their families from large reductions in income. ([93]) Reform intensity in this area has risen after the crisis. The average number of reform measures per country increased in 2009 and remained elevated in 2010 (Graph I.3.12). After a drop in 2011, the reform effort resumed in 2012, followed by more moderate intensity after the 2013 recovery. After a relative slowdown in the number of reforms in 2016, reform intensity increased again in 2017 and stayed relatively stable throughout 2018.

Graph I.3.12: **Unemployment benefits: average number of reform measures per country per year by direction of reform measures, EU28**

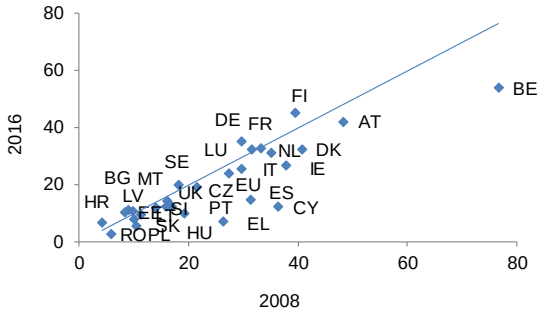


(1) Information for Croatia starts in 2012. Reform measures are classified as "increasing" ("decreasing") if they lead to an increase (decrease) in generosity and/or coverage of benefits.
Source: European Commission, LABREF database.

([93]) European Commission (2018b) reviews the reforms of unemployment benefit systems enacted after the crisis.

Since 2008, several countries have aimed at improving the coverage of unemployment benefits. Eligibility conditions were eased, mainly by reducing the minimum years of experience or contribution periods necessary to be entitled to unemployment benefits. Coverage was extended to previously excluded groups (e.g. self-employed, freelancers, non-regular workers and temporary agent workers). ([94])

Graph I.3.13: **Spending per unemployed (in percentage of GDP per capita)**



(1) GDP per capita is as percentage of 15-74 population.
Source: ESPROSS and Eurostat National Accounts.

In several Member States, activation strategies were pursued to improve the cost effectiveness of unemployment benefit systems. A clear reform pattern emerges regarding the maximum duration of unemployment benefits, which was reduced in several Member States and raised only in a few. In several countries, net replacement rates were reduced and eligibility conditions tightened through stronger job-search and work availability requirements. Although these measures strengthened activation, they may also have negatively affected poverty, as many unemployed lost their entitlements to benefits. ([95]) In several Member States, this tightening contributed to the decline of social spending on unemployment *per unemployed persons*, in particular where labour market weakness was persistent and many jobless people had lost access to unemployment benefits (OECD, 2018 and Graph I.3.13). In response to this challenge, unemployment assistance benefits were increasingly used to protect individuals not anymore eligible to unemployment insurance from the risks of poverty. Moreover, in order to improve living standards of low-income families while encouraging employment, an increasing number of countries have relied on in-work benefits and tax credits. ([96])

Although employment is the key way out of poverty, social transfers may play a role in alleviating the risk of poverty when transitioning between different jobs. Not all transfers are equivalent in relieving poverty. Their design may imply that the benefit is awarded subject to *eligibility* conditions that are differently binding as, for example, in the case of *social assistance*, where amounts paid generally depend on income or family composition or, on the contrary, in the case of the child benefits awarded without a contribution or income test. The next section will assess how effective social transfers are in when it comes to poverty reduction.

3.4. THE POVERTY-REDUCING IMPACT OF SOCIAL TRANSFERS

The effect of social transfers on monetary poverty is usually measured by comparing the at-risk-of-poverty rate before and after all social transfers. ([97]) In addition, one can also analyse the effect of social transfers on the depth of poverty, by comparing the 'poverty gap' before and after all social transfers. ([98]) This section analyses the effect of each type of benefit on both the incidence and the depth of poverty. The analysis is based on individual data from the EU-SILC for the years 2008-2017. In this survey, benefits are divided into the following types: unemployment, family, sickness and disability, social inclusion, and housing benefits. ([99])

([94]) For a detailed review of the reforms of unemployment benefit systems, see European Commission (2018a) and Joint Employment Report (2019b).
([95]) The lengthening of unemployment durations has also had a direct impact on poverty, as the net replacement rate typically declines over the unemployment spell.
([96]) Greece introduced an income support scheme in 2009 for employees in non-standard forms of employment. In 2010, Denmark introduced a tax-free in-work premium for lone parents entering employment. Slovakia introduced an activation allowance for workers in low-income families in 2013.
([97]) See box I.3.2. For an examination of the effects of taxes and transfers on inequality, see European Commission (2019c), *Employment and Social Developments in Europe*.
([98]) See box I.3.2 for a definition of poverty gap.
([99]) Calculations do not take into account the potential interactions that exist between different types of benefits (for instance some households could be eligible for other benefits if they lost one particular type).

Overall, social benefits (excluding pensions) reduce the incidence of poverty by about one third and its depth by more than one half. Graphs I.3.14 and I.3.15 show the effect of all benefits (excluding pensions), as well as that of each type separately on the AROP rate and the poverty gap. ([100]) In 2017, social transfers reduced the AROP rate by 34%, and the poverty gap by 55%, on average across the Member States. Family benefits have the largest effect on the poverty rate (17%), followed by sickness and disability benefits (15%) and unemployment benefits (10%). The effect of housing and social inclusion benefits are, on average, smaller at around 5%; this is a substantial effect considering their low share in social spending (see Section I.3.2). The ranking of benefits is the same in terms of their effect on the poverty gap.

Social transfers reduce the poverty rate by more than one half in Denmark, Finland and Ireland. In 2017, their effect also exceeded 40% in some other Nordic (Sweden), Anglo-Saxon (UK), Continental (France, the Netherlands) and Central European (Czechia, Hungary, Slovenia) welfare systems. In contrast, they reduce poverty by less than a quarter in some Central and Eastern European countries (Bulgaria, Latvia, Lithuania, Romania) and Southern Member States (Greece, Italy, Portugal, Spain, Graph I.3.14). Denmark, Finland and Ireland were also among the countries with the biggest impact of social transfers on the depth of poverty. In these countries, as well as in Belgium and Sweden, social transfers reduced the poverty gap by 70% or more (Graph I.3.15).

Family benefits reduce the poverty rate by more than a third in Hungary and Ireland. More generally, it is high in some Eastern Member States that have relatively generous parental leave schemes (Hungary and Poland), but also in Austria, Finland, Ireland and the UK (Graph I.3.14). In contrast, their effect on poverty remains below 10% in Greece, Italy, Malta, Portugal and Spain. The relative position of countries is similar in terms of the impact of benefits on the poverty gap. However, these benefits have a comparatively larger effect on the depth of poverty than on the poverty rate in Beveridge welfare models (Cyprus, Ireland, Malta and the UK). ([101]) This suggests that benefits are targeted to the poorest in these systems.

Sickness and disability benefits reduce the rate and depth of poverty the most in Czechia, Denmark, Finland and Slovenia. In these countries they reduced the poverty rate by more than 25% in 2017 (Graph I.3.14). They have a somewhat smaller but still substantial effect in Belgium, the Netherlands and Sweden. Only in a few countries, sickness and disability benefits reduce the poverty rate by less than 10%, including Germany, Greece, France, Italy and Romania.

There is a large variation in the poverty-reducing impact of unemployment benefits. In the majority of Member States, unemployment benefits only play a limited role in reducing the poverty rate and poverty gap; this includes countries with relatively high unemployment rates, such as Greece and Croatia. In these two countries, this may be explained by the low coverage of unemployment benefits - due to high long-term unemployment - and their short duration and levels. Unemployment is also comparatively high in France, Spain and Italy, but unemployment benefits in these countries play a larger role in reducing poverty. The largest poverty-reducing effect of unemployment benefits is observed in Denmark, Finland and Ireland. In these countries, the long-term unemployment rate is relatively low, while the coverage and net replacement rates of unemployment benefits are comparatively high.

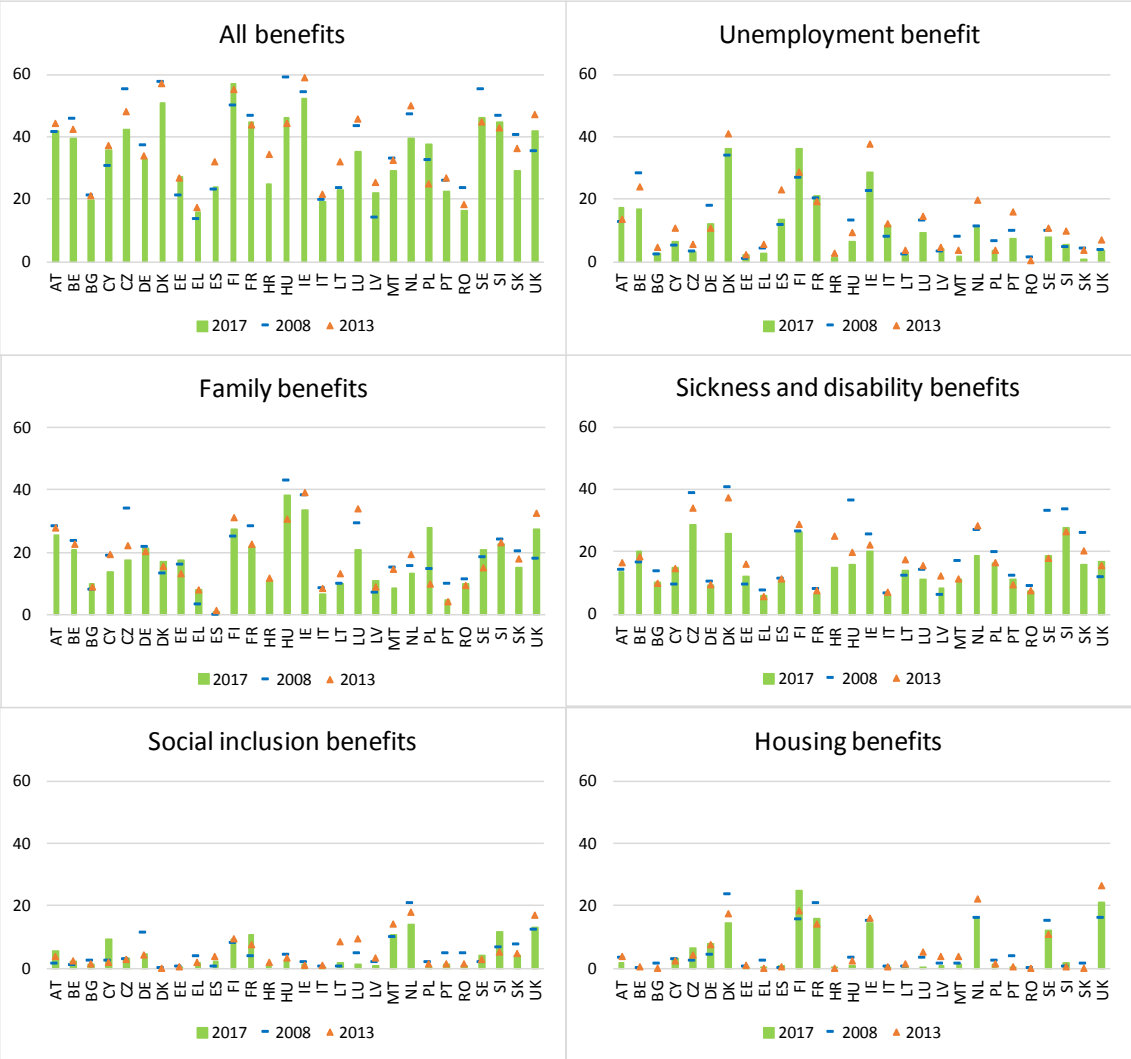
While social inclusion benefits have a relatively small impact on the poverty rate, they contribute more to reducing the depth of poverty. The effect of social inclusion benefits is the largest in the Netherlands, especially on the poverty gap. This is explained by the minimum income benefit being above the poverty threshold and the adequacy of the scheme being the highest in the EU. ([102])

([100]) For a definition of poverty gap see Box I.3.2.

([101]) Beveridge welfare models provide social insurance financed out of general taxation. Bismarckian systems provide social insurance based primarily on social contributions. Compared to the former, the latter provides fewer universal social rights in the form of benefits entitlements as their provisions is linked to the employment status. See "CESifo DICE report 4/2008.

([102]) See, for instance, Joint Employment Report (2019). The impact on the poverty gap is on average below the effect of

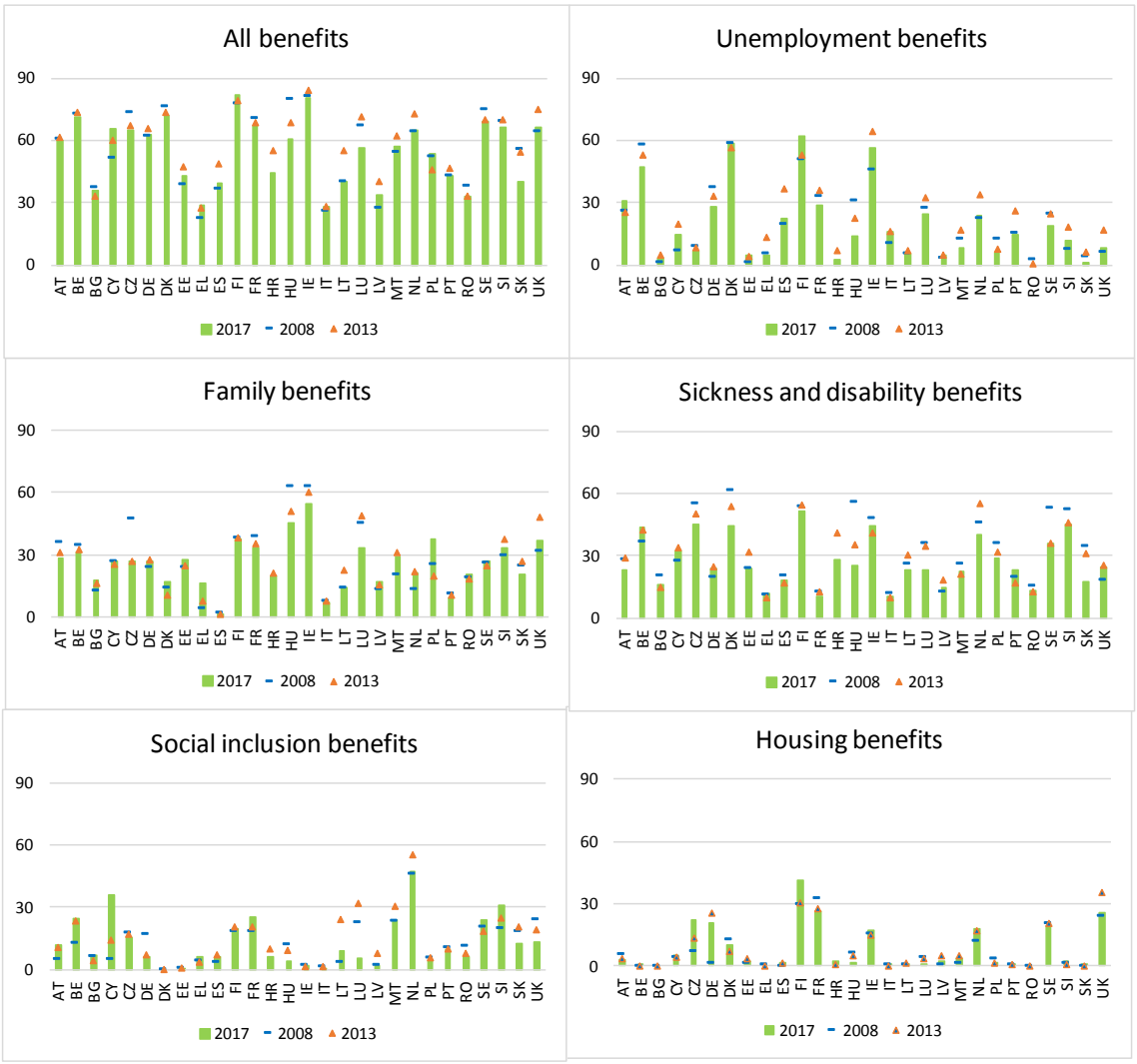
Graph I.3.14: **The impact of social transfers on the at-risk of poverty rate, by type of transfer, 2008, 2013, 2017**



(1) The impact of each type of transfer is the percentage decrease in the AROP rate brought about by the given type of transfer in a given country and year. More precisely, it is measured as the percentage difference between a counterfactual AROP rate, calculated based on disposable household income including all transfers except the type analysed, and the actual AROP rate, taking into account all transfers. The sum of the effects of the different benefits is not equal to the total overall effect of all benefits.
Source: European Commission calculations based on individual data from EU-SILC.

other types of transfers. This is not surprising as social exclusion benefits are targeted to those well below the poverty line and are not sufficient to help them cross the poverty line.

Graph I.3.15: **The impact of social transfers on the poverty gap, by type of transfer, 2008, 2013, 2017**



(1) The impact of each type of social transfer is the percentage decrease in the poverty gap 'caused' by the given type of transfer in a given country and year. More precisely, it is measured as the percentage difference between a counterfactual poverty gap rate, calculated based on disposable household income, including all transfers except the type analysed, and the actual poverty gap, taking into account all transfers.
Source: European Commission calculations based on individual data from EU-SILC.

Housing benefits play a significant role in poverty reduction in only a few Member States. In particular, in Denmark, Finland, France, the Netherlands, Sweden and the UK, they reduce poverty by 15% or more (Graph I.3.14). The social housing market represents a sizeable share of the rental market in these Member States. However, the impact on the poverty gap remains relatively low, indicating that they are not necessarily targeted at those with the lowest incomes. ([103])

In the initial phase of the crisis, the poverty-reducing impact of social transfers increased in most countries but fell in most thereafter. Between 2008 and 2017, the poverty-reducing effect of benefits fell in Hungary and Slovakia (by more than 10 pps), Luxembourg, the Netherlands and Sweden, while it increased in Latvia (8 pps), Estonia, Finland, and the UK (Graph I.3.14). In the recovery period between 2013 and 2017, the biggest increase in the poverty-reducing effect was recorded in Poland (13 pps), while the effect receded most in Croatia, Luxembourg and the Netherlands (by 10 pps each).

([103]) European Commission (2019) provides a detailed analysis of investing in affordable and adequate housing.

The impact of sickness and disability benefits decreased in the last decade. Their poverty-reducing effect fell by 1 pp in the crisis period (2008-2013) and a further 2 pps in the recovery (2013-2017). The decline was most pronounced in Hungary, where both sickness and disability systems were reformed over this period, but also in Croatia, Czechia, Denmark, Slovakia and Sweden. In Belgium and Cyprus, the poverty-reducing effect of these benefits increased by 4 pps or more.

Social transfers, in particular unemployment benefits, have mitigated the poverty effect of increased joblessness during the 2008 crisis. Graph I.3.16 shows the cross-country correlation of unemployment with the poverty-reducing effect of unemployment benefits and all benefits for periods of the downturn (2008-2013) and the following recovery (2013-2017). There is a positive correlation between the unemployment rate and the poverty-reducing effect of social transfers, in particular that of unemployment benefits. Countries where unemployment increased the most were those where the poverty-reducing impact of unemployment benefits was the greatest. During the downturn (2008-2013), a one percentage point increase in the unemployment rate was associated with an average increase in the poverty-reducing effect of unemployment benefits of roughly 0.6 pps and an increase in the effect of all benefits of about 0.7 pps. In the recovery, the effect of unemployment benefits tended to fall as unemployment receded, but the changes in the poverty-reducing effect of all benefits was no longer correlated with the change in unemployment across countries. This suggests that while differences across countries in the poverty-reducing impact of all benefits are mostly cyclical, the intensity of the reforms enacted over the period also partly explains such differences. To gain more insight into the effects of policies and the business cycle, the next section conducts an econometric analysis, whereby the poverty-reducing effect of social transfers is explained in terms of policy changes while controlling for possible cyclical fluctuations. This allows disentangling the contribution of the business cycle from that of changes in policy settings.

3.5. HOW DO POLICIES AFFECT THE POVERTY-REDUCING EFFECT OF SOCIAL TRANSFERS: MACRO-ANALYSIS

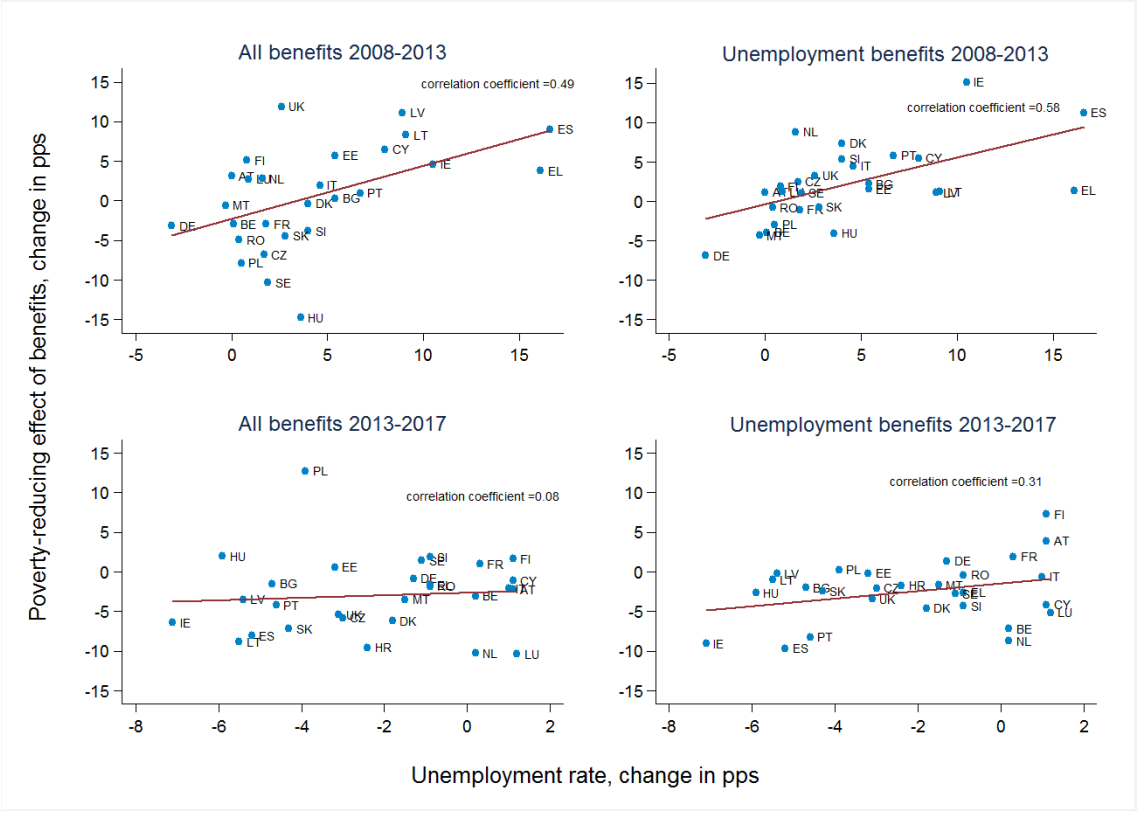
Graph I.3.17 **provides descriptive evidence for the most recent five-year period.** The graph plots changes in the poverty-reducing effect of various benefits between 2013 and 2017 against an indicator of policy action over roughly the same period. 'Reform stance', the indicator of past policy action, is derived from the Commission's LABREF database of labour market reforms. ([104]) The reform stance is defined as the number of reform measures increasing the generosity or availability of a certain type of benefit in a given country and time period, net of the number of reforms decreasing their generosity. It provides information on the direction of reforms. Since social statistics from year *t* refer to incomes earned in year *t*-1, the relevant time period for reform activity is between 2012 and 2015. Social inclusion and housing benefits are included in the same LABREF policy area and, hence, an average of the poverty-reducing effect of both types is calculated for this graph.

The poverty-reducing effect of benefits increases more in countries that adopted a larger number of reforms increasing benefit generosity. This statistical association is relatively weak, but it can be seen for all benefit types (Graph I.3.17). ([105]) In the area of sickness and disability benefits, the change in the poverty-reducing impact is correlated with the reform stance in the policy area of disability schemes (as shown in the graph), but not sickness schemes (not shown). This is consistent with the fact that disability benefits have more fiscal weight in most countries.

([104]) For a detailed description of this indicator, see Turrini et al. (2015).

([105]) However, it must be acknowledged that the weak correlation does not necessarily prove that policy reforms have a weak effect; there is some measurement error as reform stance does not account for the size of the impact on benefit generosity.

Graph I.3.16: **Correlation between change in the poverty-reducing impact of unemployment benefits and change in the unemployment rate (pps) (2008-13 vs. 2013-17)**



Source: Commission calculations based on EU SILC data.

A regression analysis allows to disentangle the effect of labour market conditions from the effect of reforms. Changes in the poverty-reducing impact of various types of benefits are regressed both on changes in the unemployment rate and on the corresponding reform stance, the indicator of policy action. For example, in the case of the poverty-reducing effect of unemployment benefits, the relevant area of reform is in the policy domain of unemployment benefits. ([106]) Since social statistics from year *t* are based on incomes earned in year *t*-1, explanatory variables need to be lagged. The *reform stance* in a given year refers to reforms adopted in that year. Since these reforms are typically implemented in the following year, the most recent reform stance included in the regression is from year *t*-2, the year preceding the income reference year of social statistics in year *t*. ([107]) Three lags are included for both the change in unemployment and the relevant *reform stance*. Additional lags did not prove to be empirically relevant. Regression results are shown in Table I.3.4 for the total effect of benefits as well as for all benefit types separately. Four main results can be derived.

First, when unemployment increases, the poverty-reducing effect of unemployment benefits increases too (and vice versa). The effect is substantial: a 1 percentage point increase in the unemployment rate is on average associated with an increase in the poverty-reducing effect of unemployment benefits by about three quarters of a percentage point in the same year (column 2 in Table I.3.4). This is in line with the fact that unemployment benefit spending increases in years when unemployment goes up. In the year following an increase in unemployment, there is a

([106]) The same LABREF policy field (social assistance) is associated with both social inclusion and housing benefits. Sickness and disability benefits are associated with the LABREF policy area of disability schemes.

([107]) The contemporaneous reform stances (from year *t*-1) are not statistically significant when included in the regressions.

smaller movement in the opposite direction: the poverty-reducing effect of unemployment benefits falls by about a quarter of a percentage point. A possible explanation is that, in most cases, jobseekers may have exhausted their unemployment benefit eligibility in the second year after the job loss. This also implies that unemployment benefits can only temporarily relieve the effect of higher unemployment on monetary poverty.

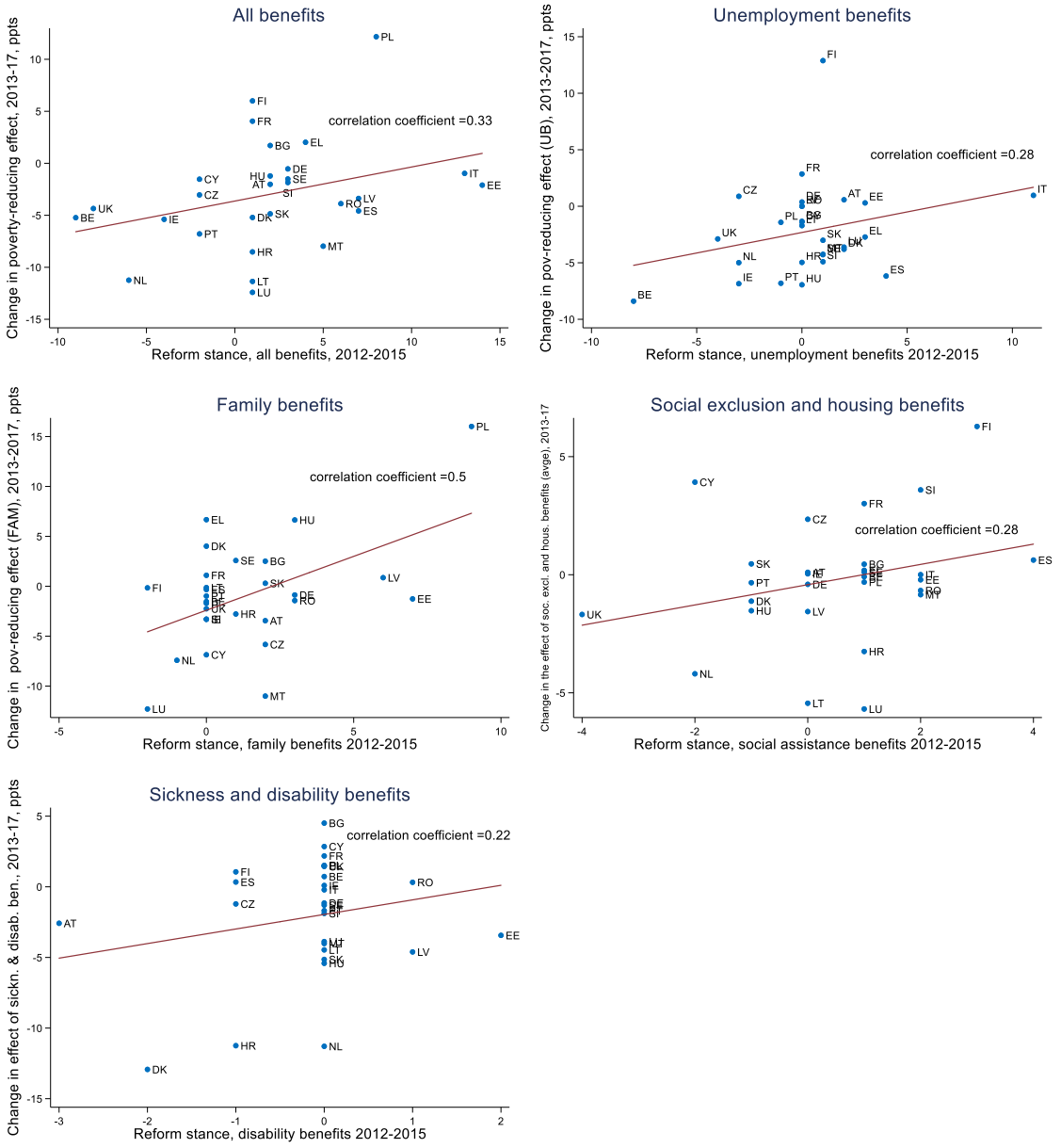
Second, unemployment also affects the poverty-reducing effect of social inclusion benefits, but to a lesser degree. The estimated effect is smaller than the one on the effect of unemployment benefits and it is estimated with less precision, but cumulates over time. A first effect can be seen in the year of the unemployment increase, while a second effect, of a similar magnitude, can be seen two years later. This is reasonable given that social inclusion benefits include benefits of the last resort. Households may rely on them after exhausting other benefits they may have been eligible for. This is particularly the case in prolonged times of high unemployment, when job finding rates plummet, including for the long-term unemployed. The poverty-reducing effect of other types of benefits is not found to be associated with changes in the unemployment rate. The point estimate suggests that increasing unemployment may also increase the poverty-reducing effect of family benefits, but the effect is not estimated with sufficient precision to be statistically significant.

Third, reforms increasing the adequacy of all types of benefits are associated with a higher poverty-reducing effect of each specific benefit. It is estimated that on average an additional reform increasing benefit adequacy raises the poverty-reducing effect of all benefits by 0.2 pps in the year following its adoption. Effects of a similar or greater magnitude appear in the regressions for all benefit types.

Fourth, policy affects poverty with a delay in the areas of family and disability benefits. In the areas of unemployment benefits, social inclusion and housing benefits, reform activity increasing benefit generosity is associated with an increased poverty-reducing impact in the year following the reform adoption. In the areas of family benefits as well as sickness and disability benefits, the effect appears two years after adoption, with an additional effect in the area of family benefits three years after adoption.

Reforms of social transfers enacted after 2007 have paid out. Overall, these findings suggest that social transfers are an effective tool to reduce the risk of poverty during downturns (i.e. when the unemployment rate increases). The reforms enacted after 2008 aiming at either expanding the coverage of benefits or improving their cost-effective design have been successful in strengthening the impact of social transfers on poverty, on top of the 'normal' contribution usually built in the benefit system. Going one step further, the next section will draw on micro-simulation models to isolate the redistributive impact of reforms of tax and benefit systems.

Graph I.3.17: **Changes in the poverty-reducing effect of transfers by type (2013-2017, pps) and 'reform stance' in the relevant policy area (2012-2015)**



(1) The 'reform stance' is calculated based on the European Commission's LABREF database of labour market reforms. It is defined as the number of reform measures adopted in a given country and year increasing the generosity or availability of a given type of benefits minus the number of reforms decreasing their generosity or availability.
Source: European Commission calculations, based on EU-SILC data and the LABREF database of labour market reforms.

Table I.3.4: **Determinants of the changes in the poverty-reducing effect of social transfers, EU28, 2007-2017**

Dependent vatiable:	(1)	(2)	(3)	(4)	(5)	(6)
	Change in the poverty-reducing effect of social benefits, by type, ppts					
	All benefits	Unemploy-ment benefits	Family benefits	Sickness and disability benefits	Social inclusion benefits	Housing benefits
Change in unemployment rate, year t-1	0.512***	0.757***	0.223	0.055	0.153*	0.092
	(0.137)	(0.123)	(0.136)	(0.118)	(0.078)	(0.069)
Change in unemployment rate, year t-2	-0.139	-0.285**	-0.143	0.018	-0.072	-0.067
	(0.151)	(0.135)	(0.149)	(0.130)	(0.085)	(0.075)
Change in unemployment rate, year t-3	-0.023	-0.011	0.037	0.035	0.156**	0.055
	(0.132)	(0.117)	(0.132)	(0.111)	(0.073)	(0.065)
Reform stance, relevant policy area, year t-2	0.208**	0.329**	0.211	0.106	0.308**	0.241*
	(0.103)	(0.142)	(0.242)	(0.463)	(0.148)	(0.131)
Reform stance, relevant policy area, year t-3	0.047	-0.270*	0.589**	0.747*	0.045	0.015
	(0.103)	(0.140)	(0.254)	(0.425)	(0.153)	(0.136)
Reform stance, relevant policy area, year t-4	0.233**	0.090	0.518*	0.114	-0.073	0.128
	(0.110)	(0.143)	(0.277)	(0.401)	(0.167)	(0.148)
Constant	-0.415**	-0.217	-0.423**	-0.362**	-0.103	-0.118
	(0.187)	(0.168)	(0.202)	(0.163)	(0.112)	(0.100)
Observations	287	264	264	264	264	264
R-squared	0.105	0.172	0.064	0.017	0.044	0.026

(1) Pooled ordinary least squares estimations. (2) Standard errors in parentheses. (3) Estimated coefficients statistically significant at the 10%, 5% and 1% level are marked with (*), (**) and (***), respectively. (4) 'Reform stance' is calculated based on the LABREF database. It is defined as the number of reform measures adopted in a given country and year increasing the generosity or availability of a given type of benefits minus the number of reforms decreasing their generosity or availability. (5) The relevant reform stance is chosen as follows: the effect of (a) unemployment benefits; (b) family benefits; (c) sickness and disability benefits; (d) social inclusion benefits; (e) housing benefits; and (f) all benefits is explained by the reform stance in the LABREF policy area (a) unemployment benefits; (b) family benefits; (c) disability schemes; (d) and (e) social assistance benefits; (f) all of these areas.
Source: European Commission calculations based on data from EU-SILC, Eurostat Labour Force Survey, and the Commission's LABREF database of labour market reforms.

3.6. HOW DO POLICY CHANGES AFFECT POVERTY AND INEQUALITY: A MICRO-SIMULATION ANALYSIS

This section examines the impact of the tax-benefit systems of today on poverty and inequality as compared to before the crisis. The observed effect on poverty reduction of various types of social transfers of Section 3.4 depends both on policy changes as well as on changes in the demographic and socio-economic structure of the population. Section 3.5 makes a first attempt at disentangling the role of policy changes from the one of changing labour market conditions. This section makes a step further, isolating the effect of policy changes by keeping constant all the other characteristics of the underlying population. This is achieved with the use of EUROMOD, the EU tax-benefit microsimulation model, which allows producing counterfactual scenarios that apply different policy settings to the same underlying income distribution. ([108])

The effectiveness of the current policy setting is assessed assuming unchanged demographic and income distributions. For each Member State, policy settings of 2008 and 2018 are compared with regard to their effects on poverty by applying them to the same population and income distribution (the 2016 wave of the EU-SILC survey). In other words, a counterfactual scenario is simulated to examine what the situation would have been in 2018, if no policy changes had occurred since 2008. This allows assessing the effectiveness of current tax and benefit systems in reducing poverty and inequality compared to the policy systems in place at the onset of the crisis. The analysis looks in particular at the impact on the distribution of disposable income by deciles, overall income inequality (measured by the Gini coefficient) and the AROP rate. ([109])

A number of caveats must be considered to interpret microsimulation results. First, simulations are static and do not incorporate the effect of possible behavioural responses induced by policy changes. Also, the standard EUROMOD model used for this exercise does not allow to

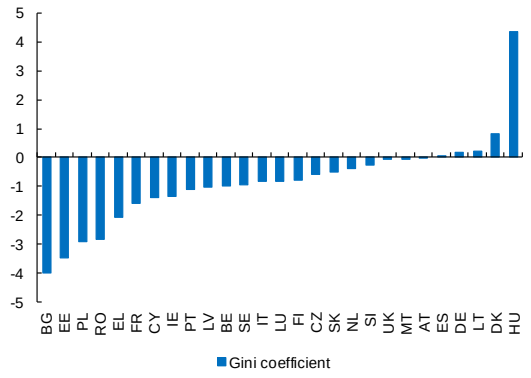
([108]) This analysis is complementary to the macro approach of Section 3.5 as it looks at specific policy settings and their changes over time. See Box I.3.1 for the methodology.

([109]) For a cross-country comparison of the Gini coefficient of equivalised disposable income after social transfers, see European Commission (2019c), *Employment and Social Developments in Europe* , Chapter 1.

simulate certain policies, such as in-kind benefits or indirect taxation, or certain features (such as asset criteria for eligibility or compliance with job-search requirements) due to the lack of necessary information in the underlying microdata used (the EU-SILC survey). ([110])

In the vast majority of Member States, the tax and benefit systems of 2018 achieve a greater reduction in income inequality than in 2008. In 20 Member States, the tax and benefit system of 2018 produces a lower level of income inequality compared to the 2008 policies applied to the same income distribution (Graph I.3.18); this means that, in most countries, changes implemented between 2008 and 2018 increase the overall progressivity of the tax and benefit systems. ([111]) The highest reduction in income inequality after redistribution is observed in Bulgaria, Estonia, Poland, Romania and Greece. In Hungary, changes in tax and benefit policies produce a significantly higher level of income inequality.

Graph I.3.18: **Change in the Gini coefficient due to tax and benefit policies: 2008-2018**



The graph shows the difference (in pps) in the Gini coefficient computed on the same income distribution and with the simulated tax and benefit policies of 2008 and 2018.
Source: Own calculations based on EUROMOD.

In general, the policy changes introduced after 2008 protected lower-income groups. Graph I.3.19 shows the change of disposable income by income deciles due to tax-benefit policy changes in the period 2008-2018. ([112]) Among the countries that saw an increase in average disposable incomes, this was higher for the low deciles in Belgium, Bulgaria, Estonia, Luxembourg, Malta, Poland, Romania, Sweden, Slovenia, Slovakia and Austria. In Germany, the Netherlands and Latvia the middle-income groups benefitted the most from the policy changes; in the latter two countries, these changes benefitted also the poorest (bottom income decile). As concerns countries where policy changes determined a fall in disposable incomes, the changes introduced after 2008 protected low-income earners in Italy, France and Greece; in the last two countries, the median income increased only for the lowest decile. This pattern is close to that of Portugal, Ireland and Spain, which however also experienced a considerable fall in the median income of lower-income earners. In Hungary, only the upper deciles benefitted from policy changes while sizable losses are found for the lowest deciles (driving the increase in inequality noted above). Finally, the highest-income brackets benefitted from policy changes in Denmark. In the UK, lower disposable incomes are recorded at the extremes while gains are observed in the middle-upper half of the income distribution.

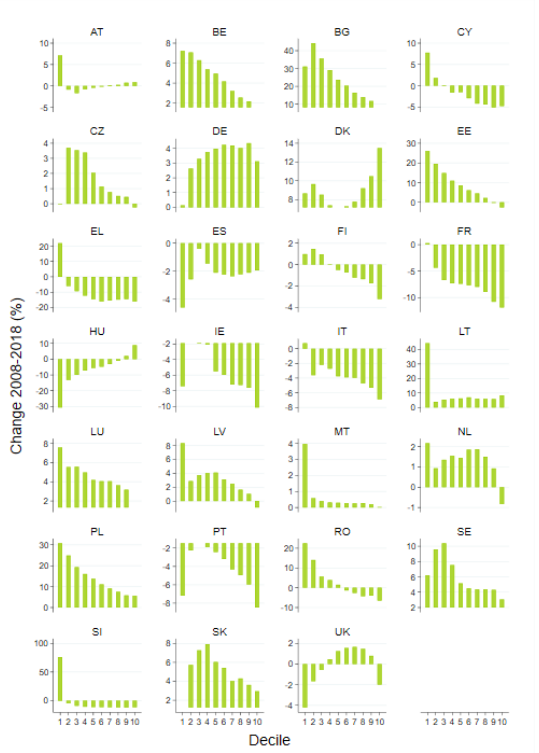
The at-risk-of-poverty rate is reduced in the majority of Member States. Graph I.3.20 shows the effect of policy changes on the AROP rate over the period 2008-2018, together with the change in the corresponding poverty threshold over the same period. In 16 Member States, policy changes result in a reduction in relative poverty, whereas in seven other Member States, the AROP rate remains unchanged. The largest increase in relative poverty is observed in Hungary and the UK, where the AROP rate increased by 3% and 2%, respectively. The increases in the poverty rates in both Hungary and the UK seem to be mostly associated with higher poverty among households with children.

([110]) In addition, results of microsimulation may differ from observed data due to partial take-up of benefits and tax evasion. To the extent that these phenomena are persistent over time, however, this last issue appears less crucial for the purpose of the present analysis, which focuses on the comparison between policy systems.

([111]) These results differ from the actual changes in income inequality that can be observed over the period, as illustrated for instance in European Commission (2019c).

([112]) Disposable income is the sum of gross market income and cash benefits, net of direct taxes and social insurance contributions.

Graph I.3.19: **Changes in disposable income by income deciles due to tax-benefit policy changes: 2008-2018**



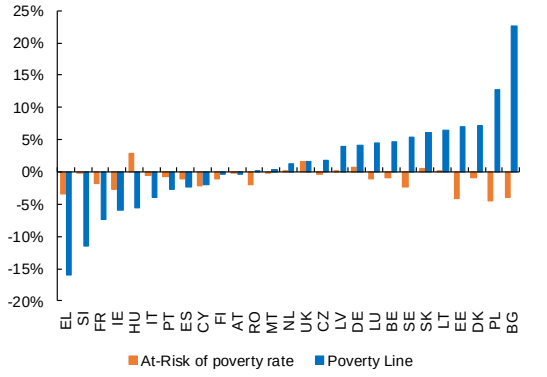
The graph shows the percentage change in average disposable income by decile based on simulated changes in the tax and benefit systems between 2008 and 2018, keeping constant the underlying distribution.
Source: Own calculations based on EUROMOD.

Once movements in the poverty line are considered, policy changes improved the income situation of the poor only in a subset of countries. The effect of policy measures on the AROP rate can be driven both by their effects on households' incomes and by shifts in the relative poverty line. ([113]) As illustrated above, in 16 countries, policy changes between 2008 and 2018 led to an increase in median disposable incomes, producing an upward shift of the poverty line.

([113]) The poverty line underpinning the AROP rate is defined as 60% of the median of equivalised disposable household income. Shifts are caused by changes in the median disposable income, as a result of tax and benefit policy reforms and possible indexation of benefits.

In half of these (Belgium, Bulgaria, Estonia, Denmark, Luxembourg, Poland, Romania and Sweden), this shift was accompanied by a fall in the number of people at risk of poverty, pointing unequivocally to a material improvement in the conditions for the poorest households. In other countries (e.g. Germany, Slovakia and the UK), both the poverty line and the share of people at risk of poverty (defined according to the new threshold) increased. In the remaining Member States, policy changes produced a fall in median incomes – and so also a lowering of the poverty line. This is the case of Greece (-15.9%), Slovenia (-11.4%) and France (-7.4%); yet, the AROP rate for these countries fell. This indicates that tax-benefit policies had a stronger (negative) impact on median incomes than on those at the lower end of the distribution (as it also appears from Graph I.3.19). Finally, in Hungary, a downward shift of the poverty line was accompanied by an increase in the AROP rate, which clearly points to a worsening of the situation for those at the bottom of the income distribution.

Graph I.3.20: **Change in the at-risk-of-poverty rate due to tax and benefit policies and changes in the poverty line: 2008-2018**



The graph shows the percentage change in the AROP rate and the AROP threshold based on simulated changes in the tax and benefit systems between 2008 and 2018, keeping constant the underlying distribution.
Source: Own calculations based on EUROMOD.

Box I.3.1: Use of microsimulation models for assessing tax-benefit systems

EUROMOD is a static tax-benefit microsimulation model for the European Union based on micro-data and national tax and benefit rules for a given year. For each Member State, it allows computing the effect of taxes and benefits on household incomes. With EUROMOD it is also possible to assess the effects of policies and simulate the effects of tax-benefit policy reforms on poverty, inequality, work incentives and government budgets. The model makes use of micro-data from nationally representative samples of households from the European Union Statistics on Income and Living Conditions (EU-SILC) and Family Resources Survey (FRS) for the UK, which contain detailed information on individual and household characteristics as well as income by source. The model allows for standardised analysis across EU countries´ tax and benefits systems. For a comprehensive overview, see Sutherland and Figari (2013).

Microsimulation models have been used to assess the performance of tax-benefit systems. A number of studies provide comparative assessments of the distributional implications of policy changes over time. For instance, Tammik (2019) studies the effects of various changes in tax and benefit systems on poverty risk, poverty gap and income inequality in the EU between 2015 and 2018. His findings suggest that public pensions are the most effective component in reducing inequality and poverty in market incomes; means-tested benefits are on average the second instrument in order of importance (though non-mean tested benefits dominates in some countries). Conversely, the role of taxes and social contribution is rather limited. De Agostini et al. (2016) provide a comprehensive assessment of distributional effects of tax-benefit reforms over the period 2008-2014. They find that tax-benefit policies increased household disposable incomes and helped to alleviate poverty and reduce inequality in the period 2008-11; overall, they had a negative impact on both incomes and poverty in 2011-14, with sizeable differences across countries. Alari et al. (2019), look at how changes in the tax and benefit policy settings affected the income distribution in 2001-2011 in seven EU countries, distinguishing between structural effects (i.e. those arising from the changes in the design of the tax-benefit system) and indexation effects (i.e. the periodic uprating of monetary parameters such as benefit amounts and eligibility thresholds, based on either automatic statutory indexation or discretionary adjustments). They show that the regular uprating of monetary parameters (indexation effect) not only has a positive effect on household incomes over the period considered (meaning that fiscal drag and benefit erosion were avoided), but that it generally contributed more to poverty and inequality reduction than structural changes.

Methodology used

EUROMOD is used to estimate the distributional effects of direct tax and cash benefit policies in EU Member States using EU SILC microdata for each country from the onset of the economic crisis (2008) and from the latest period available (2016). The analysis involves simulating the disposable income distribution and, subsequently, inequality and poverty indices, between the year 2008 and 2018. The results focus on changes between 2008 and 2018 and are based on the same input database (EU-SILC 2016, with income reference year in 2015).

The aim of the exercise is to quantify the effect of tax-benefit policy changes between 2008 and 2018 on a range of poverty and inequality measures. To achieve this is necessary to disentangle the pure effect of policy changes occurring over the period 2008–2018 from changes due to other factors, such as changes in the market income inequality - due to wage cuts, job losses or working time reductions, changes to the minimum wage, etc - and in other socio-demographic characteristics of the population.

The applied methodology draws on the method in Bargain and Callan (2010). Consider a single household and denote its market income (and other characteristics) with y and monetary values of tax-benefit parameters (e.g. maximum benefit amounts, threshold level of tax brackets, etc.) p.

Let d be the 'tax-benefit function' that calculates the household disposable income on the basis of its market income and monetary parameters, reflecting the structure of the tax-benefit system (e.g. tax rates, benefit eligibility rules). In period t, the household disposable income can be denoted as $d_t(p_t, y_t)$

The aim is to estimate the direct effect of policy changes on household incomes in the period from t=1 to t=2, where subscripts 1 and 2 refer to start-period (2008) and end-period (2018) values, respectively.

(Continued on the next page)

Box (continued)

To isolate it from other changes in the income distribution (e.g. changes in household composition or market incomes), household disposable incomes under the two policy systems are assessed holding household characteristics and market incomes constant. Furthermore, to adjust for changes in nominal income levels over time, the monetary parameters of the tax-benefit system are adjusted with a factor *alpha* which reflects benchmark indexation. In the literature, this is generally done taking into account either changes in the consumer price index, or average income growth. For this chapter the CPI indexation was chosen as the benchmark indexation. This means that the effect of policy changes is calculated in real terms.

Specifically, the policy effect (for each household) is estimated as:

$$\Delta = d_2\left(\frac{1}{\alpha}p_2, y_1\right) - d_1(p_1, y_1)$$

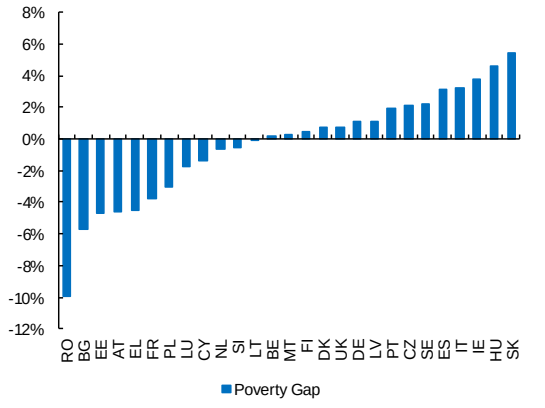
Technically in EUROMOD, instead of scaling monetary policy parameters, the method scales monetary input variables with the factor alpha and monetary output variables with the factor 1/alpha:

$$\Delta = \frac{1}{\alpha}\, d_2(p_2, \alpha y_1) - d_1(p_1, y_1)$$

This relies on the assumption that tax-benefit systems are linearly homogenous, that is $d_t(p_t c y_t) = c d_t(p_t y_t)$. Input variable adjustments are limited to market incomes, expenditures and assets. Output variable adjustments cover all monetary variables.

As a consequence of policy changes after 2008, the depth of poverty decreased in eleven countries, but worsened in eight. Graph I.3.21 presents the changes of the poverty gap during 2008-2018, providing a measure of the depth of poverty. In almost half of the Member States, the intensity of poverty increased, most notably in Hungary, Slovakia, Ireland, Italy, Spain, Sweden, Czechia and Portugal (with increases of the poverty gap ranging from 2% to 5%). By contrast, improvements in the standard of living of the poor were recorded in eleven Member States, most notably in Romania (-10%), Bulgaria (-6%) as well as Estonia, Austria and Greece (all -5%).

Graph I.3.21: **Change in the poverty gap due to tax and benefit policies: 2008-2018**



Source: Own calculations based on EUROMOD.

3.7. IMPACT ON MATERIAL DEPRIVATION OF DIFFERENT CATEGORIES OF SOCIAL EXPENDITURE

This section explores the links between relative or material deprivation and the spending on social protection. Section 3.4 looked at the effect of various types of benefits on monetary poverty by comparing indicators before and after transfers received at the household level. Section 3.5 and 3.6 assessed the impact of reforms on the poverty-reducing effects of social transfers. Building on these insights, the following section investigates how social protection spending influences poverty indicators, while taking into account the effects of macroeconomic drivers.

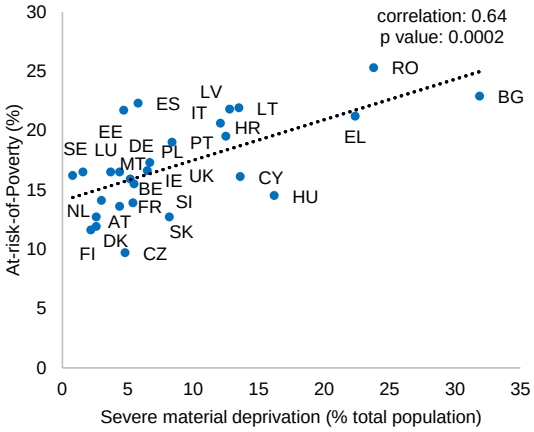
3.7.1. Drivers of relative poverty and material deprivation: descriptive analysis

Descriptive evidence on the link between economic development and poverty highlights the importance of redistributive policies. Graph I.3.23 suggests that relative poverty before redistribution (i.e. AROP based on market income) is unrelated to the level of income per capita. The correlation with economic development (as measured by income per capita) is stronger when AROP is based on *disposable income* (Graph I.3.24). This means that countries with higher GDP per capita have lower AROP rates after redistribution. These findings are not surprising as

AROP captures income *inequality* at the bottom of the income distribution rather than the standard of living and while market income inequality is often high in richer countries, this is not the case for disposable income. However, there is some diversity between countries with low/medium disposable income. Member States with similar levels of economic development can have starkly different AROP rates based on disposable income. Thus, beyond the stage of economic development, differences in social policy and in the structure of the market income distribution play a role. ([114]) Graph I.3.25 illustrates the relationship between economic development and the capacity of redistributive policies to lift people out of poverty through the tax-benefit system. Richer Member States achieve higher poverty reduction through redistribution. Yet, large discrepancies exist at a given level of economic development. For instance, poverty before transfers (excluding pensions) in Czechia and Estonia are roughly similar (37% vs. 39%; Graph I.3.23), but redistribution in Estonia only achieves a poverty reduction by 18 pps compared to 27 pps in Czechia.

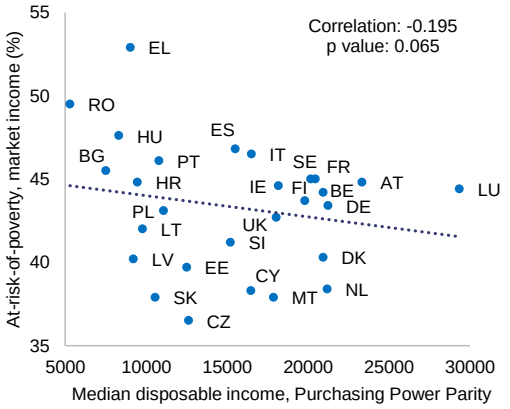
Countries that allocate a higher share of GDP to social spending have better poverty outcomes. The AROP rate and severe material deprivation are negatively associated to the social spending-to-GDP ratio. Yet, there are important exceptions. For example, Graph I.3.27 shows that Italy and Greece have a very high share of social spending despite having a severe material deprivation indicator comparable to that of Latvia and Romania, which are the countries where the intensity of social spending is among the lowest in the EU. Graph I.3.28 reveals that countries that allocate a higher percentage of GDP to social spending have a higher poverty-alleviating effect of the tax and benefit system. However, the heterogeneity across countries suggests that the effectiveness in reaching lower levels of relative poverty goes beyond the amount of resources spent.

Graph I.3.22: **Correlation severe material deprivation and AROP, 2016**



Source: EU-SILC.

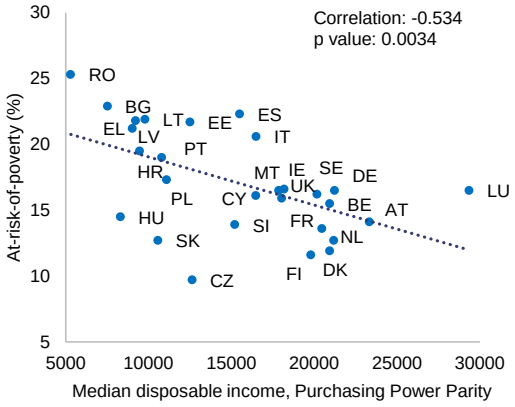
Graph I.3.23: **Median disposable income (at PPP) and AROP market income**



Source: EU-SILC and Eurostat.

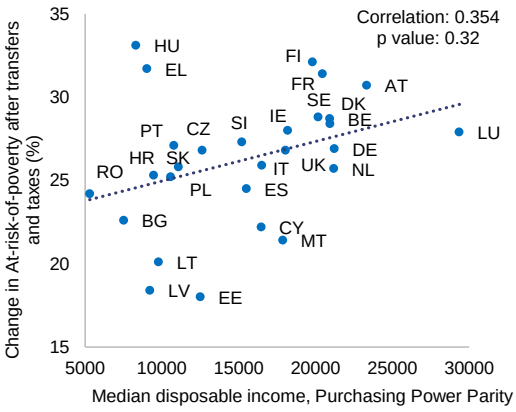
([114]) There is a strong correlation between per capita income and severe material deprivation (-0.75).

Graph I.3.24: **Median disposable income (at PPP) and AROP disposable income**



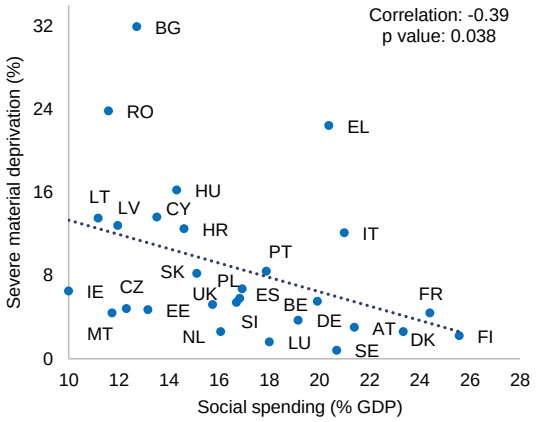
Source: EU-SILC.

Graph I.3.25: **Median disposable income (at PPP) and AROP change after redistribution**



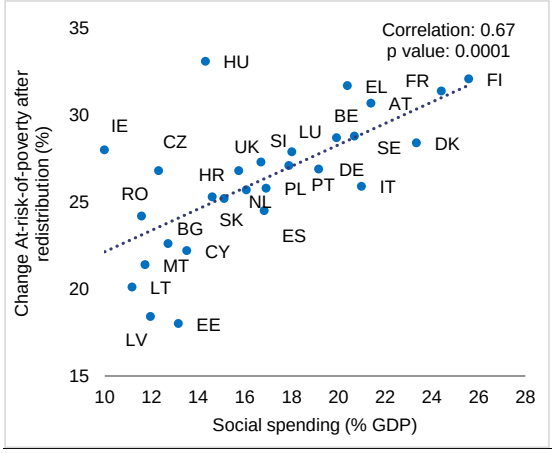
Source: EU SILC and Eurostat.

Graph I.3.26: **Severe material deprivation and social spending**



Source: COFOG database on government expenditures and EU-SILC.

Graph I.3.27: **Change in AROP after redistribution and social spending**



Source: COFOG database on government spending and EU SILC.

Box I.3.2: Indicators of poverty and social exclusion

The *at-risk-of-poverty and social exclusion* (*AROPE)* is a leading indicator and target in the EU 2020 strategy. People at risk of poverty or social exclusion are people *at-risk-of-poverty* (relative monetary poverty) and /or experiencing *severe material deprivation* (material deprivation) and/or living in households with very low work intensity. ([1])

The *at-risk-of-poverty rate* (*AROP*) is a measure of (relative) monetary poverty. The *at-risk-of-poverty rate* is defined as the share of individuals with an equivalised disposable income below 60% of the median income. Median income is the point that separates the top half of earners from the bottom half. The median income changes over the cycle and the indicator can change little during recessions. *AROP* is a measure of the gap in income or the inequality between the median and the lower deciles of the income distribution. The *AROP* with a poverty line anchored in 2005 is not affected by changes over the time in the median income and provides a characterisation of the dynamics of monetary poverty keeping unchanged the median income. The effect of a downturn on the AROP, depends on the distribution of changes in income across the different sub-populations. A fall on the aggregate income, will generally lead to a reduction in the median level of equivalised disposable income and therefore a lowering of the poverty threshold. Therefore, during a recession it is possible that *AROP* falls even if a larger number of people find difficult to make ends meet. Similarly, the increase of median income during the recovery may lead to an increase in *AROP* if not all households' benefit uniformly of the increase of aggregate income. For this reasons, it is standard to make also comparison of the *AROP* with poverty threshold anchored at a specific point in time. The *AROP* does not take into account the income needed in order to enjoy decent living standards. For instance, the *AROP* rate may suggest that poverty is less prevalent even when the *lowest levels of income do not grow*. The *AROP* is one of the headline indicators of the Social Scoreboard, a tool to monitor the performance of Member States in relation to the European Pillar of Social Rights.

The poverty gap is the distance between the median equivalised total net income of persons below the at-risk-of poverty threshold and the at-risk-of poverty threshold itself, expressed a proportion of the at-risk-of poverty threshold. The at-risk-of-poverty rate measures the incidence of poverty, while the poverty gap its depth.

Severe material deprivation is a measure of poverty defined on the basis of social and economic material needs. It is defined as the share of the population living in households that could not afford at least four out of the following nine items deemed to be needed to lead an adequate life (Eurostat, *Statistics explained*):

- to pay their rent, mortgage or utility bills;
- to keep their home adequately warm;
- to face unexpected expenses;
- to eat meat or proteins regularly;
- to go on holiday;
- a television set (if wanted);
- a washing machine (if wanted);
- a car (if wanted);
- a telephone (if wanted).

Households identified as being at risk of income poverty or as material deprived do not necessarily face unsatisfactory living conditions. For instance, more than half of those severely materially deprived have income above the first income quintile. This is the case for instance if households have sufficient savings, access to credit or other liquid assets they can use to maintain their standard of living. Material deprivation is also relevant to study various aspects of the wellbeing of groups of the population. It is also highly relevant for the self-employed, whose income not only tends to suffer from large underreporting but also to neglect the fact that the self-employed can often draw on its business assets (see Filauro and Thirion 2018 ([2])).

Indicators of poverty and exclusions are derived from two successive EU-wide surveys, the European Survey on Income and Living Conditions (EU-SILC) and its predecessor, the European Community Household Panel. The severe material deprivation series covers the EU28 Member States for the period 2004 until 2016 for most Member States. The series available for at-risk-of-poverty is slightly longer, spanning across 2000-2016.

([1]) Note that this section does not consider the low-work intensity indicator.
([2]) Chapter 4 'Inequality of outcomes', Employment and Social Developments in Europe 2018. DG EMPL.

3.7.2. Regression analysis: the drivers of monetary poverty and severe material deprivation

Econometric techniques allow to go beyond simple correlation, isolating the contribution of different factors driving poverty indicators. Thus, with a view to gaining a better understanding of the relation between social spending and poverty, this section estimates the effects of different spending categories on poverty and exclusion indicators, taking into account the effect of disposable income and the unemployment rate. ([115]) The poverty and exclusions indicators are the following:

- severe material deprivation,
- AROP based on disposable income,
- AROP based on market income,
- AROP with an anchored poverty line in 2005.

An increase in disposable per capita income and in social protection spending reduces severe material deprivation. An increase in median disposable income by 1% leads, on average, to an estimated decline by 0.23 pps in the rate of material deprivation (Table I.3.5 column a). The effect of social protection spending is comparable. ([116])

The AROP based on market income is strongly influenced by the unemployment rate and disposable per capita income. This confirms that higher unemployment and a drop in incomes leads to a higher AROP before redistribution. As expected, social spending has no statistically significant impact on AROP based on market income (Table I.3.5 column c).

Yet, social protection spending plays a role in alleviating poverty. Estimates suggest that an increase in social protection spending by 1 pp is associated with a 0.34 pps average decrease in the AROP based on disposable income. ([117]) The net median income does not have a statistically significant impact on AROP (Table I.3.5 column b). ([118]) The relevance of this effect is confirmed when the same estimate is done for the AROP with an anchored poverty line (Table I.3.5 column d). Since the poverty threshold is adjusted to take into account changes in consumer prices, an increase in unemployment leads to a loss of income and an increase in the percentage of people below the fixed poverty line. Indeed in this case, both a decline in the unemployment rate and an increase in median disposable income reduces the AROP rate. The negative sign for the median disposable income suggests that as Member States get richer, they achieve a stronger level of poverty reduction, when keeping social spending and unemployment rate conditions constant. This finding may be related to the fact that European countries with higher median income tend to be also more inclusive, leaving less scope for redistribution and poverty reduction to start with.

Table I.3.5: **Regression summary, drivers of AROP and severe material deprivation: 2000-2016**

	Severe material deprivation (a)	AROP (b)	AROP before benefits (c)	AROP, anchored 2005 (d)
Log median disposable income	-0.23***	0.001	-0.06***	-0.20***
	(0.03)	(0.01)	(0.01)	(0.03)
Unemployment rate	0.05	0.042	0.39***	0.33***
	(0.07)	(0.04)	(0.05)	(0.11)
Social protection spending as % of GDP	-0.26*	-0.34***	0.10	-0.36**
	(0.13)	(0.09)	(0.09)	(0.17)
Observations	348	374	374	264

(1) Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1.
Source: Author's calculations based on EU-SILC, Eurostat, and Cofog.

There are sizeable differences in Member States' ability to lift people out of poverty through redistributive policies. The descriptive evidence of Section 7.2 suggested that the ability of tax and benefit systems to reduce monetary poverty differ for countries with similar levels of

([115]) In order to control for unobserved time- and country-related factors, the regressions are estimated with OLS with time- and country-fixed effects. Estimates are indicative of the average response to a change in social spending. This contrasts with the analysis of Section 3.5, where the focus is on how much of the differences across countries in the poverty reducing effect of social benefits is explained by the reform stance.

([116]) Using ESSPROS data instead of COFOG leads to a slightly higher and more significant coefficient.

([117]) Yet, this effect disregards the impact of redistributive taxation.

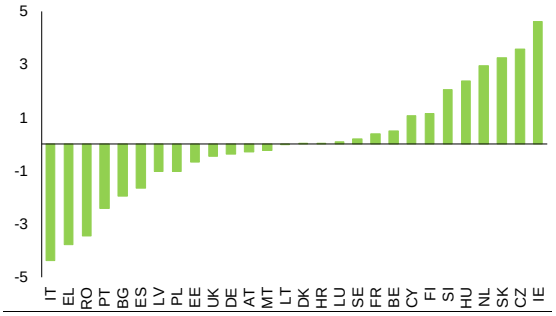
([118]) It is more that the unemployment rate does not drive AROP, as unemployed individuals are likely to fall below the poverty line. Yet, the lack of such a link might hint at the poverty-reducing effect of social protection spending.

social expenditure relative to GDP; this means that the effectiveness of social spending to alleviate monetary poverty does not only depend on the amount of resources committed. In order to estimate the effectiveness of social spending to alleviate market poverty, a measure of efficiency is computed as the component of the change in the AROP before and after benefit (excluding pensions), which cannot be explained by social spending, the level of initial AROP and the unemployment rate. This approach is based on the concept of production efficiency applied to the public sector. Social protection is considered to be effective, if the reduction in market poverty goes beyond what is expected on the basis of social spending. However, the identification of the impact of social protection is challenging when it has multiple social objectives (e.g. social inclusion and labour market integration). ([119]) Moreover, results depend on the assumption that only social protection spending contributes to reducing poverty. In practice, other policies (such as employment and educational policies) as well as a series of contextual factors (demographic and economic) also contribute to reducing the risk of poverty.

With this limitation in mind, cross-country analyses can be used to identify the effectiveness of social spending in reducing AROP, i.e. the size of the uncertainty about "why countries perform so differently" (Vandenbroucke et al., 2013). The results suggest that in Southern and some Central and Eastern European Member States there is a lower poverty-reducing effect at a given level of social spending, after controlling for initial levels of poverty. In contrast, in Ireland, Czechia, Slovakia, the Netherlands and Hungary, welfare states tend to achieve above average levels of poverty reduction. While suggestive, these findings provide some prima facie evidence of the effectiveness of social spending to reduce monetary poverty.

([119]) It is also not obvious to uniquely identify the effects when a broad set of policies influence social outcomes. See Grigoli and Kapsoli (2013) and SPC and European Commission joint report on social protection systems in the EU.

Graph I.3.28: **Efficiency of social protection spending in reducing AROP**



(1) The graph reports the residual of a regression of the change in AROP before and after redistribution on the level of AROP, social spending as a percentage of GDP and the interaction between them; The regression is estimated without country fixed-effects over the period 2000-2017.
Source: Authors' calculation based on EU-SILC, Eurostat, Cofog.

3.8. CONCLUSIONS

The 2008-2012 economic and financial crisis was accompanied by a deterioration of living standards and by an increase in poverty and social exclusion across the EU. The crisis left many unemployed with no or insufficient protection. Thus, after the initial response aimed at ring-fencing fiscal risks and improving labour market adjustment, the focus of policy action shifted towards measures tackling the social implications of the crisis. This chapter looks at the role of social protection spending in alleviating poverty and exclusion. At the current juncture, with the EU economy entering a more uncertain period, it is relevant to assess whether and how spending on social protection provides a better coverage against the risk of poverty than in the past.

During the crisis, total social protection spending as a percentage of GDP shifted up. This increase involved almost all spending categories, in particular those addressed at working age individuals. Nonetheless, spending for the unemployed started to decline well before the fall of the jobless rate, reflecting the exhaustion of entitlements of many long-term unemployed, the shortening of job tenures and the strengthening of activation measures.

Convergence in real social protection spending per capita continued during the crisis. High-income countries tend to spend more on social

protection than low-income countries. Over time, there has been a convergence in the resources allocated to social protection. This process continued during the crisis, although at a lower rate. While spending in countries with the lowest income continued to increase at a rate higher than the average, it slowed down or even dropped in countries with GDP per capita closer to the EU average.

Social protection smooths and distributes income over the business cycle. The analysis suggests that only sickness and unemployment benefits are specifically associated to the economic cycle. After 2008, total expenditure has become more responsive to the business cycle; this is mainly due to the increased responsiveness of spending on unemployment and social exclusion. This does not mean that spending items not systematically associated with the cycle do not contribute to support incomes during recessions. Spending categories that do not move with the cycle (i.e. that are a-cyclical) stabilise incomes by providing transfers to those workers more likely to be liquidity-constrained during recessions (e.g. during a recession, access to health care stabilises incomes of workers experiencing lower monthly wages because of lower working hours). The proportion of shocks that is smoothed via social protection has increased after the 2008 crisis. The degree of stabilisation of incomes varies across countries; those with relatively higher GDP per capita stabilise income shocks via social spending – in particular unemployment, sickness and disability benefits – more than countries with lower incomes.

Social benefits reduce the incidence and the depth of poverty. Social protection spending reduces the share of the population with incomes below the poverty line by one third. Family, sickness and disability benefits are the categories contributing most to the reduction of the poverty rate. Unemployment benefits mitigate the effect of higher unemployment on monetary poverty; nonetheless, their effect is only temporary. By contrast, spending on social inclusion benefits has a more moderate impact on monetary poverty, but it tends to last longer. Social benefits also reduce the gap between income of the poor and the poverty threshold by half.

Reforms increasing the generosity of benefits have reinforced their moderating effect on monetary poverty. During the crisis, social benefits have contributed to moderating the effect of higher unemployment on poverty. Estimates suggest that reforms increasing the generosity of all benefits had an impact on their poverty-reducing effect after two years. This means that countries enacting reforms early in the recession were better prepared to cope with the effects of a persistent increase in unemployment on poverty. This also implies that implementing reforms in good times, i.e. when unemployment is low, would strengthen the poverty-reducing effect of benefits as unemployment increases.

The reforms of tax and benefit systems enacted after 2008 have contributed to lower inequality and monetary poverty in many countries. With the exception of Hungary, the at-risk-of-poverty rate has fallen in all Member States as a consequence of the policy changes enacted after 2008. This includes both countries with rising poverty lines and countries with falling poverty lines. Thus, reforms of tax and benefit systems were able to reduce the risk of poverty in almost all countries. Nonetheless, only few were able to effectively improve the relative position of the most vulnerable individuals. Indeed, although the changes of tax and benefit systems introduced after 2008 increased the disposable income of low-income groups, the depth of poverty – i.e. the average gap between the income of poor people and the poverty line – dropped only in a few countries, most notably Bulgaria, Estonia, Austria and Greece. In the latter case, this is most likely a result of the declining poverty line.

Countries that allocate a higher share of GDP to social spending have better outcomes in terms of poverty indicators. Beyond the stage of economic development, the at-risk-of-poverty rate and severe material deprivation are lower in countries, where social protection absorbs a higher percentage of GDP. Estimates suggest that a one percentage point increase in social protection spending is on average associated with a reduction of the at-risk-of-poverty rate (based on disposable income) by 0.35 pps. Yet, its effectiveness differs across countries, pointing to differences in the efficiency of social spending in reducing poverty.

Box I.3.3: **Access to social protection**

Social protection systems play a key role in supporting people facing key social risks over their life course and reducing their exposure to poverty. There are key differences in the protection provided to different groups of the society. In most Member States, social protection systems were geared towards workers with full-time open-ended contracts. Conversely, workers with non-standard forms of work and the self-employed were more marginally covered. For example, some self-employed still do not have access to sickness benefits (in three Member States), unemployment benefits (in eleven Member States) or insurance against accidents (in ten Member States). These groups represent a significant share of the workforce (39% in 2018). ([1]) They usually faced higher economic uncertainty and are at higher risk of poverty. For example, for the EU as a whole, over 10% of working households are at risk of poverty or of being materially deprived, this rate exceeds 20% for the self-employed, thus being nearly three times higher than for standard employees. ([2]) Retired self-employed face a risk of poverty twice as high as that of retired employees on average. ([3])

With a view to tackle this gap in the protection of workers with different types of contracts, the Commission adopted a proposal for a Council Recommendation on Access to Social protection in March 2018. Following the proposal, the Council reached a political agreement in December 2018. ([4])

The objective of the reccomendation is to support people in non-standard forms of work and the self-employed who, due to their employment status, are not sufficiently covered by social security schemes. The recommendation applies to unemployment benefits; sickness and health care benefits; maternity and equivalent paternity benefits; invalidity benefits; old-age benefits and survivors' benefits; benefits in respect of accidents at work and occupational diseases. Member States are recommended to ensure that all workers and the self-employed:

- can adhere to social protection schemes on a mandatory basis for workers and "at least on a voluntary basis and, where appropriate, on a mandatory basis for the self-employed" (closing formal coverage gaps),
- can build up entitlements, which can be preserved, accumulated or transferred across schemes (improving effective coverage),
- can receive sufficient and timely benefits, contribute in a proportionate manner (improving adequacy),
- are informed about their rights and obligations (transparency).

The EU will support Member States and stakeholders in achieving the objectives of the recommendation by launching mutual learning activities, establishing a monitoring framework and pursuing dialogue with the Member States, social partners and civil society. This will help social protections systems to better deliver poverty redutction, income smoothing and automatic stabilisation.

([1]) Source: Eurostat, Labour Force Survey, 2018.
([2]) Source: Eurostat, EU-SILC, 2016.
([3]) 2017 Share survey data: comparison available for all EU Member States except Bulgaria, Latvia, Lithuania, Portugal, Romania and Slovakia, due to a limited sample size, and Ireland, the Netherlands and the UK, which are not included in the survey. The largest gaps are in Denmark, Poland and Malta. Only in the Czech Republic and Estonia the self-employed have lower AROP rates.
([4]) http://data.consilium.europa.eu/doc/document/ST-15394-2018-INIT/en/pdf

APPENDIX 1
Quartile analysis

Table I.3.A1.1:**ESSPROS: all expenses**

Selected characteristics	Quartile 1	Quartile 2	Quartile 3	Quartile 4
Real per-capita income, 2000-2016	EUR 7700	EUR 14821	EUR 28358	EUR 33980
Growth rate of real per-capita GDP, 2000-2016	85.4%	22.1%	9.2%	21.5%
Mean percentage of unemployment rate, 1996-2016	11.0%	9.5%	9.4%	6.3%
Max increase in unemployment rate after 2008 (duration in years)	6.7 (2)	6.1 (5)	5.8 (5)	2.3 (5)
Decline in unemployment since peak	6.3	5.0	2.8	2.0
At-risk of poverty rate, 2005-2016 average	19.7%	15.2%	16.9%	14.3%
Real Expenditure per person, 2000-2016	EUR 1357	EUR 3104	EUR 7479	EUR 9242
Real Expenditure per poor person, 2005-2016	EUR 7662	EUR 21948	EUR 46446	EUR 66829
Expenditure over GDP, 2000-2016	17.6%	20.9%	26.4%	27.2%

Source: Eurostat

Table I.3.A1.2:**Quartiles, 1996-2016**

Quartile 1	Quartile 2	Quartile 3	Quartile 4
BG	CZ	BE	AT
EE	EL	CY	DE
HR	HU	ES	DK
LT	MT	FI	IE
LV	PT	FR	LU
PL	SI	IT	NL
RO	SK	UK	SE

(1) Quartiles built on average income per capita (pps).
Source: Eurostat

APPENDIX 2
Definitions of the functions of social protection

Table I.3.A2.1: **Definitions of the functions of social protection**

Function	Brief description
1. Sickness/Health care	Income maintenance and support in cash in connection with physical or mental illness, excluding disability. Health care intended to maintain, restore or improve the health of the people protected irrespective of the origin of the disorder.
2. Disability	Income maintenance and support in cash or kind (except health care) in connection with the inability of physically or mentally disabled people to engage in economic and social activities.
3. Old age	Income maintenance and support in cash or kind (except health care) in connection with old age.
4. Survivors	Income maintenance and support in cash or kind in connection with the death of a family member.
5. Family/children	Support in cash or kind (except health care) in connection with the costs of pregnancy, childbirth and adoption, bringing up children and caring for other family members.
6. Unemployment	Income maintenance and support in cash or kind in connection with unemployment.
7. Housing	Help towards the cost of housing.
8. Social exclusion not elsewhere classified	Benefits in cash or kind (except health care) specifically intended to combat social exclusion where they are not covered by one of the other functions.

Source: Eurostat

Part II

Analytical chapter

1. THE RELATIONSHIP BETWEEN POLARISATION AND SKILLS MISMATCHES: EVIDENCE FOR THE EU

Skills mismatches – i.e. discrepancies between the skills sought by employers and the skills offered by workers – increased during the crisis and remain high in many Member States. This imbalance may be temporary, because of labour market frictions and the business cycle, or more persistent, because of structural disequilibria between supply and demand of skills.

At the same time, employment is largely shifting from routine to non-routine occupations in the EU as a whole. Known as job polarisation, this phenomenon captures the decline of employment in middle-skilled occupations and the increase of jobs requiring lower and higher skill levels. As this chapter will explore, polarisation is a broadly observed, long-term process influenced by technological changes and shifts in the international division of labour.

Only a few studies have so far tried to assess the link between job polarisation and skills mismatches. This chapter investigates this relationship. The analysis suggests that the introduction of technologies that reduce the demand for workers performing routine tasks has increased skills mismatches. This is consistent with technological changes driving permanent shifts in the demand for labour, which lead to imbalances between supply and demand.

The increasing labour demand for high-skill tasks along with the lower labour demand for routine tasks have increased skill mismatches in the EU. This effect may be partly offset by improvements in economic conditions and by higher levels of education and labour market participation. This highlights the scale of the challenge to promote the alignment of skills supply with skills demand in a growing economy. In the absence of an adequate supply response, the labour market trends would lead to higher skill mismatches, in particular during weakening economic conditions.

1.1. INTRODUCTION

Much has been written about job polarisation, but little is known about its impact on skills mismatches. Job polarisation, defined as the relative job growth at both extremes of the wage distribution (lower and higher-skilled) relative to the middle-wage (middle-skilled) ones, is a well-documented phenomenon in advanced economies (Autor et al., 2006; Goos and Manning, 2007; Acemoglu and Autor, 2011; OECD, 2018a). A large strand of the literature has focused on the causes of this phenomenon, pointing to technology and globalisation as the main drivers of the decline in the share of middle-wage (middle-skill) occupations. Less is known, however, about its consequences and more precisely its impact on skills and skills mismatches. Technology can replace workers in routine tasks that are easy to automate and complement workers in tasks that require creativity, problem solving and cognitive skills. As machine learning and artificial intelligence advance in many sectors, a growing number of workers may need to move from declining occupations (concentrated in middle-skill routine tasks) to growing ones (which are characterised by high- or low-level, non-routine cognitive skills).

All EU Member States have experienced job polarisation in the past two decades, though unevenly. Compared to the pre-crisis period, the proportion of workers in middle-paid and middle-skill occupations is shrinking in all EU Member States, albeit to different degrees. This chapter will consider different notions of polarisation across Member States and examine whether this has occurred mostly within sectors or between them. In countries that experienced a late shift of employment from agriculture and manufacturing to service sectors, such as Southern and Central European countries, the increase in polarisation observed at the national level may have occurred because of employment reallocations, both between and within sectors. This shift is expected to affect both the demand and the supply of skills: the types of tasks carried out in jobs as well as the types of professions and occupations required in the labour market.

Skills mismatches refer to a discrepancy between the demand and the supply of skills in the labour market, a situation in which the skills sought by employers are different from the skills offered by workers in general or job seekers in particular. The term skills mismatch is very broad. It can refer to the level of the economy as a whole (macroeconomic skills mismatch), to skills shortages experienced by firms when filling open vacancies (firm-level aggregates), or to on-the-job skills mismatches experienced by specific workers, i.e. a discrepancy between the worker's skills and the skills needed for the specific job. While skills shortages refer to a situation whereby employers are unable to fill vacant posts due to a lack of suitably qualified candidates, on-the-job skills mismatches refers to the degree at which workers in firms possess skill or education levels that are above, below or poorly connected to those required at their current job (Quintini, 2011; Cedefop, 2015). This last dimension of skills mismatches does not capture individuals who are out of work. Every economy experiences some degree of skills mismatch as a result of labour market frictions in the short-term (Kiss and Vandeplas, 2015). However, when mismatches become structural and persistent, they can have considerable economic and social repercussions, requiring appropriate structural policy responses to address them.

Skills mismatches remain high among Member States. Today, more than 60 million adults in the EU lack necessary literacy, numeracy and digital skills. Digital technologies are increasingly used in workplaces across the EU and nowadays most jobs require basic digital skills. In 2017, almost half of the EU population (43%) had basic or below basic digital skills with only a slight improvement observed since 2015, while 38% of employers reported that the lack of digital skills had an impact on their performance, notably through productivity losses. In 2019, every Member State received a Country-Specific Recommendation related to skills, out of which twelve explicitly mentioned their labour market relevance and skills mismatches (Belgium, Bulgaria, Croatia, Estonia, France, Ireland, Netherlands, Poland, Portugal, Romania, Slovenia, and Spain). This highlights the scale of the challenge to promote the alignment of skills supply with skills demand in the EU.

In this context, it is relevant to examine whether job polarisation has affected skills mismatches and, if so, to what extent. Both job polarisation and skills mismatches have become topics of increasing interest given their prevalence. Technological progress and automation have been offered as explanations for job polarisation. Furthermore, there is substantial evidence on the adverse effects of skills mismatches on wages and job satisfaction (Mavromaras et al., 2009; European Commission, 2015), but also productivity and output (Nickell and Nicolatsis, 1997; Bennett and McGuinness, 2009). In contrast, the effect of job polarisation on skills mismatches has been much mess analysed, although the literature on job polarisation suggests the existence of such a link (Goos and Manning, 2007).

From a theoretical point of view, the effect of job polarisation on skills mismatches is ambiguous. Starting from a hypothetical situation in the labour market, in which the supply of skills perfectly matches demand and adequately trained workers fill all jobs, polarisation could increase different dimensions of skills mismatches. In the absence of a supply response, it could increase macroeconomic skills mismatches, as it would imply a fall in the demand for middle-skilled workers and a rise in the demand of high- and low-skilled workers. It could also increase labour shortages for the latter two groups. Furthermore, under-qualification could rise among workers moving to the growing share of high-skill jobs, while over-qualification would rise for those performing low-skill jobs, if workers previously employed in middle-skill jobs take up these jobs. Whether such effects would materialise is uncertain for at least three reasons. First, the supply of skilled workers is on an upward trend in many EU countries, which may or may not be in accordance with the increasing share of high-skill jobs. Secondly, labour markets are often characterised by a certain extent of skills mismatches and different starting positions with regard to levels and types of such mismatches will clearly change how polarisation shapes them. In a country with a high incidence of under-skilling, for example, job polarisation could even reduce under-skilling, if it implies a shift of medium-skilled workers from medium- to low-skilled jobs. Finally, job polarisation may interact with unemployment (i.e. the workers previously employed in middle-skill occupations might become unemployed instead of moving immediately to low-skill and/or high-skill occupations). In that case, it might not

affect skills mismatches at all. Overall, this illustrates that the relationship between polarisation and skills mismatches is not straightforward, but rather ambiguous.

This chapter examines the relationship between job polarisation and skills mismatches as well as the main determinants of the latter across Member States. The chapter is structured as follows. First, it starts with a literature review of the determinants of both job polarisation and skills mismatches. The chapter proceeds with an overview of the main concepts and dimensions of skills mismatches and job polarisation that have been employed in the literature as well as the indicators to operationalise them, their pros and cons, their evolution over time across Member States and some descriptive statistics. The subsequent section estimates the effect of job polarisation on skills mismatches across Member States between 2002 and 2017, presenting the empirical findings. Finally, the chapter concludes with some policy recommendations.

1.2. LITERATURE REVIEW ON THE DETERMINANTS OF SKILLS MISMATCHES AND POLARISATION

1.2.1. The determinants of job polarisation

The most important determinant of job polarisation is technological change. For several years, it was argued that technological change benefits the more skilled workers and harms the low-skilled workers, thereby creating a "skill bias" in the evolution and remuneration of labour (Katz and Autor, 1999). However, several studies have challenged this view arguing that the relationship between new technologies and the employment or wages of different skill groups is more complex (Card and DiNardo, 2002; Lemieux, 2008). In particular, while the hypothesis of skill-biased technological change could account for the growth of high-skilled employment, it could not explain the simultaneous increase in the demand of low-skilled jobs and the fall in middle-skill occupations. In their seminal study, Goos and Manning (2007) were the first to refer to this phenomenon as "job polarisation" putting forward an alternative link between technological change and job polarisation. Goos and Manning (2007) used the US data from Autor et al. (2003) to show that the jobs that require non-routine tasks tend to be at the top and bottom of the skills and wage distribution, while the jobs that require routine tasks tend to be in the middle. Following Autor et al. (2003), they attributed polarisation to "task-biased technological change" which leads to the replacement of middle-skill, routine tasks undertaken by workers with primarily medium-level education (such as clerical and craft occupations) and corresponding to tasks performed by computers and associated technologies (the "routinisation hypothesis").

However, technological progress and automation do not necessarily lead to job destruction. Member States where automation and digitalisation are most widespread, for example Germany and the Czech Republic, are also those that have registered the lowest unemployment rates in the EU (European Commission, 2018a). In particular, this study finds that the extent to which labour can be replaced by technology depends on the level of skills required by the tasks to be performed in each job. This explains the relatively high replacement rate of repetitive low-skill tasks. In contrast, skilled labour is needed to fully exploit the potential of modern technologies by operating, maintaining, repairing and improving them. Whether or not labour is substituted by technology ultimately depends on the ability of education and training systems to adapt to the fast-changing technological opportunities.

Furthermore, although there is evidence of job polarisation in terms of employment, the evidence for polarisation in terms of wages is mixed. According to the theory, along with employment, also wages should be polarising with salaries growing relatively faster for those at the poles. This pattern, however, is found only for the US (Autor et al., 2006; Acemoglu and Autor, 2011). For Europe, the evidence is mixed with several studies finding no wage polarisation (Dustmann et al., 2009; Mishel et al., 2013; Autor, 2015; OECD, 2019). Goos et al. (2009) looked at ISCO 88 two-digit occupations between 1993 and 2006 and find evidence for job polarisation in Europe as a whole: the four lowest paying and the eight highest-paying occupations increase their employment share, while the nine middle-paying occupations lose jobs. Kampelmann and Rycx (2011) find some evidence of wage polarisation in Germany for the period 1985-2008. In particular,

they find that occupations situated around the 40th percentile of the earnings distribution have lost and high-paid occupations have gained employment shares. The lowest percentiles stagnated or recorded minor employment losses.

Other structural determinants of job polarisation comprise international trade, off-shoring, deindustrialization and the shift from manufacturing to services. In addition to technological change, international trade and off shoring allow respectively to substitute home routine productions with imports and to move routine activities in countries with lower labour costs (Autor et al., 2013; 2015). Both international trade and offshoring have been shifting the domestic labour demand in favour of non-routine occupations (both low skilled and high skilled) for the last three decades. However, it is inherently difficult to disentangle the effects of technological change and international trade on job polarisation, since these two megatrends complement and reinforce each other. Keller and Utar (2016) linked the rise in Chinese imports to the decline in Danish middle-paid manufacturing jobs, which has further aggravated job polarisation. Their study finds that as workers are pushed out of middle-paid employment in manufacturing, they turn to low-wage and high-wage services. ([120]) These effects hold when controlling for off shoring and technology, suggesting that international trade competition operates separately from these channels.

The increase in polarisation observed at the national level can result from polarisation within individual industries or employment shifting away from initially less polarised industries to more polarised ones. Polarisation between industries might be of particular interest given the decline of manufacturing and the shift towards services in developed economies. In a recent study, Breemersch et al. (2017) find that, in the EU for the period 1997-2010, polarisation occurred mostly within industries, while the reallocation of employment away from less polarised industries towards more highly polarised industries contributed only to about one third of the total change. They find that both technological change and international trade competition contributed to job polarisation within European manufacturing industries. ([121]) However, they find no evidence that technological change played any role in job polarisation between industries. This implies that raising barriers to trade seem to have limited effects on reducing job losses in declining industries. Finally, labour market institutions could also play a crucial role. Kampelmann and Rycx (2011) provide evidence that declining unionisation has also led to job polarisation: the fall in union membership has a significant effect on the evolution of employment shares in Germany between 1985 and 2008. Nevertheless, Breemersch et al. (2017) find no evidence that labour market institutions (namely union density, employment protection legislation and minimum wages) have affected job polarisation in the EU.

Several studies have attributed job polarisation to changes in the business cycle; yet, the evidence is mixed. Jaimovich and Siu (2012) find that in the US, much of the job loss in middle-skill occupations occurs during economic downturns, while high- and low-skill occupations are less affected. However, another US-based study (Foote and Ryan, 2013) finds that middle-skill occupations have traditionally been more cyclical than other occupations, in part because of the volatile industries that tend to employ middle-skill workers. Unemployed middle-skill workers also appear to have few attractive or feasible employment alternatives outside of their skill class. On the contrary, employment of the low-skill non-routine manual group never shows much cyclical variance and their relative unemployment rate even improves in recessions ([122]).

1.2.2. The determinants of skills mismatches

Human capital theory considers skills mismatches a short-term, cyclical phenomenon. Most of the studies on the determinants of skills

([120]) Overall, the estimates suggest that Chinese import competition accounts for about a fifth of total middle-paid employment decline in the Danish national labour market.

([121]) More precisely, technological change explains a third of within-industry polarisation, while international net import competition contributed to a much smaller extent. The process of between-industry polarisation is driven by widespread deindustrialization and the structural shift to the services sector while international net import competition explains about a fifth of the reallocation of labour within economies away from less polarised manufacturing industries.

([122]) This is also supported by the recent study of Baley et al. (2019).

mismatches have focused on over-qualification. In his seminal work, Becker (1964) assumes that workers will always be paid their marginal product, which is determined by the level of human capital acquired through initial formal training and on-the-job training. Thus, human capital theory, under the assumption of perfect competition, predicts no mismatches assuming that employers will fully utilise the skills of their employees. However, for the proponents of the human capital theory, it is possible that in the short-run workers are overeducated, as workers themselves may be seeking a job that suits more their skills while firms may require time to adapt their production processes to human capital of existing workers. Several economists have questioned this view (Duncan and Hoffman, 1981; Hartog and Oosterbeek, 1988). Battu et al. (2000) examine the prediction that firms upgrade the tasks they give to their overeducated workers by testing for the hypothesis that graduates' jobs converge over time, rendering over-qualification a short-term phenomenon. They find no evidence that overeducated graduates have been able to upgrade their jobs (i.e. implying that over-qualification can survive in the long-term.

Skills mismatches are affected by the business cycle. Whether and how labour supply responds to rapid increases of demand depends on the distribution of existing skills, the type of skills mismatch, the extent of geographical mobility and the signals provided by wage adjustments. In downturns, there are two factors at play: on the one hand, mismatches decline, because low quality matches are destroyed but high quality matches between firms and employees survive. On the other hand, mismatches increase because firms post fewer vacancies and job seekers are willing to accept less desirable jobs because of the higher competition they face ("sullying effect"). When demand is buoyant and the labour market is tight, employers may be forced to adjust their hiring standards downward to cope with difficulties in recruiting skilled labour, which increases the incidence of under-skilling (Healy, Mavromaras and Sloane, 2015; Livanos and Nunez, 2017). Yet, over-qualification has been found to behave counter-cyclically: the highly educated crowd out the lower educated during downturns where the selectivity of employers and workers decreases (Croce and Ghignoni, 2012; Kiersztyn, 2013).

While there is evidence that at least some part of skills mismatches is cyclical, there are also important structural determinants. One important structural determinant is technological change (Di Pietro, 2002). The rapid pace of technological change may require skills and qualifications higher than those possessed by workers; it changes the demand for skills between sectors, occupations and firms. Technological change can lead to skill shortages by creating the need for new skills that are not immediately available in the labour market, until the education system at large (including employer training) is able to respond to the demand of new skills. In addition, firms may wish to hire high-skilled workers as these can adapt at a lower cost relative to the unskilled workers (Desjardins and Rubenson, 2011). Demographic trends are another structural factor that can add to skill shortages through its impact on size, age and the composition of the labour force. Demographic change also affects the demand for goods and services, and hence on the demand for the skills necessary to provide them (e.g. medical services and personal care). Shifts in the demand for labour towards more skilled jobs and ageing – a long-term feature of European economies – can produce skill shortages and mismatches, as older workers are endowed with skills that do not necessarily match closely those required by the process of digitalisation of modern economies (European Parliament, 2015).

There is a broad consensus on the importance of labour market institutions and labour market policies in reducing skills mismatches. Berton et al. (2017) study whether the Italian reform of employment protection legislation of 2012 (Fornero reform) has influenced the quality of the match between workers and firms. ([123]) They found that the reform increased the probability of a good match by 9.5% and that the main driver for this has been a reduction in under-education and an improvement of labour reallocation. Thus, reforms that improve labour reallocation may lead to a more efficient match between existing jobs and skills and reduce skills mismatches. Adalet McGowan and Andrews (2015) explore the

([123]) The study uses Labour Force Survey data and a difference-in-difference approach and measures the quality of matches in terms of dispersion around sector- and occupation-specific median educational attainment.

relationship between skills mismatches and public policies using micro data for 22 OECD countries from the OECD Survey of Adult Skills (PIAAC). After controlling for individual and job characteristics, their findings suggest that well-designed product and labour markets are associated with a smaller skills mismatch. More precisely, greater flexibility in wage negotiations and higher participation in lifelong learning are associated with a better matching of skills to jobs. Higher shares of temporary contracts have been found to increase over-qualification via lowering the selectivity of employers and workers. Increasing participation in lifelong learning from the lowest level (Italy) to the median (Estonia) is associated with a 6 pps reduction in the mismatch. Less cumbersome product market regulations and bankruptcy legislation that does not excessively punish business failure are associated with lower skills mismatches. ([124]) Finally, skills mismatches are lower in countries with housing policies that do not impede residential mobility (e.g. transaction costs on buying property and stringent planning regulations). ([125])

Individual characteristics are also important determinants of skills mismatches. Several studies suggest that individual characteristics may be more important than macro-level factors (Ghignoni and Verashchagina, 2014). At the microeconomic level, three factors have been found to significantly affect skills mismatches: gender, immigrant background and education. Empirical evidence about gender effects has been mixed, however, most studies conclude that women have a higher skills mismatches risk than men (Aleksynska and Tritah, 2013; Baert et al., 2013; Betti et al., 2011; Kiersztyn, 2013). Using Dutch data, Renes and Ridder (1995) find that on average women are required to have almost six months more work experience than men to be hired for the same job. However, Quintini (2011) finds that women across the OECD are less likely to be over-skilled. First- and second-generation immigrants face higher risks of skills mismatches (Aleksynska and Tritah, 2013; Tarvid, 2012), whereas residence duration seems to have no effect on it (Aleksynska and Tritah, 2013; Fernández and Ortega, 2008). However, Nieto et al. (2014) do not find any significant difference in the probability of having skills mismatches between natives and EU-movers while immigrants from outside the EU are less likely to match skills demand, once individual characteristics are controlled for. The region of origin, the native language, length of residence and work experience in the host country, place of acquisition of formal qualifications, age at migration and migrant generation can be important determinants of whether migrants are more likely to be mismatched (Battu and Sloane, 2004). Finally, and somewhat counterintuitively, Adalet McGowan and Andrews (2015) show that skills mismatches are more likely among those with higher levels of educational attainment, suggesting that policies to increase educational levels may not be sufficient to address mismatches.

1.2.3. The relationship between job polarisation and skills mismatches: the literature

There have been few empirical studies on the relationship between job polarisation and skills mismatch. Sparreboom and Tarvid (2016) find that job polarisation decreases the mismatch between skills demand and skills supply, approximated by the level of educational attainment, but that there is no statistically significant effect on the reverse relationship (from skills mismatches to job polarisation). Zago (2018) examines the effect of polarisation on skills mismatches in the US during the Great Recession and finds that a 1 pp increase in polarisation leads to a rise in skills mismatch by 0.39 pps. The author provides evidence that when the economy is hit by a negative transitory shock and the labour market polarises, high-skilled workers are mismatched only temporarily to lower paying jobs, i.e. they typically move from abstract to routine (clerical) jobs in bad times, but they climb up the ladder when the economy goes back to its expansionary path. On the contrary, low-skilled workers are mismatched permanently or remain unemployed for longer, since their mobility is constrained by their skill level and their employment opportunities are critically reduced due to job polarisation. ([126])

([124]) The role of bankruptcy law is particularly strong: reducing the cost of closing a business from its most restrictive level in Italy to the median level in Canada is associated with a 10 pps decrease in the probability of mismatch.

([125]) However, in this paper a caveat applies and causation is difficult to establish given that the data is available only at one point in time.

([126]) For the US, the paper suggests that as a result of a 1 pp increase in polarisation during the recession, high-skilled

This is the only empirical study to track mismatched workers in the economy and account for the efficiency of the reallocation patterns over the cycle, bridging the literature on job polarisation with the literature on the cyclical reallocation of workers.

Acemoglu and Restrepo (2018) develop a theoretical framework to analyse the implications of automation and artificial intelligence on the demand for labour, and find that the former lead to skills mismatches. Their model suggests that automation has a displacement effect in accordance with the task-based approach and a simultaneous productivity effect, resulting from the cost savings generated, which in turn increase the demand for labour in non-automated tasks. Therefore, automation is found to lead to skills mismatches. To the extent that the workforce does not possess the new required skills, the adjustment process will be hampered with significant repercussions. As the authors argue "If the educational system is not up to providing those skills (and if we are not even aware of the types of new skills that will be required so as to enable investments in them), the adjustment will be greatly impeded. At stake is not only the speed of adjustment, but potential gains from new technologies. If certain skills are complementary to new technologies, their absence will imply that the productivity of these new technologies will be lower than otherwise. Thus, the mismatch between skills and technologies not only slows down the adjustment of employment and wages, but holds back potential productivity gains" (Acemoglu and Restrepo, 2018, pp.13).

1.3. SKILLS MISMATCH: MEASURES AND RECENT DEVELOPMENTS

Skills mismatch refers to a discrepancy between the demand and the supply of skills in the labour market, whereby the skills sought by employers are different from the skills offered by workers. It is a broad, encompassing term and the literature has distinguished among three different concepts of skills mismatch. The first is the broader ***macroeconomic skills mismatch*** in the economy, which captures the gap between the skills that the working age population has and the skills needed in the economy. This has been operationalised through the dispersion in the employment rates of low, middle and high-skilled workers. The second concept of skills mismatch are ***labour shortages***, which refer to the difficulties experienced by employers in filling open vacancies. Finally, the third and more specific concept of skills mismatches in the literature is ***on-the-job skills mismatch***, which refers to differences between the worker's skills and the skills needed for his/her specific job.

On-the-job skills mismatches have been operationalised in the literature through indicators of vertical and horizontal skills mismatch. ***Vertical skills mismatch*** (over-qualification, under-qualification) refers to a situation in which there is an ordinal relationship between the skills required for a specific job and the skills possessed by the worker, i.e. a worker has more/less skills compared to those required by her/his job. ***Horizontal skills mismatch*** (mismatch by field of education) refers to a situation in which a worker possesses skills that are different from those that are required to adequately perform her/his job tasks, but no clear ordinal relationship emerges. This is for example the case when a worker is employed in an occupation different from the field of study in which he/she has been trained.

There are significant differences across Member States in both the levels and the trends of all these indicators. The evidence suggests that certain types of skills mismatches are indeed on the rise in the EU, notably labour shortages and over-qualification. Other types are on a long-term declining trend (e.g. under-qualification) or follow patterns that are more complex over time (e.g. macro-economic skills mismatch) ([127]).

1.3.1. Macroeconomic skills mismatch

The macroeconomic skills mismatch shows the relative dispersion of employment rates across population groups with different educational attainment. While the term "macroeconomic skills mismatch" has been broadly used in the literature, the term "macroeconomic qualifications

workers are 3 pps more likely to temporarily downgrade into routine jobs while low-skilled workers are 2 pps more likely to permanently downgrade into manual jobs in the upcoming recovery.

([127]) For a review see Vandeplas and Thum-Thysen (2019).

mismatch" would arguably be more accurate as in the operationalisation of the indicator skills are approximated by qualifications. If data are available, one can directly compare the composition of vacancies (in terms of qualification levels) with that of (un)employment (see e.g. Şahin et al., 2014). Nevertheless, as reliable data on vacancies at the EU level are hard to obtain, simplified measures can be used to compare the composition of employment in terms of qualifications (as a proxy for labour demand) with that of the working age population (as a proxy for supply); or the composition of unemployment (as a proxy for the lack of demand) with that of the labour force (as a proxy for supply). Thus, in the absence of reliable vacancy data, the macroeconomic skills mismatches indicator is defined as the relative dispersion of employment rates across three population groups with different educational attainment: the low, middle and high skilled. ([128]) In general, macroeconomic skills mismatches will be high if the employment rates of low- and/or middle-skilled workers are low as compared to those of high-skilled workers, while the former make out a substantial share of the working age population. ([129])

Macroeconomic skills mismatches can have both cyclical and structural determinants. On the one hand, as low-skilled employment tends to be more sensitive to the cycle than high-skilled employment, the difference in employment rates between qualification groups typically increases in economic downturns. As a result, macroeconomic skills mismatches typically increase during an economic downturn and decline again during the recovery. Nevertheless, changes in the index could also be due to structural factors, such as technological, occupational or demographic changes or differences in the impact of changing institutional settings and of demographics across education groups (e.g. if the increasing generosity of benefit systems affects low-qualified workers more than highly-qualified ones). Some skills mismatches are inevitable in dynamic, continuously changing economies, as there are always some unfilled positions, even if some people remain unemployed. Moreover, there can be individuals who are in a job that does not fully match their skills profile. Even when an economy is "in equilibrium", less skilled workers are likely to experience higher unemployment rates than the highly skilled (Layard et al., 2005). Nevertheless, high and persistent macroeconomic skills mismatches are costly for firms, workers, the society and the economy as a whole (see for example Velciu, 2017; LaRochelle-Côté and Hango, 2016; European Commission, 2015). ([130])

Over the last decade, the macro-economic skills mismatch has followed a countercyclical pattern on average in the EU. It increased during the crisis and recession and declined again during the recovery, although there is a large heterogeneity among Member States. Graph II.1.1 presents the evolution of macro-economic skills mismatches across EU countries. In 2018, the highest rates were recorded in Belgium, Croatia, Bulgaria and Italy, with differences in employment rates among skill groups of above 20%. These countries generally combine substantial employment gaps (between low- and highly-qualified workers, and/or between medium- and highly-qualified workers) with substantial shares of low- and/or medium-qualified workers in their population. The lowest macroeconomic skills mismatches were observed in the United Kingdom (10%) followed by Portugal (12%). In the recovery, 21 Member States have seen a reduction of the mismatch. The largest declines were observed in Lithuania, Cyprus, Hungary, Bulgaria

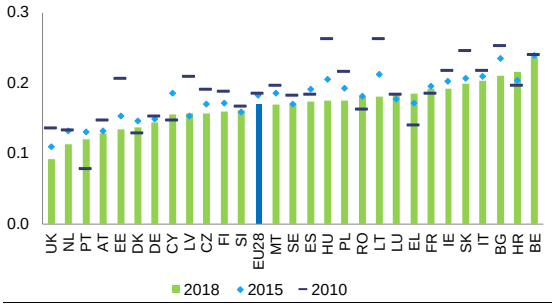
([128])
$$SMI = \sum_{i=L,M,H} \left|\frac{E_i}{E_t} - \frac{P_i}{P_t}\right| = \frac{1}{e_t} \sum_{i=L,M,H} \left|\frac{P_i}{P_t}(e_i\right.$$
where i equals the three different qualification groups *(low-skilled, middle-skilled* and *high-skilled)*, E_i, P_i and e_i equal the total employment, the working age population and the employment rate of group i respectively; and E_t, P_t and e_t equal the aggregate employment, the aggregate population and the aggregate employment rate respectively. This indicator have been calculated by Estevao and Tsounta (2011) for US states, by the ECB (2012) for the euro area as a whole and by European Commission (2013b, Chapter) and Arpaia et al. (2014) for all EU Member States. The use of dispersion indicators to measure mismatch in the labour market dates back to Lipsey (1960).

([129]) This measure takes on values between 0 and 2. It equals 0 if the employment rates of all skill groups are equal to each other and hence to the aggregate employment rate. It equals 2 if the employment rate is extremely low (0%) in two out of three skill groups, and extremely high (100%) in the third group, and if the size of the former two is sufficiently high. For a detailed description of the indicator, see Kiss and Vandeplas (2015).

([130]) Among other things, economic losses can take the form of employment, productivity or income losses, while social losses can be reflected in inequality of opportunities, poverty, low quality of life or social exclusion.

and Estonia. In these countries, employment rates of medium- and high-qualified workers have been converging to the aggregate employment rate over recent decades, while the latter have been growing in importance as a share of the working age population. The opposite applies to the employment rate of low-qualified workers, who, however, made up a shrinking part of the working age population. On the other hand, skills mismatches have increased in the recovery in some of the countries particularly hit by the crisis (namely Greece and Latvia), but also in Croatia and Luxembourg.

Graph II.1.1: **Relative dispersion of employment rates by education level (macroeconomic skills mismatch), 2010, 2015 and 2018**



Source: Own calculations based on Eurostat. Annual average based on the average of four quarters.

1.3.2. Labour shortages

Labour shortages reflect a market disequilibrium where the demand for labour exceeds the available supply, at the particular wages and working conditions. According to Quintini (2011), labour shortages arise "when employers are unable to recruit staff with the required skills in the accessible labour market and at the ongoing rate of pay". Labour shortages can be specific to certain geographical locations, to occupations with special skills or functional requirements and can have a seasonal pattern in certain industries (such as services or agriculture). It is useful to distinguish quantitative and qualitative labour shortages. In case of a quantitative (or aggregate) labour shortage, the total supply of labour in an economy (i.e. for all sectors and occupations) is below the total demand for labour. Qualitative shortages occur if labour demand exceeds labour supply in a specific sector, occupation or at a specific skill level (Reymen et al., 2015).

Like macroeconomic skills mismatch, labour shortages can have both cyclical and structural determinants. Cyclical factors include increasing or decreasing labour demand due to shifts in the economic business cycle. Employers typically encounter more challenges to recruit the "right" workers at times of economic growth (Green and Ashton, 1992; Desjardins and Rubenson, 2011). The employment of low-qualified workers tends to be more sensitive to the cycle than the employment of the high qualified. Empirical evidence supports the view that employers adjust wages upwards and/or recruitment standards down (such as minimum qualification levels for hiring) during economic upturns when job applicants become scarcer (Layard et al., 1991; Devereux, 2002; Büttner et al., 2010; Vandeplas and Thum-Thysen, 2019). Structural skills shortages stem from technological changes, low labour market relevance of the education and training systems, demographic factors and migration flows, while skills mismatches are a major determinant of labour shortages (Shah and Burke, 2003; Kaminska and Kahancova, 2010; Fuchs and Söhnlein, 2013; Quintini, 2011; Cappelli, 2015). Organisational and sectoral changes may be a further structural reason behind the emergence of labour shortages: job seekers who previously worked in declining sectors, such as agriculture and manufacturing, may not be easily employable in jobs in growing sectors such as health and education, which require different types of skills (CEDEFOP, 2014).

Labour shortages can be measured either through Beveridge curves or based on business surveys. The Beveridge curve plots unemployment against job vacancies. A large share of vacancies coupled with low unemployment is indicative of quantitative labour shortages, likely of a cyclical nature. On the other hand, vacancies coexisting with high unemployment are indicative of qualitative labour shortages. Business surveys can establish the existence of unfilled or hard-to-fill vacancies, and discern the employers' views for the reasons underlying the recruitment difficulties.

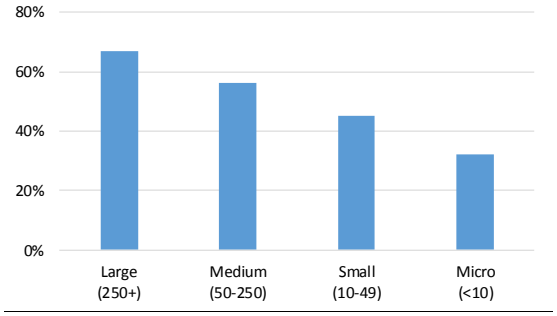
Three surveys collect data from employers on their difficulties to fill vacancies. Their sampling methodologies, the questions asked and the results are different. First, Eurofound's European Company Survey (ECS), implemented every four years, asks employers whether they "encounter

difficulties in finding employees with the right skills". Second, the annual Manpower Group Talent Shortage Survey asks employers about why the open positions in their organizations remain difficult to fill. Finally, the European Business and Consumer Surveys (EU-BCS) collects quarterly data on employers in manufacturing, services and construction reporting whether labour shortages are a major factor limiting their production. Both the ECS and the EU-BCS have the same coverage, i.e. all EU Member States and the five candidate countries. The Manpower Group Talent Shortage Survey has a broader, global coverage including 41 countries out of which 20 are Member States.

Both the Beveridge curve approach and business surveys can reflect cyclical conditions and structural factors. The Beveridge curve analysis cannot help to distinguish the cyclical from the structural determinants of labour shortages. Similarly, when firms report recruitment difficulties, this can be due to a genuine lack of labour supply to meet labour demand, or this can also be due to the unwillingness of firms to increase wages or to improve their working conditions (CEDEFOP, 2015) as well as other factors such as geographical location.

Contrary to the macroeconomic skills mismatch, labour shortages in the EU moved counter-cyclically, i.e. they decreased during the crisis and increased again in the recovery, with many Member States experiencing today high labour shortages. The Manpower Talent survey is an annual, global survey on skills shortages, although it does not cover all EU Member States ([131]). In 2018, 45% of all the employers surveyed stated that they found it difficult to fill positions, the highest rate in the last decade. Nevertheless, this high percentage could be attributed to other factors and not "genuine" skills shortages, such as preferences (e.g. individuals not willing to accept jobs or high labour turnover induced due to poor wage and working conditions) and barriers to geographical mobility. Thus, to identify "genuine" skill shortages the Manpower Talent survey asks for the reasons why employers are encountering these difficulties. Almost one third of employers said that the main reason why they cannot fill jobs is a lack of applicants while 20% said that candidates lack the necessary experience; 27% of employers said that applicants lack either the hard skills or soft skills they needed to fulfil their roles. Graph II.1.2 depicts the percentage of firms facing difficulties in filling positions by company size. As can be seen, across the whole sample, large firms have twice as much difficulty filling vacancies: 67% report hiring challenges as opposed to 45% of small firms.

Graph II.1.2: **Percentage of firms reporting difficulties in filling positions by company size (2018)**

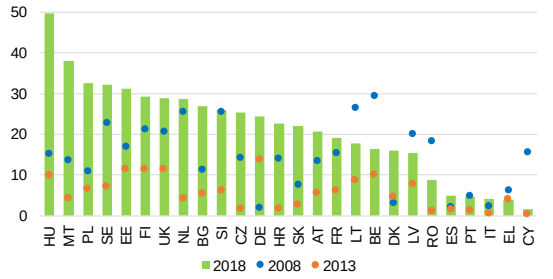


Source: Manpower Talent Shortage Survey.

The last survey on labour shortages is the European Business and Consumer (EU-BCS) survey. Graph II.1.3 depicts the evolution of a composite indicator on labour shortages of the three biggest sectors (construction, industry and services) across Member States, based on the EU-BCS. The 2004 EU enlargement and the concomitant emigration can – at least partly – account for the high labour shortages in 2007 in Estonia, Latvia, Lithuania and Romania. Labour shortages fell significantly during the crisis in all Member States, but they have re-emerged in the post-crisis period and are currently at their historical peak in several countries. Since 2013, almost all Member States have seen an increase in labour shortages in all three sectors examined, with the exceptions of Cyprus, Greece, Portugal and Spain, which never experienced substantial labour shortages, neither before the crisis nor in the recovery. This could be attributed to the fact that these are all high unemployment countries. The highest labour shortages are observed in Sweden, Malta, Hungary, Poland, Finland, Estonia, Finland and the United Kingdom, which are all low unemployment countries.

([131]) The latest available data are from 2013.

Graph II.1.3: **Labour shortage index, 2008, 2013 and 2018, Composite indicator**



(1) Annual data obtained from raw quarterly seasonally adjusted data. Data are missing for CY, DK, ES and HR for 2007 and for IE for all years.
Source: EU-BCS.

1.3.3. On-the-job mismatch

The concept of on-the-job mismatch reflects a complementary dimension of skills mismatches that has received ample attention in the micro-economics literature. It captures the discrepancies between the skills/qualifications of individuals who have a job and the skills/qualifications required for their job. As opposed to the other two concepts of skills mismatch, this dimension does not take into account the unemployed and unfilled vacancies. Ideally, on-the-job mismatch should look at mismatches between the skills a worker possesses and those that are needed for his/her job. However, as skills are very difficult to operationalize and measure, all indicators so far have focused on education, either in terms of years of education/qualifications (vertical on-the-job mismatch) or in terms of field of education (horizontal on-the-job mismatch).

Skills and competencies are not measured by the regular statistical surveys of most countries and this is why qualifications usually serve as proxy for skills, although the two terms differ and cannot be used interchangeably. Education is often used as a proxy for skills; yet, the two terms differ. Skills are defined as a "bundle of knowledge, attributes and capacities that can be learned and that enable an individual to successfully and consistently perform an activity or task, whether broadly or narrowly conceived, and can be built upon and extended through learning" (OECD, 2012). While this definition is not undisputed, everyone agrees that skills can be acquired through formal and informal education, training and job experience/practice. Hence, formal education is just one of the components of skills acquisition, and its relevance might decrease as workers age, leaving space to training (formal and informal) and work experience. For instance, a person qualified as a university professor working as a receptionist is clearly overeducated, but may lack the communication skills that are necessary in this job and may therefore also be under-skilled. Quintini (2011) shows that only about 36% of overqualified workers report being over-skilled. Furthermore, only about 12% of underqualified workers report being under-skilled. Hence, a majority of over- and under-qualified workers report that their skills match their jobs' requirements well. Based on an analysis of PIAAC data, Flisi et al. (2014) even find a negative correlation between qualification and skills mismatch, i.e. the higher the qualification the lower the skills mismatch. More precisely, their findings suggest that the share of people who are simultaneously mismatched (both overeducated and over-skilled) is low (15% of those employed for the 17 countries covered by the first round of the PIAAC survey). On the contrary, 30% of those employed reported being overeducated (but not over-skilled), while roughly 17% are found to be over-skilled (but not overeducated). This demonstrates that the two indicators cannot be used interchangeably.

1.3.3.1. Vertical skills mismatch: under- and over-qualification

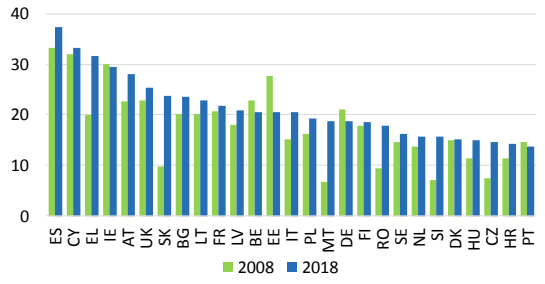
Over-qualification is an indicator of vertical skills mismatch, which measures the number of medium- and high-qualified workers holding a job for which they are overqualified, as a share of total employment. ILO (2015) proposes that jobs classified at ISCO levels 1-3 require workers that are high-qualified, jobs at ISCO levels 4-8 require workers that are medium-qualified; and elementary jobs (ISCO level 9) do not require workers to have any qualification. ([132])([133]) As a result, a high-qualified worker will be considered

([132]) ISCO 1-digit categories are specified as follows: 1 - Managers; 2 - Professionals; 3 - Technicians and associate professionals; 4 - Clerical support workers; 5 - Service and sales workers; 6 - Skilled agricultural, forestry and fishery workers; 7 - Craft and related trades workers; 8 - Plant and machine operators, and assemblers; 9 - Elementary occupations.

([133]) ECB (2012: 74) proposes a slightly different classification, notably assuming that jobs at ISCO levels 7-9 do not require any qualification.

as overqualified if he/she has a job at ISCO levels 4-9. A medium-qualified worker will be considered as overqualified if he/she has a job at ISCO level 9, and as underqualified if he/she has a job at ISCO level 1-3. A low-qualified worker will be considered as underqualified if he/she has a job at ISCO levels 1-8. As a natural consequence, over-qualification is not only determined by the probability that a high- (or medium-) qualified worker is overqualified, but also by the share of high- and medium-qualified workers in total employment.

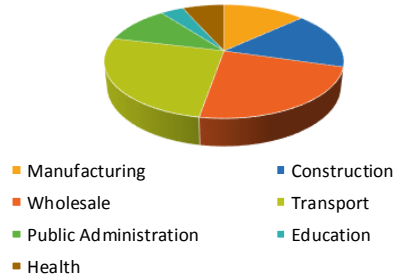
Graph II.1.4: **Over-qualification rate (vertical skills mismatch) in 2018 and 2008 across EU Member States**



(1) Over-qualification is defined as the % of people aged 20-64 with tertiary education and working in ISCO 4-9.
Source: EU-LFS.

While the incidence of over-qualification has remained roughly constant for the EU-28 as a whole in the last decade, there is a large heterogeneity across Member States. Graph II.1.4 depicts the percentage of over-qualification across EU Member States in 2018 and 2008. This indicator shows how many high-skilled persons (i.e. persons who have completed tertiary education level based on the ISCED classification) are employed in occupations (based on the ISCO classification) that do not require tertiary education. In 2018, fourteen Member States had a share of over-qualification above 20%. Over-qualification was the highest in Spain (37.3%), Cyprus (33.3%) and Greece (31.6%) and the lowest in Luxembourg (5.3%), Portugal (13.7%) and Croatia (14.3%) – even if tertiary attainment in Luxembourg is relatively high (higher than in Spain). The largest increases over time are recorded in Slovakia, Malta and Greece, where over-qualification increased by more than 10 pps between 2008 and 2018. In Denmark and Ireland, over-qualification has remained relatively stable during the last decade, while only in Estonia, Germany and Belgium it decreased by 7, 2.3 and 2.2 pps, respectively. Some have argued that the expansion of higher education necessarily leads to higher rates of over qualification. Interestingly, however, the positive correlation between over qualification and tertiary attainment is driven by those countries with very low tertiary attainment and hardly any over qualification as a result (Vandeplas and Thum-Thysen, p. 16). Among the countries with high tertiary attainment, there is no longer a significant correlation between tertiary attainment and over qualification. The reason is that in some countries, growing tertiary attainment has coincided with a correspondingly strong growth in jobs with higher skills requirements, while in other countries the growing number of tertiary graduates has seemingly not been absorbed into higher skilled jobs, resulting in over qualification. Different factors may account for this, including policy-related ones such as quality assurance institutions in education, policies that promote the alignment between education and training systems and the labour market, but also business regulations allowing for firm entry, growth, sectoral reallocation and policies supporting labour mobility and innovation. Graph II.1.5 depicts over-qualification by sector in the EU-28 in 2018. In the EU-28 overall, the highest over-qualification was observed in Transport (51%) and in Wholesale (46%), while the lowest rate of over-qualification was observed in Education (7%) and in Health (13%).

Graph II.1.5: **Over-qualification rate (vertical skills mismatch) in 2018 in EU28 by sector**



Source: own calculations based on EU-LFS.

Although this indicator has several drawbacks, there are currently no better alternative indicators to allow cross-country comparisons on vertical skills mismatch. A major drawback of this indicator is that the classification dates back to the latest ISCO update in 2008 and it is not being

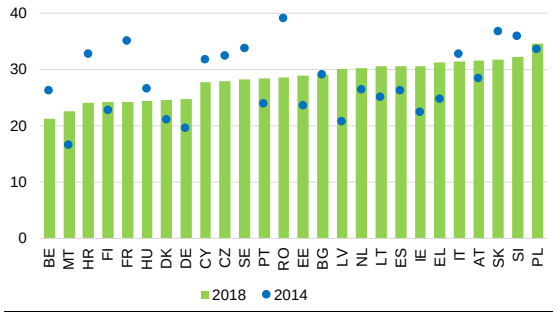
updated even though occupational skills requirements may have evolved since then. Furthermore, within the same occupation, educational attainments of workers might vary in time (and by country) due to technological change and educational reforms (e.g. reforms favouring tertiary education). Also within the same occupation, young workers have higher educational attainment levels than older cohorts. This implies that over-qualification will appear higher in occupations and sectors in which there are more young workers/rising sectors. While this indicator of over- (under-) qualification has drawbacks, there is currently no better indicator available for cross-country comparisons. Indicators based on subjective estimations of workers' qualifications suffer from measurement error (workers have different interpretation of the appropriate levels of education) and from response bias (workers might tend to overstate the educational requirements of their job in order to gain social status or simply equate job requirements to their own level of education).

1.3.3.2. Horizontal skills mismatch: on-the-job mismatch by field of education

In addition to vertical skills mismatches, horizontal skills mismatches capture the discrepancy between the field of education and the occupation. Although most indicators of on-the-job mismatch have focused on the vertical dimension, Garcia-Espejo and Ibáñez (2006) consider horizontal skills mismatches as an important complement to vertical skills mismatches, as over-qualification and under-qualification do not take into account the field of education and in general the heterogeneity among individuals who have the same qualification level. Skills mismatches by field of education may be relevant since "non-matched" persons (i) might experience frustration because of the lack of a direct return to the effort dedicated to study and (ii) may generate economic losses for businesses because of lower efficiency and/or the additional costs of acquiring job specific skills. The indicator of horizontal skills mismatches presented below is also based on the EU-LFS and aims at understanding how many employed persons are working in occupations (based on the ISCO classification) that do not correspond to the field of education they have attended (based on the ISCED classification). After having matched fields of education (based on the ISCED classification) to occupations at ISCO 2008 3-digit level, persons working outside their field of education are considered as individuals with horizontal skills mismatch. ([134]) This indicator, however, focuses only on employed persons aged 25 to 34 years who have attained tertiary education (ISCED level 5 to 8) and currently covers only the years 2014-2018. It cannot be calculated for all the employed people because the information about the field of education is only collected if the person has successfully completed his/her highest level of education within the last 15 years.

Although horizontal skills mismatches have remained the same (30%) in the EU-28 as a whole during the recovery, there is a large heterogeneity among Member States. The highest rates in 2018 were observed in Poland, Slovenia and Slovakia, while the lowest rates were observed in Luxembourg, Belgium and Malta (Graph II.1.6). Nevertheless, it is worth noting that both Poland and Slovenia have educational systems favouring the acquisition of general, transferable skills and not sector-specific skills. Some countries have experienced large increases (Latvia, Ireland) while others have experienced large declines (France, Romania, Croatia).

Graph II.1.6: **Horizontal skills mismatch across EU Member States, 2014-2018**



Fields of education are defined according to the ISCED1999 classification for the years 2014 and 2015 and the ISCED 2013 as from 2016 onwards. Occupations are based on the ISCO08 classification. In order to match fields of study to occupation the methodology from the article Job Mismatches and their Labour Market Effects among School-leavers in Europe by Maarten Wolbers (European Sociological Review, Vol.19 No. 3, 249-266) has been used. Data for the UK and LU are not included due to low reliability.
Source: EU-LFS.

([134]) The indicator is defined as 1- (persons employed with matching field of education) / (persons employed).

1.4. JOB POLARISATION: MEASURES AND RECENT TRENDS

Job polarisation refers to the relative job growth in the lower and upper tail of the wage distribution relative to the middle-wage ones. The most prominent theory used to explain job polarisation is the well-known routinisation hypothesis, called Routine Biased Technical Change. It argues that recent technological change is biased towards replacing labour in routine tasks (tasks that are easy to codify and automate). It claims that routine tasks are more frequent in the middle of the skills continuum, while non-routine ones are in the top and bottom, hence the polarising effect of technological change. ([135])

Studies define the low-, middle- and high-skilled groups based mainly on two different approaches: the jobs-based and the task-based approach. In the jobs-based approach, studies rank occupations based on the wage level by ISCO major (1 digit) or minor (two or three digit) groups and then assign occupations to each of the three aforementioned groups. Alternatively, other authors use a "task content" approach to analyse this phenomenon, which allows a better understanding of occupational changes.

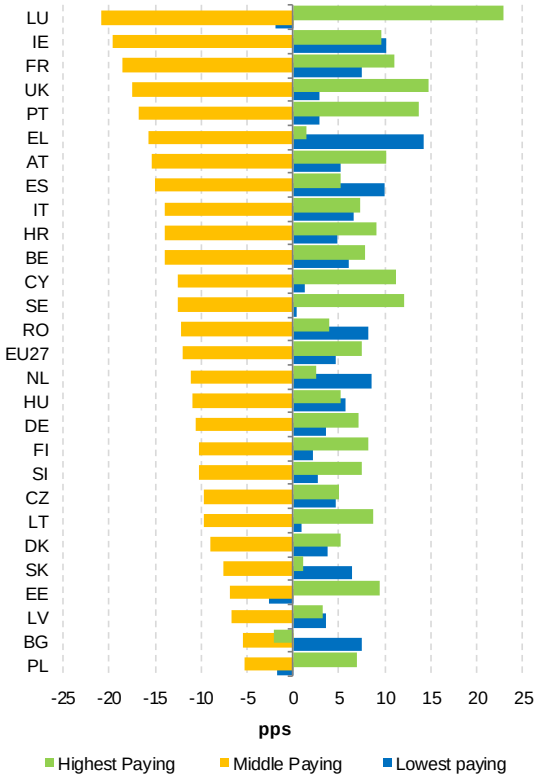
1.4.1. The jobs-based approach

The jobs-based approach has been used to assess the extent to which employment structures are polarising. Evidence of polarisation has been found for a number of countries. ([136]) OECD (2018b) observed that during the 1995-2015 period, job polarisation was a pervasive phenomenon affecting all countries with the exception of Hungary and the Czech Republic.

Differences in methodology and/or data sources lead to different and sometimes contradictory results. For example, Oesch et al Menes (2011), Fernández-Macías (2012) and Eurofound (2017) find different results and conclude that there is not a clear pattern of a pervasive polarisation. The key differences stem from three factors.

First, some studies use for the definition of jobs only the two-digit occupational codes of ISCO, while others an occupation-industry matrix approach. Second, a key component of the jobs-based approach is that the jobs are ranked by their median hourly wages (for constructing job quality tiers later). Some studies rank jobs based on the median hourly wage of a specific country. For example, Goos et al. (2009) used the median hourly wages of the United Kingdom to rank jobs in all 15 European countries. Others, however, use country-specific wage levels to rank jobs by their quality. Third, while some studies classify the ranked jobs in three categories, which may have very uneven sizes in terms of number of occupations and in terms of employment shares, other studies group the jobs in equally sized groups ranked by their median hourly wages.

Graph II.1.7: **The proportion of middle wage workers is shrinking**



High, middle and low-paying jobs in the EU - change from 2002 to 2018 in pps.
Source: Own calculations based on LFS.

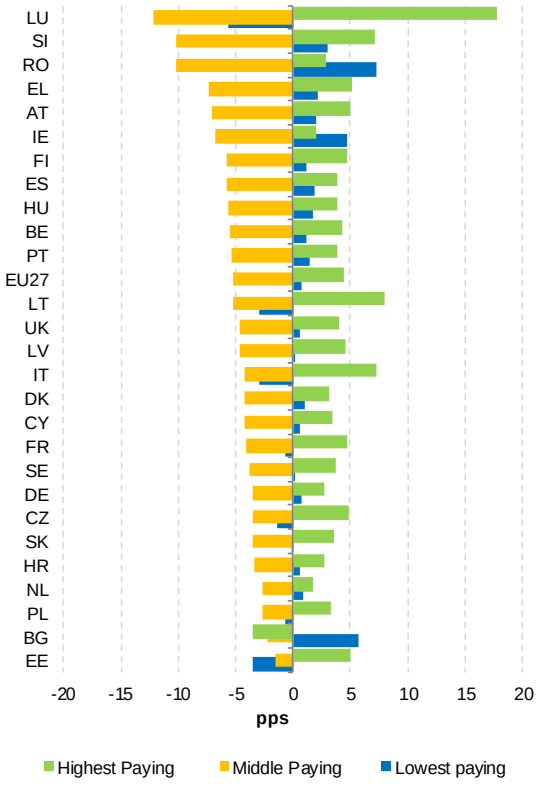
([135]) For a discussion of how technological transformations are shaping the European labour market see European Commission (2018a).

([136]) These include the United States (Acemoglu and Autor, 2011; Autor and Dorn, 2013; Autor, 2014), the UK (Goos and Manning, 2007; Salvatori, 2018), Germany (Spitz-Oener, 2006; Dustmann et al., 2009; Kampelmann and Rycx, 2011), Sweden (Adermon and Gustavsson, 2015) and France (Harrigan, Reshef and Touba, 2016).

The proportion of workers in middle-paid occupations is shrinking in all EU Member States, albeit to different degrees. To establish the relevance of job polarisation in European economies based on the jobs-based approach, this report follows the methodology suggested by Goos et al. (2014) and recently applied by the European Commission (2018a). Using EU-LFS micro-data, occupations are grouped according to their mean wage in low, middle, and high-paying occupations. ([137]) On average, over the period 2002-2018, the share of middle-paid jobs declined in the EU-27 ([138]) by about 13 pps, while the shares of low- and high-paying employment increased by 5 and 7 pps, respectively (Graph II.1.7). However, this masks significant differences across Member States. While there is a clear hollowing-out of middle-paid jobs across Member States, the pace of this process differs by country.

After the crisis, the intensity of the fall of middle-paid jobs decreased. There are not only differences across countries, but also over time. Breaking down the period 2002-2018 into two (2002-2010 and 2011-2018) shows that while the share of middle-paying jobs declined in both periods in most countries, this decline has moderated significantly after the crisis. More interestingly, since 2011 only Luxembourg, the Netherlands, Italy, Bulgaria, Finland and the Czech Republic show polarisation patterns (Graph II.1.9). In addition, some countries (Slovenia, Hungary, Greece, Latvia and Romania) have even experienced an increase in middle-paying occupations ("de-polarisation"). These countries might be benefiting from offshoring within the Single Market. Thus, less polarisation in these countries means job creation in routine occupations. Conversely, more polarisation in high-income countries might be the consequence of middle-paying jobs displaced to certain middle-income countries.

Graph II.1.8: **Polarisation peaked at the height of the crisis**



High, middle and low-paying jobs in the EU - change from 2002 to 2010 in pps.
Source: Own calculations based on LFS.

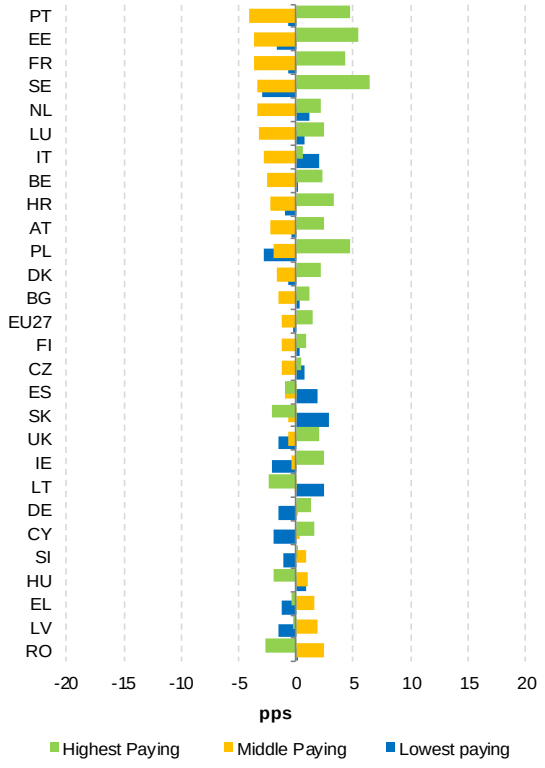
Polarisation may be the result of within and/or between sectors dynamics. The shift of employment away from middle-skill jobs can occur in two ways. On the one hand, factors underlying job polarisation may contribute to a shift of employment within an industry, as middle-skill jobs decline and the shares of high- and low-skill jobs increase. Technological advances tend to be the primary drivers of this aspect of job polarisation, as middle-skill jobs becomes obsolete (OECD, 2017). On the other hand, employment may shift between industries when some industries experience increases in demand for their products and respond by hiring workers, while other industries contract in the face of weakening demand for their products. Worker reallocation contributes to job polarisation if the contracting

([137]) The three categories are defined in the following way. **High-paying occupations**: Corporate managers; Physical, mathematical, and engineering professionals; Life science and health professionals; Other professionals; Managers of small enterprises; Physical, mathematical and engineering associate professionals; Other associate professionals, life science and health associate professionals. **Middle-paying occupations**: Stationary plant and related, stationary plant and related operators; Metal, machinery and related trade work; Drivers and mobile plant operators; Office clerks; Precision, handicraft, craft printing and related trade workers; Extraction and building trades workers; Customer service clerks; Machine operators and assemblers; Other craft and related trade workers. **Low-paying occupations**: Labourers in mining, construction, manufacturing and transport; Personal and protective service workers; Models, sales persons and demonstrators; Sales and service elementary occupations.

([138]) Malta is not included due to data limitations.

industries have a larger share of middle-skill jobs and the expanding industries have a larger share of low- or high-skill jobs.

Graph II.1.9: **After the crisis, intensity in polarisation decreased**



High, middle and low-paying jobs in the EU - change from 2011 to 2018 in pps.
Source: Own calculations based on LFS.

Polarisation mostly occurs within sectors. To understand the relative importance of between- and within-industry effects, one can apply a formal decomposition of the change in overall polarisation over the period analysed into between- and within-industry components (Goos et al., 2014). ([139]) Across all countries considered, the share of top and bottom occupations in total employment increased on average by about 13 pps between 2000 and 2018 - Table II.1.1. The last row shows that 79% of this increase is explained by changes in polarisation within industries, while the remaining 21% is accounted for by changes in the relative size of different industries. The positive between-industry component is the result of the fact that overall employment has shifted towards industries with higher polarisation, in particular from agriculture to services, reflecting structural changes in the labour market. On top of that, within most sectors, polarisation has increased. Because of these two forces, the real estate and business services sector emerges as the industry making the largest contribution to aggregate polarisation (28% of the overall increase).

Table II.1.1: **Industry contributions to with- and between-industry polarisation, 2000 to 2018**

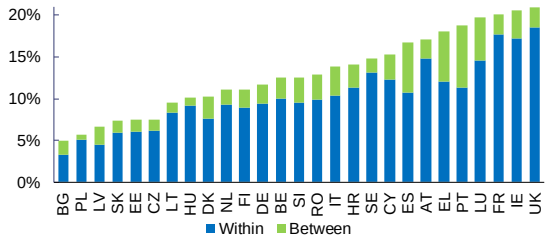
Sector	Within	Between
Agriculture, Fishing, mining	0.29	-0.51
Manufacturing	1.85	-2.36
Electricity, gas water	0.25	0.17
Construction	0.50	-0.17
Wholesale and retail	0.85	-0.56
Hotels and restaurants	0.17	0.76
Transport, storage and communications	2.07	0.95
Financial services	1.16	-0.05
Real estate and business activities	0.99	2.79
Public administration and defense	0.91	-0.16
Education	0.25	0.60
Health and social work	0.54	1.37
Other service activities	0.50	-0.10
Total	**10.32**	**2.74**

Average industry contributions expressed in percentage points. Total polarisation is the sum of both within and between components
Source: Own calculations based on EU LFS.

In all EU countries, the increased polarisation within sectors has played a major role in overall polarisation. Graph II.1.10 shows that the prevalence of the within-industry component is a pattern observed in all EU countries. This suggests that technological advances might be the primary drivers of job polarisation in EU Member States. However, in some countries like Spain, Portugal and Greece, the decline of specific sectors has also played an important role, suggesting that the polarisation observed in these countries is also the result of a process of structural change in employment.

([139]) Overall polarisation is the sum of high- and low-paid workers over total employment. Within-sector polarisation is the increase in the share of high- and low-paying jobs within an industry; between-sector polarisation is the reallocation of employment towards more highly polarised industries. Within-industry polarisation is the change in polarisation by industry over the time period, multiplied by the average share of employment of that industry. Between-industry polarisation is change in the employment share of an industry over the time period, multiplied by the average polarisation of that industry.

Graph II.1.10: **In all countries polarisation has largely reflected within-sector dynamics**



Percentage-point change in polarisation between 2000 and 2018.
Source: Own calculations based on LFS.

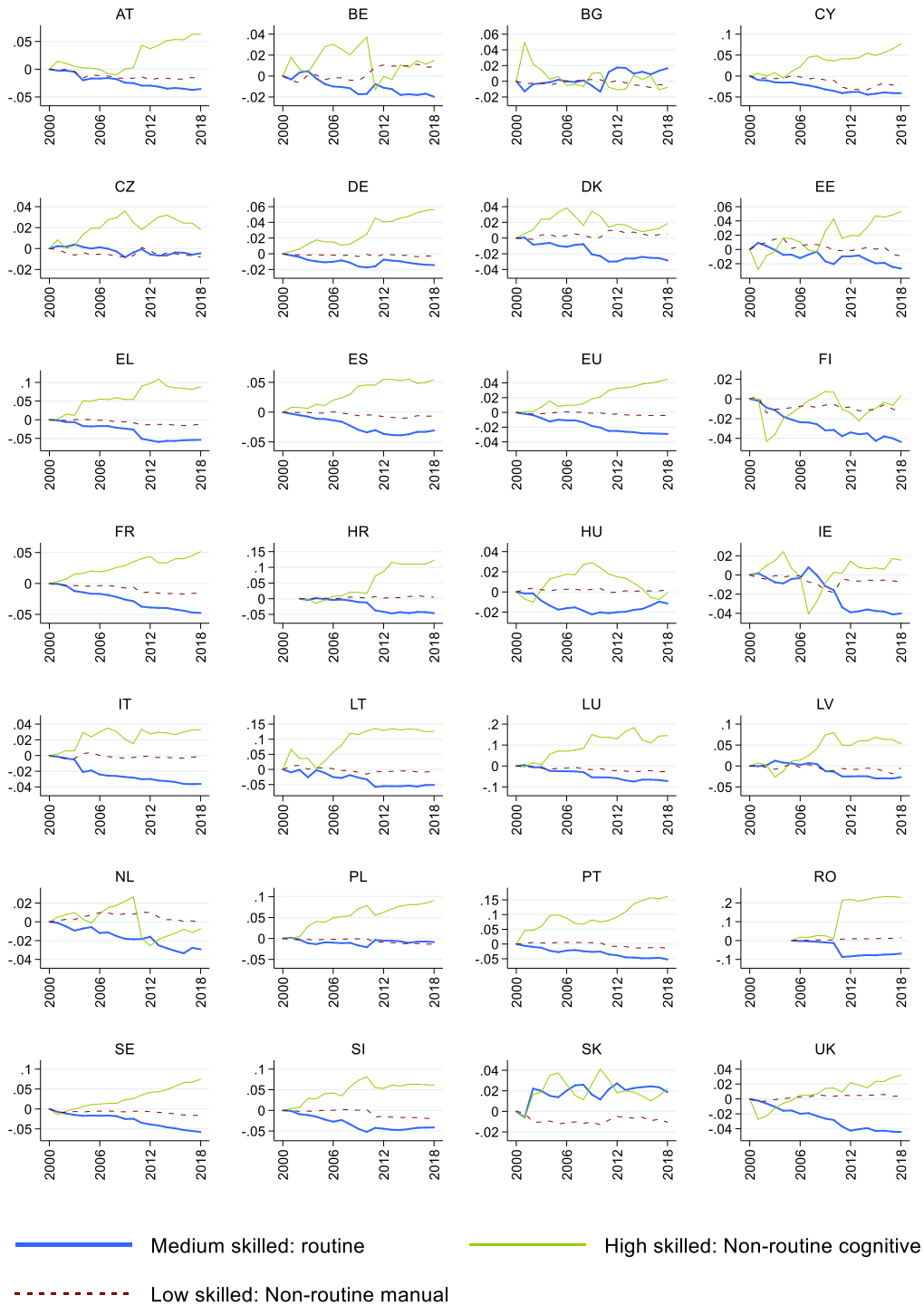
1.4.2. The task-based approach

The task-based approach is a richer alternative that has sparked a growing literature. One caveat of the jobs-based approach is its assumption that broad groups of "middle-skilled" occupations are routine-intensive, disregarding the heterogeneity of routine intensity within occupations, potentially overstating the decline in routine-intensive employment. It is easy to see that underlying this alternative model is a richer concept of skills. It is non-linear and multidimensional one: instead of a single continuum of skills, there are different axes (such as routine or cognitive task content) affecting the impact of technology on labour demand. This alternative approach has sparked a growing literature, which has not only applied it to different periods and countries, but which has also discussed other types of task content beyond routine and cognitive (the ones proposed in the earlier literature; see Autor, Levy and Murnane, 2003).

High-skill tasks are on the rise while routine tasks are falling. This report follows closely Acemoglu and Autor (2011) methodology to show the overall evolution of task content of jobs in Member States (Box II.1.1). Graph II.1.11 shows that the EU as a whole has experienced a significant growth of non-routine cognitive tasks (high-skilled tasks) and a steep decline of routine tasks (middle-skilled tasks), while non-routine manual tasks (low-skilled tasks) remain constant. Thus, if the assumed correspondence between routine and skill content of jobs is correct, in the EU overall, a process of upskilling seems to be ongoing rather than a true polarisation phenomenon.

Few countries have experienced true polarisation. While almost all countries have experienced a steep decline in routine tasks, few countries have experienced a simultaneous growth in high- and low-skilled tasks (true polarisation). Only the UK, Denmark, Belgium, Estonia, Finland, Ireland and to a lesser extent Italy seem to be experiencing a true polarisation process based on the evolution of the task content of jobs. On the other hand, several countries have experienced an increase in high-skilled tasks relative to middle- and low-skilled tasks (upskilling).

Graph II.1.11: **Almost all countries have experienced a decline in routine tasks**



(1) To make the results comparable the task indices were rescaled so that the initial value was 0.
Source: Own calculations based on EU-LFS and O*NET data.

Box II.1.1: The task-based approach and construction of task measures

Studies following this approach are typically based on the job skill measures created by Acemoglu and Autor (2011) and combine Occupational databases or Workers' surveys as a source of information on the task content of occupations with country-specific labour force survey data to analyse changes in task content of jobs over time. While few studies use workers' surveys like the OECD Program for the International Assessment of Adult Competencies (PIAAC) or the European Working Conditions Survey (EWCS), many authors use an occupational database, in particular, the Occupational Information Network dataset (ONET). Both alternatives, workers' surveys and occupational databases, have advantages and disadvantages to infer the task content of jobs and occupations. On the one hand, using workers' surveys enables the study of variability in task content within each occupation or job type. However, gathering information on tasks from workers introduces a potential bias in measurement, since workers' answers may be subjectively biased or just wrong (dissatisfied workers may exaggerate the amount of routine in their jobs, or new recruits may not be able to answer). Furthermore, there can be inconsistencies in the classification of workers across occupational levels and sectors. On the other hand, the Occupational Information Network dataset (ONET) is generally quite detailed in its measure of task content. However, it is only available for the US and although the task content of occupations should (in principle) be roughly the same across similarly developed economies, certain institutional and socioeconomic factors differ across countries, which could have an impact even at the level of task content.

This report follows the standard approach of combining the Occupational Information Network (O*NET) database as a source of information on the task content of occupations with the EU Labour Force Survey (EU-LFS) to analyse changes in task content of jobs over time. Using the Acemoglu and Autor (2011) methodology, six task content measures are constructed, namely: non-routine cognitive analytical, non-routine cognitive interpersonal, routine cognitive, routine manual, non-routine manual physical and non-routine manual personal. Each of these measures was created by adding up the appropriate standardised task items (listed in Table 1). These measures can be further grouped into three broader groupings - non-routine cognitive, routine, non-routine manual – approximating the top, middle and lower ends of the labour market respectively. In the final step, we standardise the content measures over time using the survey weights for each country separately so that the task indices represent the overall intensity in the use of each task by country and year.

Table 1 displays the six task indices, paired by skill level, their corresponding tasks and an example of occupation that requires high levels of the relevant index.

Skill level	Task content measure	Tasks	Example
High Skilled: non-routine cognitive tasks	Non-routine cognitive analytical	Analysing data/information Thinking creatively Interpreting information for others	Mathematicians, Actuaries and Statisticians
	Non-routine cognitive interpersonal	Establishing and maintaining personal relationships Guiding, directing and motivating subordinates Coaching/developing others	Managing Directors and Chief Executives
Medium skilled: routine tasks	Routine cognitive	The importance of repeating the same tasks The importance of being exact or accurate Structured vs. unstructured work	Rubber, plastics and paper products machine operators
	Routine manual	Pace determined by the speed of equipment Controlling machines and processes Spending time making repetitive motions	Cashiers and ticket clerks
Low skilled: non-routine manual tasks	Non-routine manual physical	Operating vehicles, mechanized devices, or equipment Spending time using hands to handle, control or feel objects, tools or controls Manual dexterity Spatial orientation	Heavy track and bus drivers
	Non-routine manual personal	Social Perceptiveness Face-to-face discussions Assisting and Caring for Others	Hairdressers, beauticians, and related workers

Source: Own elaboration based on Acemoglu and Autor (2011).

Box II.1.2: Description of the variables used in the empirical analysis

Polarisation-related variables:

The Job Polarisation Index (JPI). Sparreboom and Tarvid (2016) developed a polarisation index using three groups of occupations categorised by skill level. The JPI traces what happens to "medium-level" jobs and measures what can be called imbalanced polarisation. The index points to higher polarisation at a point in time if the proportion of "medium-level" jobs, relative to its average in previous years, has fallen (and vice versa). The index also registers changes in the proportion of medium-level jobs that come about in a very imbalanced manner, e.g. if there is a strong change to either low- or high-level jobs. Such an "imbalance effect" would inflate the JPI. Using the three pay segments in Chart II.1.5, it is possible to calculate the JPI since 2001. The Job Polarisation Index (JPI) is composed of two terms. The first measures the growth in the share of "low-level" and "high-level" jobs (the negative of the change in the proportion of medium-level jobs). The second accounts for the imbalance, which is the greater the more the change in the proportions of low- and high-level jobs differ from each other.

The Routine Task Intensity Index (RTI). The RTI is a polarisation-related measure based on the task-content approach. It is considered the best way to capture the impact of recent technological progress. The RTI index has become the standard practice for measuring the task content of occupations (Goos, Manning and Salomons, 2014). Routine tasks consist of a repeated sequence of actions and are more easily replaceable through technological innovations. A higher RTI score thus indicates that an occupation is more "routine-task intensive" and, thus, can more readily be automated. Following Autor and Dorn (2013), the RTI is calculated for each occupation as a relative intensity of routine tasks. In particular, from these three measures the Routine Task Intensity (RTI) index is constructed as the difference between the log of routine tasks (medium skill) and the sum of the log of abstract (high skill) and the log of manual tasks (low skill).

The off-shorability index. It is also a task-based measure related to polarisation, which measures the potential for outsourcing of jobs in the economy. Technological progress, particularly in the area of information and communication, has made it easier to outsource tasks previously performed by middle-skilled workers. In particular, jobs that require little face-to-face interaction, or other on-site requirements, are more at risk of outsourcing. While routinisation and off-shorability are related, they are different concepts. Blinder and Krueger (2013) find that off-shorability is conceptually distinct from, though related to, an occupation's routineness. The authors argue that it is likely that jobs that can be broken down into simple, routine tasks are easier to offshore than jobs requiring complex thinking, judgment, and human interaction. However, a wide variety of complex tasks that involve high levels of skill and human judgment can also be offshored via telecommunication devices.

The low-, middle- and high-skill task indices. They are based on the job skill measures created by Acemoglu and Autor (2011). They use O*NET skill description data to classify each occupation according to their propensity for use of five tasks. The skill characteristics form three broad groupings - non-routine cognitive, routine, non-routine manual – approximating the top, middle and lower ends of the labour market respectively (See Box II.1.1 for more details).

Other variables used in the analysis:

- Non-accelerating wage rate of unemployment (NAWRU). It is the rate of unemployment consistent with constant wage inflation (structural unemployment).
- GDP per capita, in log.
- Share of employment in agriculture and manufacturing over total employment.
- The total expenditure in Research and Development (R&D) as a % of the GDP.
- Activity rate by level of education (primary-ISCED 0-2, secondary-ISCED 3-4, tertiary- ISCED 5-8).
- Ageing is captured by the average age of the workforce.
- The supply of skills is captured by the share of the population with at least secondary education.

1.5. DOES POLARISATION INCREASE (REDUCE) SKILLS MISMATCHES?

1.5.1. Macroeconomic skills mismatches and polarisation

Descriptive evidence suggests that polarisation and off-shorability are negatively linked to macroeconomic skills mismatches, but this relation is weak. Table II.1.2 shows the correlations between macroeconomic skills mismatch indicator and the different polarisation-related variables. ([140]) While the three polarisation-related measures are negative correlated with skills mismatches, the link is weak and only significant for the job polarisation (JPI) and off-shorability indices.

Deroutinisation seems positively linked to skills mismatches in middle-income Member States and negatively in high-income ones. Table II.1.2 also suggests that the routinisation index (RTI) is related to skills mismatches differently in high-income Member States and middle-income ones. ([141]) While for the latter the link is negative, i.e. more routinisation is associated to less skills mismatches, the opposite is true for the high-income countries.

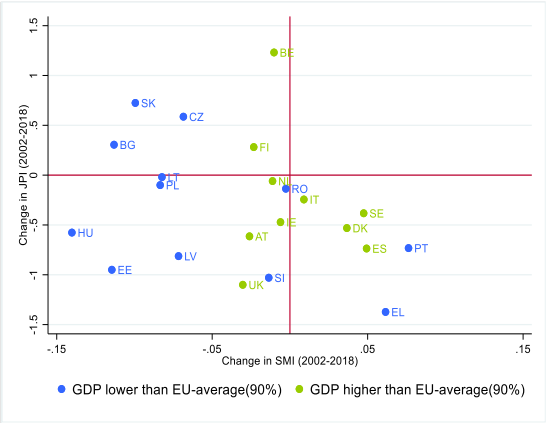
Table II.1.2: **Correlations skills mismatch and polarisation indicators. EU 2002-2018**

Skill mismatch	EU	More developed countries	Less developed countries
JPI	-0.0769*	0.0452	-0.1099*
RTI	-0.0349	0.2269*	-0.3419*
Offshorability Index	-0.2032*	-0.0137	-0.2044*
Low-skill Index	0.3245*	-0.06	0.3717*
Middle-skill Index	0.2788*	0.0939	0.1575*
High-skill Index	-0.0848*	-0.0449	0.1820*

(1)* Significant at 10%.
Source: Own calculations based on EU-LFS and O*net.

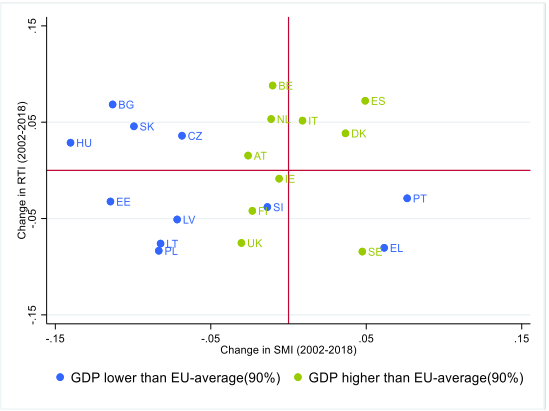
The link between polarisation and skills mismatches is weak and different by group of countries. To graphically analyse how job polarisation and skills mismatches are linked, Graph II.1.12 plots changes in polarisation and skills mismatches between 2002 and 2018. The graphical analysis confirms the descriptive assessment. First, while there seems to be a negative link between polarisation and skills mismatches, i.e. more polarisation leads to less skills mismatches, this link seems weak. Secondly, the link differs by group of countries. While for high-income Member States the link is more evident, for middle-income ones, there seems not to be a clear link. Similarly, Graph II.1.13 depicts changes in routinisation and skills mismatches between 2002 and 2018. It also suggests that the link between the two is different by group of countries.

Graph II.1.12: **Skills mismatches vs JPI**



Source: Own calculations based on LFS.

Graph II.1.13: **Skills mismatches vs RTI**



Source: Own calculations based on EU-LFS and O*NET data.

On aggregate, polarisation and deroutinisation are associated with an increase in skills mismatches. To more formally test the link between polarisation and skills mismatches this section provides an analysis of the impact of the different polarisation-related measures on the

([140]) See Box II.1.2 for details on the polarisation-related variables (direct and indirect)
([141]) Middle-income countries = Member States with GDP below 90% of the EU average. High-income countries = Member States with GDP above 90% of the EU average.

Table II.1.3: **Determinants of Macroeconomic skills mismatches in EU27, 2000-2018**

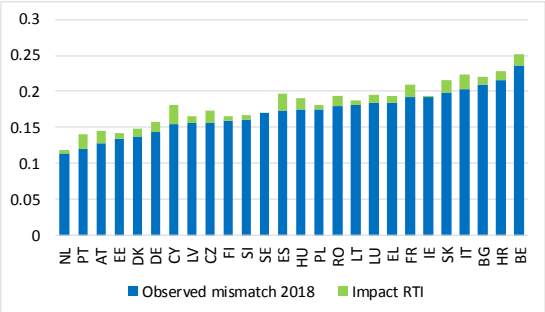
	EU			High-income countries			Middle-income countries		
VARIABLES	JPI	Off-shorability	RTI	JPI	Off-shorability	RTI	JPI	Off-shorability	RTI
Polarisation measure	-0.0017	-0.2300	-0.0541*	-0.0017	-0.0609	-0.0085	-0.0017	-0.4084	-0.0930**
	(0.0016)	(0.0068)	(0.0264)	(0.0013)	(0.0118)	(0.0310)	(0.0024)	(0.0068)	(0.0409)
Non-accelerating wage rate of unemployment	0.0038**	0.0036*	0.0034*	0.0040	0.0040	0.0040*	0.0037	0.0035	0.0032
	(0.0018)	(0.0018)	(0.0019)	(0.0022)	(0.0023)	(0.0022)	(0.0030)	(0.0030)	(0.0031)
lngdp	-0.1234***	-0.1262***	-0.1327***	-0.0515*	-0.0522*	-0.0540**	-0.1268***	-0.1269***	-0.1330***
	(0.0267)	(0.0265)	(0.0264)	(0.0243)	(0.0241)	(0.0213)	(0.0377)	(0.0379)	(0.0366)
Share employment in agriculture + manufacturing over total	-0.2375*	-0.2882**	-0.2629**	-0.1812	-0.2068	-0.2009	-0.2241	-0.2106	-0.1240
	(0.0562)	(0.0554)	(0.0534)	(0.0597)	(0.0615)	(0.0589)	(0.1017)	(0.0992)	(0.0986)
Total R&D expenditure (%GDP)	-0.0145*	-0.0127*	-0.0108	-0.0064	-0.0067	-0.0061	-0.0188**	-0.0108	-0.0087
	(0.0078)	(0.0068)	(0.0068)	(0.0119)	(0.0118)	(0.0116)	(0.0081)	(0.0068)	(0.0063)
Observations	436	449	449	212	220	220	224	229	229
R-squared	0.5207	0.5413	0.5474	0.3067	0.3156	0.3153	0.5918	0.6218	0.6362
Countries	27	27	27	13	13	13	14	14	14
Country FE	YES	YES	YES	YES	YES	YES	YES	YES	YES

(1) Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1.
Source: Own calculations using LFS and O*net.

macroeconomic skills mismatches indicator (Table II.1.3). ([142]) Among the three polarisation-related measures, only the off-shorability and RTI indices seem to have a significant and negative relationship with skills mismatches. Thus, more deroutinisation is associated with an increase in skills mismatches. Technological change increases polarisation by reducing routine-jobs, and this deroutinisation is associated with more macroeconomic skills mismatches. Similarly, technology makes possible to outsource tasks previously performed by middle-skilled workers. As a result, skills mismatches seem to be driven by shifts in the demand spurred by technological changes.

Most Member States may experience an increase in skills mismatches due to deroutinisation. To better explain the impact of changes in employment structures driven by technology, Graph II.1.14 plots the current level of skills mismatches and the predicted impact of a process of deroutinisation that would bring the routine intensity of all EU Member States to the level currently observed in the UK, the country with the lowest level of RTI. The graph suggests that with the exception of countries such as Ireland and Sweden with a structure of employment similar to that of the UK, most Member States would experience a rise in skills mismatches, as there is room for further deroutinisation. Yet, climate change policies might mitigate this process of deroutinisation by adding middle-skilled, middle-paying jobs (European Commission, 2019c).

Graph II.1.14: **Current and predicted macroeconomic skills mismatches if countries reach UK (de)routinisation levels**



Source: Own calculations using LFS and O*net.

Middle-income Member States, however, are more exposed to the impact of employment deroutinisation on skills mismatches. The impact of routinisation (measured by RTI) and off-shorability on skills mismatches seem to be significant only in middle-income Member States (Table II.1.3). ([143]) Fast-changing technology accelerates the demand for different skills and creates mismatches unless supply follows accordingly. At the same time, technology replaces more routine jobs and makes it easier to outsource middle-skilled ones. Finally, an ongoing process of shifting employment from more routine sectors (e.g. manufacturing) to less routine sectors (e.g. services) is taking place, particularly in middle-income countries as high-income countries have

([142]) See Box II.1.3 for details on the empirical strategy.

([143]) The RTI coefficients is only significant for less developed member states (Last column of Table II.1.3).

Box II.1.3: **Empirical analysis: The link between macroeconomic skill mismatch and polarisation**

The empirical model to study the links between macroeconomic skill mismatches and polarisation in the EU is based on a fixed-effects panel regression to control unobservable country-specific factors and estimated the model for each polarisation-related measure (see Box II.1.2), in the following formula:

$$SMM_{it} = u_{it} + \alpha_1 P_{it} + \beta C_{it} + \varepsilon_{it}$$

Whereby:

SMM_{it} is the macroeconomic skill mismatch indicator during the period t $\in T$ in country $i \in$ C, where C is the set of countries and T={2012,…, 2018};

α_1 is the estimated coefficients for the polarisation measure (P);

P_{it} is one of the polarisation measures in country i and time t;

β is a vector of the estimated coefficients for the control variables (C);

C_{it} is a vector of controls in country i and time t;

u_{it} is the unknown intercept for each country i.

ε_{it} is the error term for country i and time t.

The basic set of controls included in the analysis consit of: the level of unemployment, the log of gdp per capita, the share of employment in manufacturing or agricultural sectors and the R&D expenditure as a proxy for technology adoption. In addition to this basic set of controls, in some specifications other controls are included: the average age of the workforce, the share of the population with at least secondary education and the activity rates by level of education (see Box II.1.2 for more details on the variable used in the analysis).

largely completed this process. As a result, deroutinisation in middle-income countries might be faster and more intense, potentially increasing skills mismatches as labour supply in these countries might find it more difficult to meet the fast changing labour demand.

Workforce upskilling and improvements in economic conditions have contributed to reducing skills mismatches in many Member States. Box II.1.4 and Table II.1.4 show that changes in macroeconomic skills mismatches were largely driven by changes in general economic conditions and improvements in the supply of skills (upskilling). General economic conditions are captured by unemployment, the level of GDP per capita and by the activity rate (by level of education). The supply of skills is captured by the share of the population with at least secondary education. In particular, upskilling and increasing participation rates seem to be important factors to reduce skills mismatches and better meet the increasing demand for more complex skills.

The rise in labour demand for high-skilled tasks leads to more skills mismatches. A more detailed look at the impact of the changing task content of jobs on skills mismatches shows that, for the EU, only changes in the labour demand for high- and low-skilled tasks have a significant (and positive) impact on skills mismatches (Table II.1.4). Since overall trends in the task content of jobs suggest a significant rise in high-skilled tasks and a stagnation in low-skilled ones (Graph II.1.11), the overall growth of skills mismatches seems mostly driven by changes at the top of the skill-content distribution.

Trends in the labour demand for skills play against the decline in skills mismatches. Graph 2 in Box II.1.4 and Table II.1.4 suggest that the increasing non-routine cognitive task content of jobs has been associated with increasing macroeconomic skills mismatches in EU countries, particularly in middle-income ones. Similarly, the declining routine task content of jobs has been associated with an increase in macroeconomic skills mismatches in high-income Member States.

Table II.1.4: **Determinants of Macroeconomic skills mismatches in EU27, 2000-2018. Content of jobs**

VARIABLES	EU	EU	High-income countries	High-income countries	Middle-income countries	Middle-income countries
Low skilled: Non-routine manual	-0.1298	0.5803**	0.7987*	0.8285*	-0.9044**	0.1521
	(0.3263)	(0.2742)	(0.4436)	(0.4213)	(0.4286)	(0.3871)
Medium skilled: routine	-0.2223	0.1227	-0.4442**	-0.8316***	0.9366***	0.2264
	(0.1633)	(0.1549)	(0.1962)	(0.2192)	(0.2728)	(0.2602)
High skilled: Non-routine cognitive	0.3890***	0.3966***	0.2168	0.1497	1.2492***	0.5855***
	(0.1280)	(0.1065)	(0.1480)	(0.1202)	(0.2137)	(0.1876)
Non-accelerating wage rate of unemployment	0.0039***	0.0048***	0.0047***	0.0048***	0.0024**	0.0028***
	(0.0007)	(0.0005)	(0.0008)	(0.0007)	(0.0010)	(0.0008)
lngdp	-0.1176***	-0.1339***	-0.0369**	-0.0826***	-0.1553***	-0.1367***
	(0.0084)	(0.0083)	(0.0167)	(0.0153)	(0.0113)	(0.0115)
Upskilling		-0.0016***		-0.0028***		-0.0008
		(0.0003)		(0.0003)		(0.0005)
Ageing		0.0081***		0.0136***		-0.0037
		(0.0018)		(0.0018)		(0.0036)
Activity rate: low-skilled		-0.0048***		-0.0034***		-0.0051***
		(0.0003)		(0.0003)		(0.0004)
Activity rate: middle-skilled		0.0034***		0.0038***		0.0035***
		(0.0004)		(0.0006)		(0.0006)
Activity rate: high-skilled		0.0024***		0.0015**		0.0011*
		(0.0005)		(0.0008)		(0.0007)
Observations	478	440	234	214	244	226
R-squared	0.5596	0.7572	0.3119	0.6349	0.6881	0.8338
Countries	27	27	13	13	14	14
Country FE	YES	YES	YES	YES	YES	YES

(1) Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1.
Source: Own calculations based on LFS and O*net.

Due to technological change, the skills demand is shifting towards higher skills and qualifications. Besides, there is an increasing demand for highly educated workers, even in low-paying jobs (European Commission, 2018a) and this demand might not be met fully and immediately by the skills supply on the labour market, as it takes time for the education system and for adult learning to adjust. This is more apparent in middle-income countries, while in high-income countries, the increase in the supply of high-skill workers may have contributed to mitigating the effects of changes at the top of the skill-content distribution.

1.5.2. On-the-job mismatch and polarisation

Across EU Member States, job polarisation seems to have a positive impact on individual-level skills mismatches. To complement the analysis at the macro level, this section studies how the risk of mismatch at the individual level depends on individual and job characteristics (including its task content), but also on the polarisation of the occupational structure (job polarisation). Results in Table II.1.5 suggest that the probability of being mismatched increases if polarisation increases. ([144]) This is mainly driven by a positive impact on the probability of being under-skilled. If polarisation increases, under-education may rise if middle-skilled workers cannot find appropriate jobs and increasingly compete for jobs usually taken by those with a higher level of education.

Men are less likely to be over-skilled than women, while the relationship between gender and under-skilling is not significant (Table II.1.5). This may reflect gender discrimination, the effect of career brakes on the working lives of women or a preference towards more family friendly working arrangements.

Foreign-born workers are more likely to be mismatched in terms of skills than the native workforce. Table II.1.5 shows that the probability of skills mismatches is higher for immigrants. This applies to most Member States except in Luxembourg and Portugal, where the opposite is true (Table II.1.A1.2 in Appendix). Looking at the components of mismatches reveals that immigrants are more likely to be over-skilled. Among the factors that might explain this result are the non-recognition of qualifications, discrimination or more difficult labour market access, as well as a lack of language skills.

Temporary and part-time workers are more likely to be overeducated. Occupational choices

([144]) See Appendix 1.A2 for details on the empirical strategy.

in part-time work could be more limited, raising the probability of over-skilling and a switch from full-time to part-time employment could entail occupational downgrading (Connolly and Gregory, 2009).

Table II.1.5: **Job polarisation increases the probability of being mismatched**

VARIABLES	Skill mismatch	Over-skilled	Under-skilled
Job Polarisation Index	0.0171***	-0.00326	0.0197***
	(0.00511)	(0.00573)	(0.00677)
male	-0.00630	-0.0169**	0.00970
	(0.0104)	(0.00756)	(0.0153)
married	0.00471	-0.0124***	0.0164***
	(0.00559)	(0.00361)	(0.00605)
foreign	0.0296***	0.0454***	-0.0214
	(0.00796)	(0.00720)	(0.0197)
temporary	0.0445*	0.0297***	0.0104
	(0.0266)	(0.00815)	(0.0332)
parttime	0.00981	0.0434***	-0.0400***
	(0.00629)	(0.00403)	(0.00746)
lgdp	-0.165***	0.118***	-0.308***
	(0.0438)	(0.0440)	(0.0714)
nawru	-0.00598	0.00687***	-0.0134***
	(0.00478)	(0.00148)	(0.00411)
firmsize = 2, 11 to 49 persons	-0.0279***	0.0118***	-0.0398***
	(0.00720)	(0.00381)	(0.00881)
firmsize = 3, 50 persons or more	-0.0554***	0.00779*	-0.0633***
	(0.0109)	(0.00463)	(0.0147)
age_group = 2, 25-34	-0.0578**	0.0289***	-0.0889**
	(0.0283)	(0.0101)	(0.0376)
age_group = 3, 35-44	-0.0305	0.0138	-0.0460
	(0.0325)	(0.0140)	(0.0469)
age_group = 4, 45-54	0.00702	0.00402	0.000483
	(0.0384)	(0.0179)	(0.0570)
age_group = 5, 55-65	0.0270	0.000286	0.0247
	(0.0415)	(0.0211)	(0.0636)
Observations	22,716,934	22,716,934	22,716,934
Country and sector FE	YES	YES	YES

(1) All regressions weighted with EU-LFS weights, and standard errors clustered at country level.
Source: Own calculations based on EU-LFS.

EU labour market trends favour on-the-job skills mismatches. It is increasingly demanding occupations that are intense in non-routine skills. Table II.1.6 shows that being in occupations with a high use of non-routine cognitive tasks increases the probability of being under-skilled, while being in occupations that are intensive in the use of non-routine manual tasks increases the probability of being over-skilled. Moreover, workers in more off-shorable occupations are less likely to be mismatched. Thus, in the absence of an adequate supply response, EU labour market trends could increase on-the-job skills mismatches in several Member States.

Table II.1.6: **Skills mismatches are more likely in jobs in increasing demand, while they are less likely in jobs at risk of disappearing**

VARIABLES	Skill mismatch	Over-skilled	Under-skilled
High routine occupations	0.00335	0.146***	-0.162***
	(0.0251)	(0.00938)	(0.0195)
High off-shorable occupations	-0.0188*	-0.0128	-0.00603
	(0.0104)	(0.0137)	(0.0183)
Non-routine manual occupations	0.0198	0.0315***	-0.00221
	(0.0151)	(0.0118)	(0.0119)
Non-routine cognitive occupations	0.00696	-0.131***	0.143***
	(0.0373)	(0.00439)	(0.0315)
Observations	23 292 064	23 292 064	23 292 064
Country and sector FE	YES	YES	YES

(1) All regressions weighted with EU-LFS weights, and standard errors clustered at country level.
(2) High index occupations is a dummy that takes value 1 if the occupation is above the 66th percentile for the index in that year.
Source: Own calculations based on EU-LFS and O*net.

Box II.1.4: **Decomposition of changes in macroeconomic skills mismatches**

To delve further into factors driving changes in macroeconomic skill mismatches, contributions of selected explanatory variables to the total change in the macroeconomic skill mismatch indicator between 2002 and 2017 are estimated. Given C is the set of countries, the change in skill mismatch indicator may be approximated by the formula below:

$$\forall_{i \in C} S_i^{2018} - S_i^{2002} \approx \widehat{\beta_1}\Delta U_i + \widehat{\beta_2}\Delta G_i + \widehat{\beta_3}\Delta E_i + \widehat{\beta_4}\Delta A_i + \widehat{\beta_2}\Delta L_i + \widehat{\beta_3}\Delta M_i + \widehat{\beta_4}\Delta H_i$$

Whereby:

S_i^{2018} and S_i^{2002} are the macroeconomic skill mismatch indicator in 2018 and 2002, respectively;

$\widehat{\beta_k}$ are the estimated coefficients (Table II.1.A1.1 in the Annex) for independent variables (k=1,2,3);

ΔU_i is the change in unemployment rate in country i between 2002 and 2018.

ΔG_i is the change in log of GDP percapita in country i between 2002 and 2018;

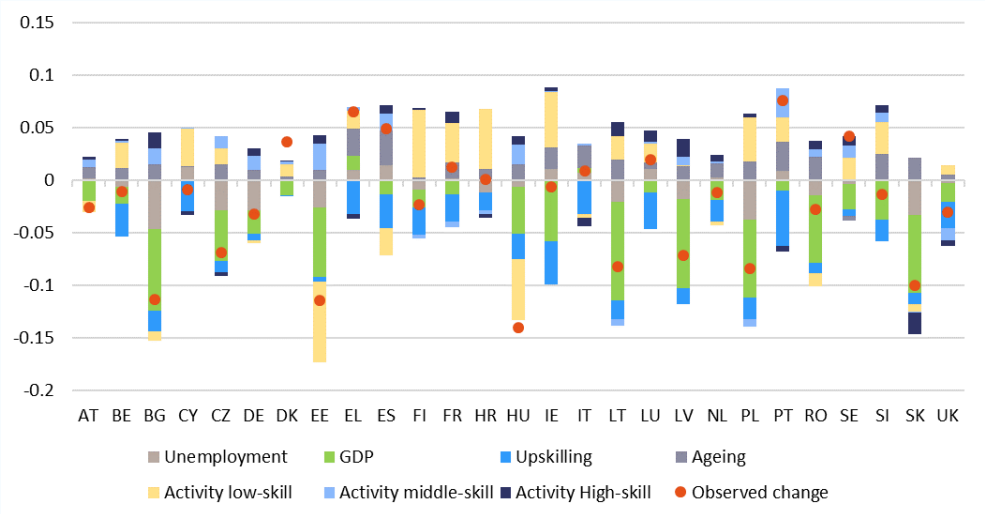
ΔE_i is the change in the share of the population with at least secondary (ISCED 3-8) in country i between 2002 and 2018;

ΔA_i is the change in the average age of the workforce in country i between 2002 and 2018;

ΔL_i, ΔM_i and ΔH_i is the change in the activity rate of those with primary (ISCED 0-2), secondary (ISCED 3-4) and tertiary education (ISCED 5-8) respectively in country i between 2002 and 2018.

Graph 1 shows that the rise or fall in macroeconomic skill mismatches was largely driven by changes in the general economic conditions, particularly among middle-income Member States. General economic conditions are captured by unemployment, GDP per capita and by the activity rate (by level of education). Each of these variables capture to some extent the state of the economic business cycle, with the unemployment rate most influenced by short-term downturns and upswings. However, ageing and improvements in the supply of skills (captured by the share of the population with at least secondary education) have also significantly contributed to increase and decrease, respectively, skill mismatches in many Member States.

Graph 1: Decomposition of changes in macroeconomic skills mismatches between 2002 and 2018



In the next step, the analysis focuses on the impact of changes in the task content of jobs on Macroeconomic skill mismatches. In particular, the contributions of changes in the task content of jobs (low, medium and

(Continued on the next page)

Box (continued)

high skill) to the total change in macroeconomic skills mismatches are estimated following a similar equation to the previous one:

$$\forall_{i \in C} S_i^{2018} - S_i^{2002} \approx \widehat{\beta_1} \Delta L_i + \widehat{\beta_2} \Delta M_i + \widehat{\beta_3} \Delta H_i$$

Whereby:

S_i^{2018} and S_i^{2002} are the macroeconomic skill mismatch indicator in 2018 and 2002, respectively;

$\widehat{\beta_k}$ are the estimated coefficients (Table II.1.4) for independent variables (k=1,2,3);

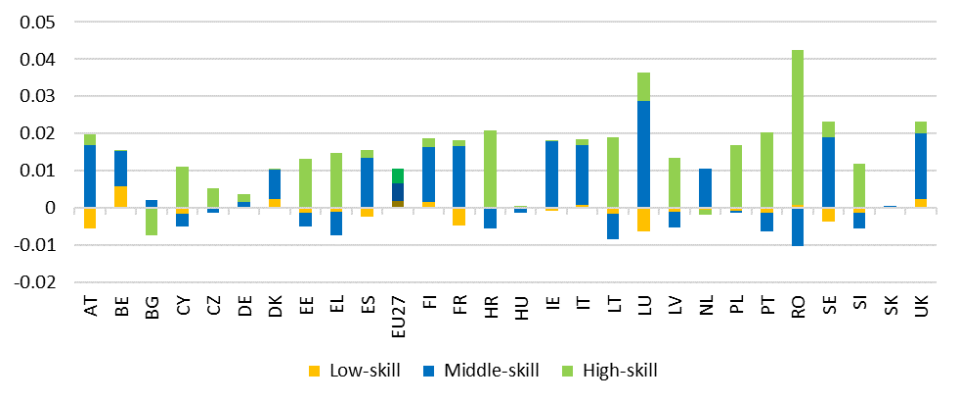
ΔL_i is the change in the Low-skill: non-routine manual indicator in country i between 2002 and 2018;

ΔM_i is the change in the Medium-skill: routine indicator in country i between 2002 and 2018;

ΔH_i is the change in the High-skill: non-routine cognitive indicator in country i between 2002 and 2018.

As results from table II.1.4 suggest that the impact differs by group of country, separate regressions for each group of countries are estimated (i.e. High-income and middle-income countries). Among the group of high-income Member States, the decrease in routine intensive (middle-skill) jobs was the main contributor related to changes in the task content of jobs. However, the rise in the use of non-routine cognitive skills (high skill) also played an important role in many high-income Member States. On the other hand, changes at the top of the skill distribution had a more prominent impact on skill mismaches in middle-income Member States. However, as Graph 1 and Table II.1.3 suggest, this change in the skill content of jobs that would have led to more skill mismacthes was compensated by other factors. In particular, some middle-income Member States benefited from an increase in routine skills and many more in general from improvements in economic conditions (less unemployment and higher GDP per capita), workforce upskilling and an increase in labour participation (Graph 1).

Graph 2: Contribution of changes in the skill content of jobs to changes in skill mismatches: 2002-2018



1.5.3. The role of labour market institutions

The existence of structural imbalances in the labour market makes it crucial to use several types of policies in order to address frictions. As previous sections show, cross-country differences in skills mismatches can be due to structural differences in supply and demand as well as cyclical factors.

Employment protection legislation (EPL) and other aspects of labour market institutions may have an impact on skills mismatches. For example, stringent regulations on the firing of permanent employees make it more difficult for firms to adapt the labour force structure to address mismatches between the demand and supply of skills. The use of fixed-term contracts and temporary work contracts may help avoid strict firing rules, and thus reduce mismatches. In addition, in response to the changing demand for skills, firms need to adjust wages or their labour force composition to avoid mismatches. At the same time, institutional settings (access to education, education policies, more rigid labour markets and higher labour market segmentation) may explain the different nature of skills mismatches across European countries (European Commission, 2013b; Boheim et al., 2008).

At the macro level, EPL and certain labour market policies do not seem to affect skills mismatches. Table II.1.7 explores the effects of different policy-related factors on skills mismatches at the macro level. ([145]) Results suggest that the strictness of employment protection does not have a significant impact on skills mismatches. Similarly, some labour market policies such as the labour market services, supported employment and rehabilitation, direct job creation and out of work income maintenance do not seem to have an impact on skills mismatches either. While employment services, which aim to match workers and jobs, should improve skill mismatches, the results highlights the importance of well targeted and quality labour market services as not necessarily more spending on those services reduces skill mismatches.

Table II.1.7: **Employment protection legislation and labour market policies on macroeconomic skill mismatches**

VARIABLES	Skill mismatch
Strictness of employment protection	-0.0116
	(0.0078)
Labour market services	-0.0007
	(0.0491)
Training	-0.0444**
	(0.0167)
Employment incentives	-0.0746**
	(0.0288)
Supported employment and rehabilitation	-0.1273
	(0.1033)
Direct job creation	-0.0574
	(0.0457)
Start-up incentives	0.2231**
	(0.0859)
Out-of-work income maintenance and support	-0.0002
	(0.0053)
Country FE	YES
Full Controls + RTI	YES

(1) Clustered standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1.
Source: Own calculations based on EU-LFS.

However, more spending on training and employment incentives can improve the matching of skills to jobs. Higher spending on policies related to training and lifelong learning is associated with lower skills mismatches (Table II.1.7), reinforcing the importance of skills gained beyond formal qualifications through both on the job training and opportunities for lifelong education and training as important instruments to reduce skills mismatches. Moreover, employment incentives seem to be also important to reduce skill mismatches. According to results in previous sections, employment incentives might be particularly important to counterbalance the increase in over qualification by improving the employment rates of low-skilled workers.

Adult learning and training are important to address new skill requirements driven by technological change as well as skill loss over time. Given the changing face of the labour market, both workers who are just entering the labour force and those already in the workforce have to be willing to learn new skills. Participation

([145]) The coefficients reported are the result of a country fixed effects linear regression controlling for routinisation (RTI), unemployment, GDP and activity rates by level of education (see Box II.1.2). However, only the estimated coefficients of policy-related variables are reported for the sake of brevity.

in lifelong learning can be especially useful to workers who need to adapt to rapid changes in labour market demand and the arrival of new technologies. Finally, employment incentives seem to be also important to reduce skill mismatches particularly by improving the employment rates of low-skilled workers, counterbalancing the increase in over qualification driven by technological change.

1.6. CONCLUSIONS

This chapter examines the evolution as well as the relationship between the well-documented process of job polarisation and skills mismatches. Different concepts and measures of skills mismatches and polarisation are considered and the analysis yields a number of interesting results and new insights. Firstly, our analysis suggests that certain types of skills mismatches are on the rise in the EU as a whole, notably labour shortages and over-qualification (especially in those countries where tertiary attainment has expanded considerably, without being accompanied by a commensurate rise in high-skilled jobs). Other types, such as the macroeconomic skills mismatches have been declining in the recovery, or followed more complex patterns over time (e.g. horizontal skills mismatch). Nevertheless, there are significant differences across EU Member States in the levels of these indicators as well as in their evolutions over time. Polarisation is also evident in all EU Member States through the simultaneous shrinking of employment in middle-skilled occupations (requiring routine tasks) and its rise in low-skilled and particularly high-skilled occupations, albeit with large differences across countries.

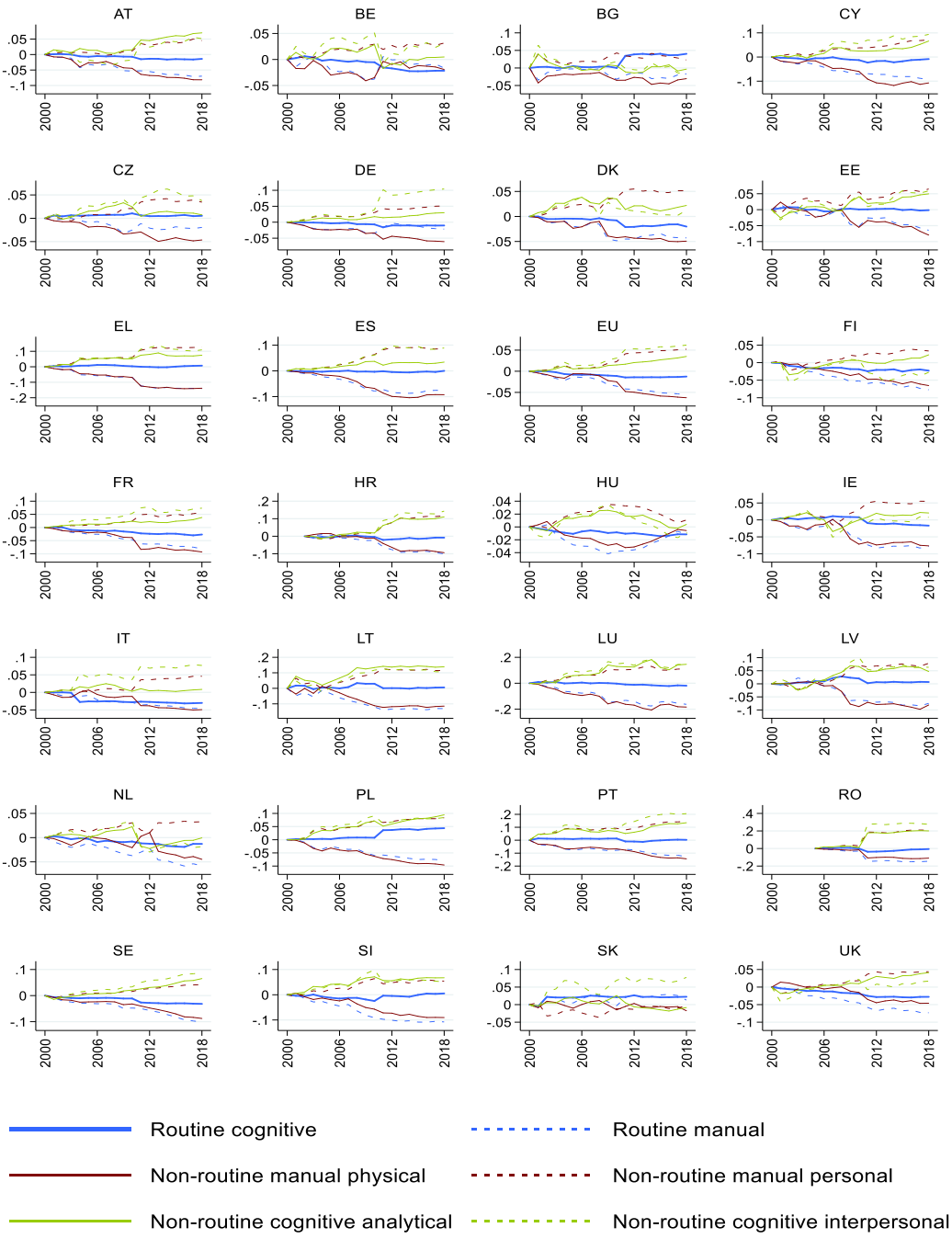
Current EU labour market trends hinder reducing skills mismatches. Labour demand for skills is shifting towards higher skills and qualifications. Fast-changing technology accelerates demand for different skills, particularly for more complex skills that can complement technology. At the same time, technology replaces more routine jobs and makes it easier to outsource middle-skilled jobs. Results suggest that the increases in the high-skill task content and the declining routine task content of jobs are linked to an increase in macroeconomic skills mismatches in EU Member States. Moreover, on-the-job skills mismatches are more likely in jobs with increasing demand, while they are less likely in jobs at risk of disappearing.

While most Member States are exposed to the impact of routinisation and off-shorability on skills mismatches, middle-income ones are more at risk. First, deroutinisation in middle-income countries might be more intense as they have more routine employment structures, potentially leading to more skills mismatches. Moreover, while in the short-term certain middle-income countries may potentially benefit from job creation in routine occupations outsourced from high-income Member States, this will leave these countries more vulnerable to routine labour displacing technologies. Finally, middle-income countries might find it more difficult to meet the fast changing labour demand for more complex skills, as it takes time to upskill their workforces.

A policy response to address the consequences of job polarisation can also help to address skills mismatches. Countries should put in place a comprehensive package of policies on skills, lifelong learning, labour markets, social protection, as well as research and innovation. Training policies will need to facilitate the transition of workers in jobs with a high risk of automation into new and better-quality jobs that are in higher demand. As technology advances the importance of certain jobs in the labour market, governments will need to foster flexibility and labour mobility as well as invest in education and training. This could enable workers to change jobs or even occupation, allowing them to benefit from new job opportunities and reducing their risk of job loss.

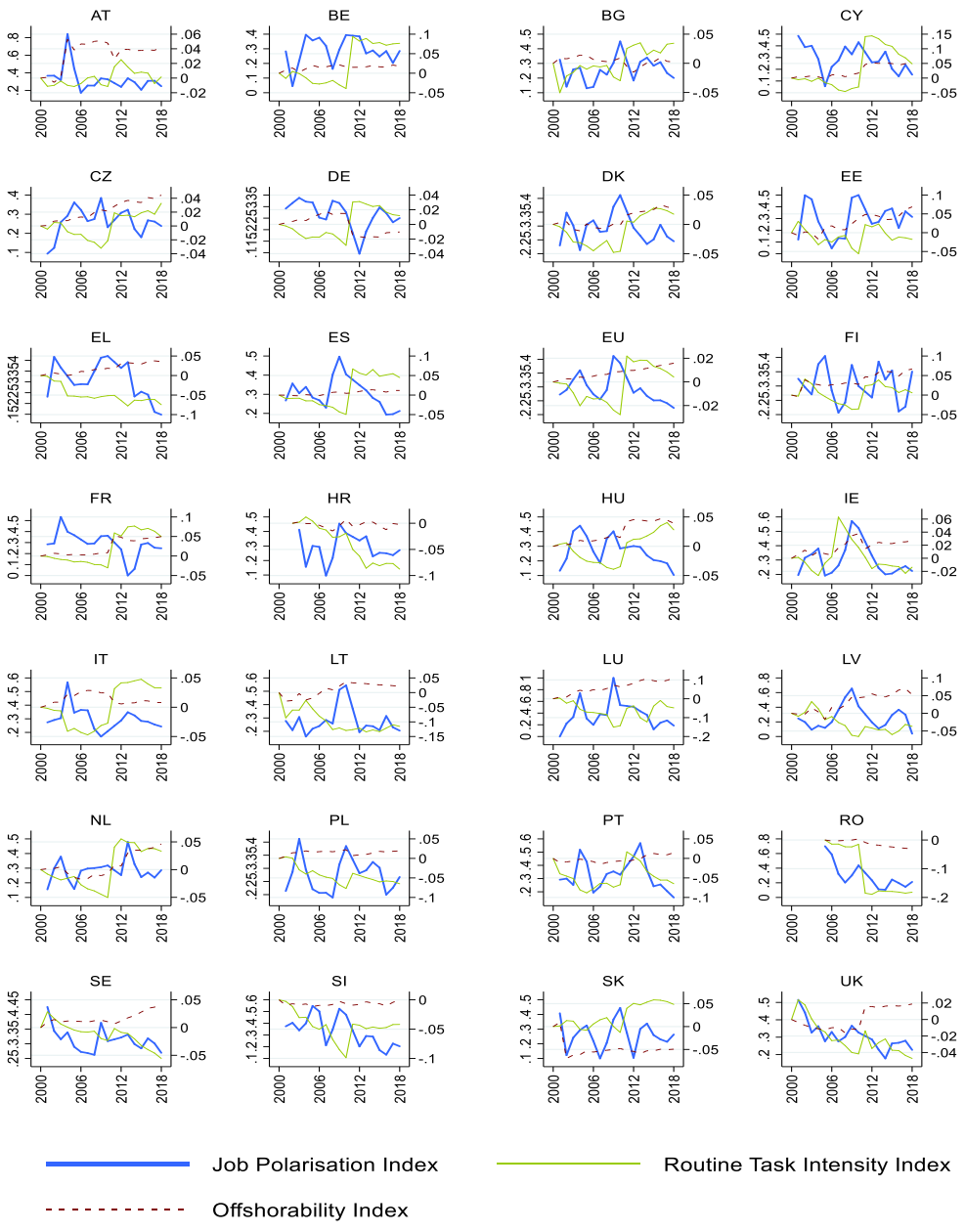
APPENDIX 1

Graph II.1.A1.1: **Evolution of the task content of jobs in EU Member States, 2000-2018**



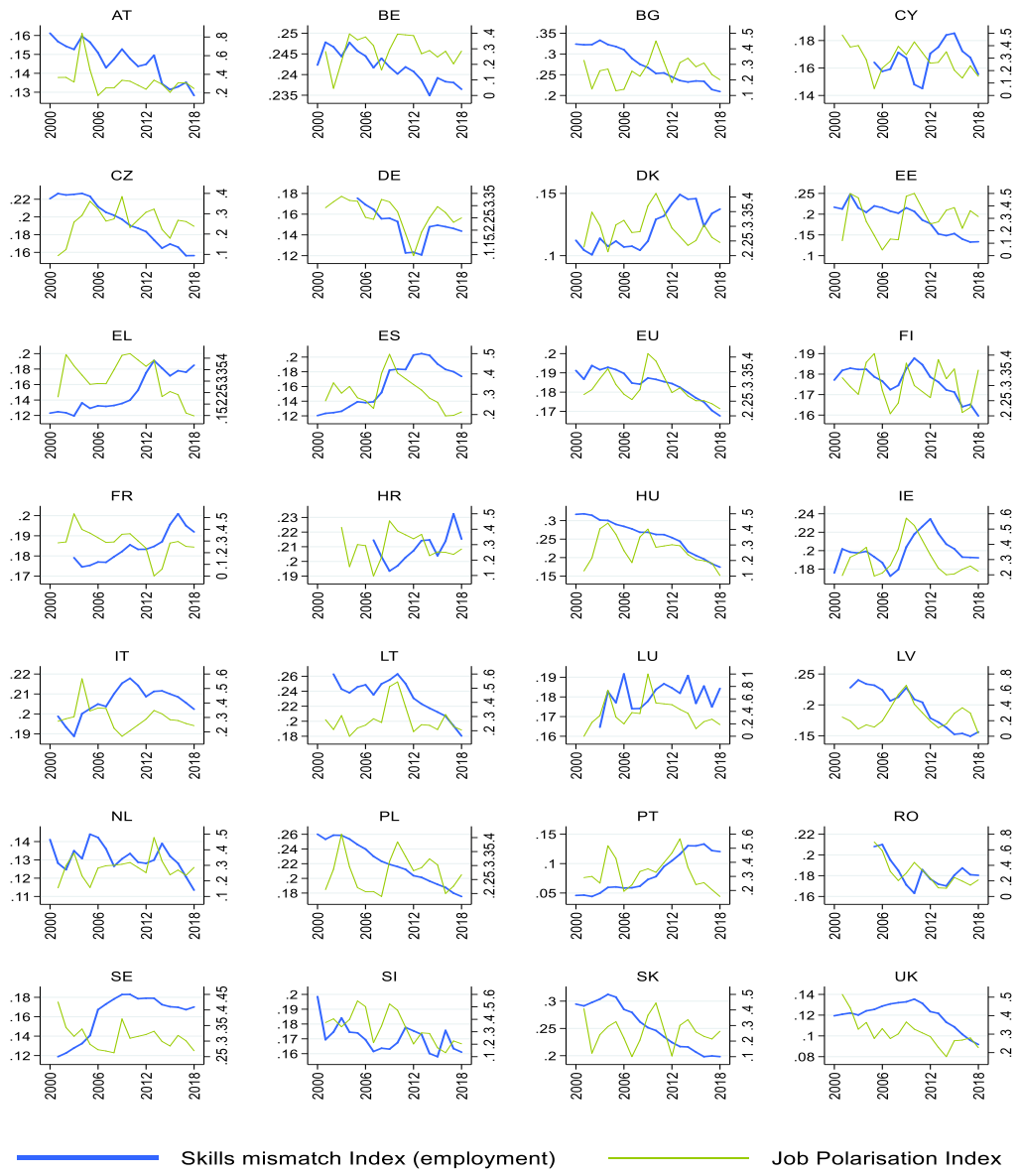
(1) To make the results comparable the task indices were rescaled so that the initial value was 0.
Source: Own calculations based on EU-LFS and O*NET data.

Graph II.1.A1.2: **Evolution of the polarisation-related mearues in EU Member States, 2000-2018**



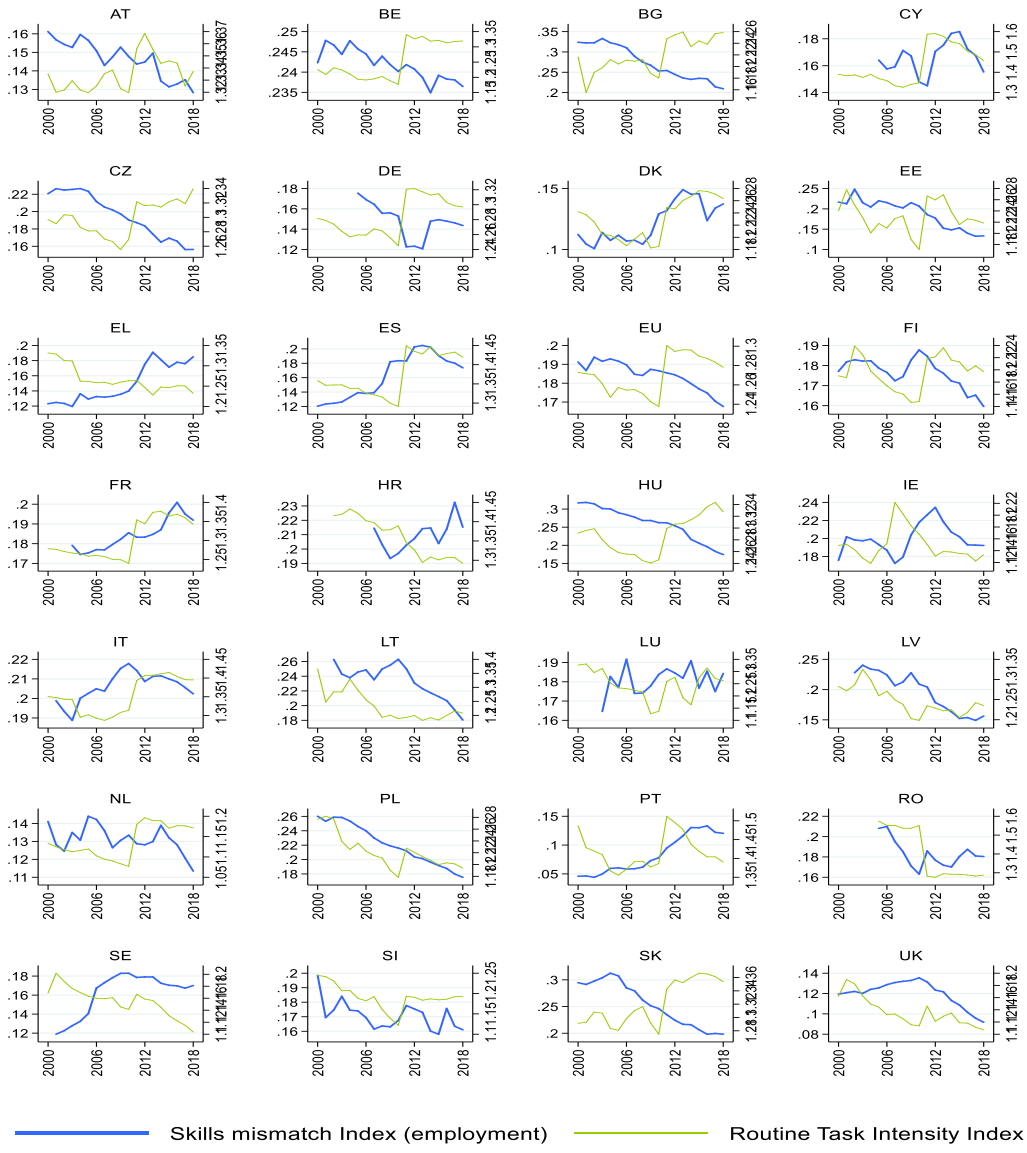
Source: Own calculations based on EU-LFS and O*NET data.

Graph II.1.A1.3: **Evolution of the macroeconomic skill mismatch and JPI in EU Member States, 2000-2018**



Source: Own calculations based on EU-LFS and O*NET data.

Graph II.1.A1.4: **Evolution of the macroeconomic skill mismatch and RTI in EU Member States, 2000-2018**



Source: Own calculations based on EU-LFS and O*NET data.

Table II.1.A1.1: **Determinants of Macroeconomic skills mismatches in EU27, 2000-2018**

VARIABLES	EU	High-income countries	Low-income countries
Non-accelerating wage rate of unemployment	0.0050***	0.0051***	0.0042***
	(0.0005)	(0.0007)	(0.0008)
lngdp	-0.1204***	-0.0733***	-0.1174***
	(0.0084)	(0.0161)	(0.0115)
Upskilling	-0.0018***	-0.0019***	-0.0012**
	(0.0003)	(0.0003)	(0.0005)
Ageing	0.0100***	0.0138***	0.0035
	(0.0018)	(0.0019)	(0.0032)
Activity rate: Low-skill	-0.0049***	-0.0038***	-0.0056***
	(0.0003)	(0.0004)	(0.0004)
Activity rate: Middle-skill	0.0030***	0.0039***	0.0029***
	(0.0004)	(0.0007)	(0.0006)
Activity rate: High-skill	0.0027***	0.0016**	0.0023***
	(0.0005)	(0.0007)	(0.0007)
Observations	443	214	229
R-squared	0.7297	0.5716	0.7936
Countries	27	13	14
Country FE	YES	YES	YES

(1) Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1.
Source: Own calculations based on LFS and O*net.

Table II.1.A1.2: **Marginal effects on the probability of being mismatched by Member State, 2000-2018**

VARIABLES	AT (1)	BE (2)	BG (3)	CY (4)	CZ (5)	DE (6)	DK (7)	EE (8)	EL (9)	ES (10)	FI (11)	FR (12)	HR (13)	HU (14)	IE (15)	IT (16)	LT (17)	LU (18)	LV (19)	NL (20)	PL (21)	PT (22)	RO (23)	SE (24)	SI (25)	SK (26)	UK (27)
JPI	0.0129***	-3.54e-05	0.00948	0.00425	0.0323***	0.0371***	0.0404***	-0.00460	0.0113**	0.0114**	-0.0149**	0.00348	-0.00259	0.00809**	-0.00352	0.0196***	-0.00839**	-0.00441**	0.00991	0.0103**	-0.00897**	0.0161***	-0.00230	-0.0348***	0.0138**	0.000257	0.00545*
	(0.00467)	(0.00222)	(0.00685)	(0.00406)	(0.0109)	(0.0113)	(0.00434)	(0.00300)	(0.00486)	(0.00498)	(0.00694)	(0.00266)	(0.00271)	(0.00363)	(0.00385)	(0.00275)	(0.00351)	(0.00221)	(0.00659)	(0.00405)	(0.00346)	(0.00441)	(0.00259)	(0.0117)	(0.00619)	(0.00291)	(0.00305)
male	0.0115	0.0188*	-0.00250	-0.00243	-0.0755***	-0.0379**	0.00883	-0.00562	0.0316	0.0497***	-0.0182	0.00856	0.00520	-0.0723***	0.0306***	0.0387	-0.0286*	-0.0150	0.00183	-0.00403	-0.0517*	0.0906***	-0.0500*	0.0416***	-0.0212	-0.0896***	-0.0242***
	(0.0182)	(0.0112)	(0.0172)	(0.0161)	(0.0289)	(0.0188)	(0.0162)	(0.0168)	(0.0255)	(0.00793)	(0.0218)	(0.00834)	(0.0266)	(0.0221)	(0.00947)	(0.0238)	(0.0166)	(0.0113)	(0.0216)	(0.0115)	(0.0272)	(0.0196)	(0.0258)	(0.0110)	(0.0240)	(0.0253)	(0.00861)
married	0.00489	-0.00269	0.00467**	-0.0108	0.00893***	0.00386	-0.00865	-0.0227***	0.0174***	0.0188***	-0.0334***	-0.00414	0.0160***	-0.0148***	-0.0182**	0.0314***	-0.0221***	0.0167**	-0.0191***	0.00733*	-0.0161**	0.0568***	-0.0136**	-0.00581	-0.00503	-0.00356	-0.0128***
	(0.00461)	(0.00376)	(0.00220)	(0.0155)	(0.00316)	(0.00509)	(0.00700)	(0.00554)	(0.00562)	(0.00565)	(0.00793)	(0.00552)	(0.00392)	(0.00393)	(0.00908)	(0.00495)	(0.00446)	(0.00654)	(0.00693)	(0.00422)	(0.00721)	(0.0113)	(0.00567)	(0.00856)	(0.00618)	(0.00673)	(0.00460)
foreign	0.0176**	0.0494***	-0.000181	0.0375**	0.0106	0.0848***	0.113***	0.0288**	0.0276	-0.0162	0.118***	0.0513**	0.0130	0.00388	0.0850***	0.0189**	0.0114	-0.0832**	0.0173**	0.0299***	0.0250***	-0.0630***	0.0476	0.0701***	0.0242***	0.0130	0.0126
	(0.00836)	(0.00835)	(0.0335)	(0.0179)	(0.0181)	(0.0219)	(0.00921)	(0.0118)	(0.0307)	(0.0358)	(0.0122)	(0.0202)	(0.0100)	(0.0255)	(0.0164)	(0.00957)	(0.0135)	(0.0377)	(0.00852)	(0.00661)	(0.00960)	(0.0220)	(0.0523)	(0.0168)	(0.00847)	(0.0253)	(0.0110)
temporary	0.173***	0.0569***	0.0600***	0.00869	0.00894	0.130***	0.0960***	0.0266***	0.00280	0.00504	0.0714***	0.0816***	0.0244*	0.0381***	0.0238***	-0.0523***	0.0943***	0.0438*	0.0542***	0.0214*	0.0291**	-0.0256**	0.0624***	0.0740***	0.0220	0.0438***	0.00465
	(0.0535)	(0.0101)	(0.0126)	(0.0146)	(0.00798)	(0.0288)	(0.0191)	(0.00939)	(0.0190)	(0.0170)	(0.0198)	(0.0142)	(0.0134)	(0.00627)	(0.00620)	(0.0187)	(0.0171)	(0.0245)	(0.0158)	(0.0110)	(0.0121)	(0.0112)	(0.0153)	(0.0187)	(0.0148)	(0.0155)	(0.0111)
parttime	0.00526	0.0450***	0.0801***	0.0361***	0.0343**	0.00679	0.0356**	0.0595***	0.0224	0.00975	0.0580***	0.0214	0.0813***	0.0541***	0.0371*	-0.0340***	0.0756***	0.0292*	0.0565***	0.0299*	0.0666***	-0.0772***	0.0264	0.0337***	0.0604***	0.0429***	0.0124
	(0.0152)	(0.0161)	(0.0141)	(0.0124)	(0.0144)	(0.0169)	(0.0144)	(0.0202)	(0.0166)	(0.0180)	(0.0176)	(0.0139)	(0.0175)	(0.0112)	(0.0199)	(0.00745)	(0.0157)	(0.0161)	(0.0128)	(0.0160)	(0.00883)	(0.0119)	(0.0189)	(0.0124)	(0.0130)	(0.0147)	(0.0249)
lgdp	0.110*	-0.512***	-0.122***	-0.0485	-0.338***	-0.194	0.253***	-0.0271	0.0607***	-0.205***	-0.394**	-0.427***	-0.0851	-0.166***	-0.127***	0.0342	-0.201***	-0.147**	-0.0679*	-0.430***	0.0151	-0.435***	-0.0922**	-0.227*	-0.148***	-0.00542	-0.429**
	(0.0612)	(0.104)	(0.0265)	(0.0420)	(0.106)	(0.120)	(0.0799)	(0.0402)	(0.0209)	(0.0437)	(0.198)	(0.0686)	(0.0560)	(0.0366)	(0.0264)	(0.0537)	(0.0355)	(0.0742)	(0.0356)	(0.0430)	(0.0446)	(0.0942)	(0.0408)	(0.132)	(0.0495)	(0.0464)	(0.0997)
nawru	-0.0270**	0.0380***	-0.00203	-0.00706*	-0.00854**	0.00181	0.0522**	-0.00173	-0.0174***	-0.0121***	0.00527	-0.0287*	0.00187	-0.00577**	-0.00510**	-0.0491***	-0.0274***	-0.0128**	0.000758	-0.0372***	0.00619*	-0.0107***	-0.00736	0.000850	-0.0284	0.0141***	-0.0506***
	(0.0122)	(0.00579)	(0.00201)	(0.00414)	(0.00382)	(0.00842)	(0.0243)	(0.00287)	(0.00646)	(0.00302)	(0.0222)	(0.0158)	(0.00435)	(0.00175)	(0.00154)	(0.00549)	(0.00401)	(0.00552)	(0.00242)	(0.00913)	(0.00355)	(0.00247)	(0.00540)	(0.0163)	(0.0319)	(0.00453)	(0.0122)
firmsize = 2, 11 to 49 persons	-0.0196	-0.00812	-0.0360***	-0.0334***	-0.00558	-0.0132	-0.0285*	-0.0181	-0.0616***	-0.0571***	-0.0471***	-0.00437	-0.0283**	0.0136	-0.0209***	-0.0230***	-0.00127	-0.0155	-0.0126	-0.0205	-0.00248	-0.0595***	-0.0911***	-0.0225**	-0.0252**	-0.00406	-0.0228***
	(0.0159)	(0.00708)	(0.00915)	(0.00981)	(0.0216)	(0.0194)	(0.0159)	(0.0111)	(0.0130)	(0.00849)	(0.0104)	(0.00768)	(0.0119)	(0.00927)	(0.00759)	(0.00681)	(0.0123)	(0.00981)	(0.0105)	(0.0128)	(0.0127)	(0.00935)	(0.0350)	(0.0114)	(0.0120)	(0.0260)	(0.00586)
firmsize = 3, 50 persons or more	-0.0125	-0.0334***	-0.0610***	-0.0738***	-0.00401	-0.0144	-0.0566***	-0.0387**	-0.0833***	-0.109***	-0.0705***	-0.0398***	-0.0527***	0.00638	-0.0540***	-0.0846***	-0.0212	-0.0486***	-0.0313**	-0.0327	-0.0230	-0.131***	-0.119***	-0.0553***	-0.0120	-0.0124	-0.0665***
	(0.0198)	(0.00634)	(0.0106)	(0.0149)	(0.0234)	(0.0233)	(0.0196)	(0.0174)	(0.0126)	(0.0120)	(0.00829)	(0.0116)	(0.0107)	(0.0148)	(0.0140)	(0.0201)	(0.0184)	(0.0149)	(0.0152)	(0.0200)	(0.0142)	(0.0121)	(0.0424)	(0.0191)	(0.0258)	(0.0288)	(0.0103)
age_group = 2, 25-34	-0.0954***	0.00679	-0.00161	-0.0166	-0.00626	-0.150***	-0.0753***	-0.0478*	0.0306*	-0.0167	-0.0436	-0.0244*	0.0242	-0.0151	0.0424**	0.0171	-0.0668***	-0.0795***	-0.0456**	-0.0778***	-0.0245	-0.0185	-0.0428***	-0.0337	-0.00646	-0.00544	0.0223
	(0.0167)	(0.0134)	(0.0276)	(0.0188)	(0.0192)	(0.0202)	(0.0225)	(0.0254)	(0.0184)	(0.0155)	(0.0302)	(0.0130)	(0.0236)	(0.0141)	(0.0185)	(0.0141)	(0.0182)	(0.0210)	(0.0213)	(0.0218)	(0.0200)	(0.0120)	(0.0133)	(0.0205)	(0.0208)	(0.0189)	(0.0324)
age_group = 3, 35-44	-0.0700***	0.0478***	-0.00843	-0.0335**	0.0130	-0.138***	-0.0407*	-0.0483*	0.0558**	0.000879	-0.0190	0.0262*	0.0660**	0.00808	0.0594***	0.0779***	-0.0718***	-0.0405	-0.0580***	-0.0367*	-0.00774	0.0354**	-0.0681***	0.0206	0.00984	0.0143	0.0565
	(0.0206)	(0.0171)	(0.0286)	(0.0169)	(0.0187)	(0.0253)	(0.0220)	(0.0278)	(0.0239)	(0.0172)	(0.0344)	(0.0136)	(0.0269)	(0.0118)	(0.0227)	(0.0215)	(0.0148)	(0.0258)	(0.0173)	(0.0223)	(0.0151)	(0.0159)	(0.0112)	(0.0233)	(0.0231)	(0.0161)	(0.0347)
age_group = 4, 45-54	-0.0479**	0.0956***	0.00872	-0.00155	0.0255	-0.122***	0.00447	-0.0443	0.101***	0.0400*	0.0251	0.103***	0.0914***	0.0221	0.101***	0.130***	-0.0497**	0.0111	-0.0591***	0.00813	0.0420***	0.0917***	-0.0517***	0.0884***	0.0414	0.0314	0.0880***
	(0.0219)	(0.0229)	(0.0284)	(0.0198)	(0.0201)	(0.0267)	(0.0216)	(0.0294)	(0.0318)	(0.0223)	(0.0336)	(0.0172)	(0.0304)	(0.0144)	(0.0249)	(0.0296)	(0.0198)	(0.0278)	(0.0169)	(0.0265)	(0.0148)	(0.0197)	(0.00958)	(0.0261)	(0.0281)	(0.0201)	(0.0335)
age_group = 5, 55-65	-0.0317	0.122***	0.0443*	0.0543**	0.0332	-0.112***	0.0294	0.00454	0.156***	0.0643**	0.0720*	0.128***	0.0807**	0.0289	0.156***	0.138***	0.000775	0.0154	-0.0162	0.0323	0.0735***	0.0992***	0.00850	0.149***	0.0238	0.0411*	0.112***
	(0.0297)	(0.0279)	(0.0268)	(0.0245)	(0.0209)	(0.0324)	(0.0221)	(0.0310)	(0.0422)	(0.0300)	(0.0381)	(0.0224)	(0.0403)	(0.0200)	(0.0266)	(0.0362)	(0.0146)	(0.0304)	(0.0170)	(0.0337)	(0.0189)	(0.0236)	(0.0242)	(0.0326)	(0.0326)	(0.0236)	(0.0332)
Observations	1240134	534382	267306	235379	770057	2316181	685896	146170	1044697	627811	229385	763997	156936	1396880	1030001	2724910	347293	159453	169716	775657	1422374	874390	1065717	2081856	398208	540246	711902

(1) All regressions weighted with EU-LFS weights, and standard errors clustered at country level.

Source: Own calculations based on EU-LFS.

APPENDIX 2
Empirical analysis: on-the-job mismatch and polarisation

The link between skill mismatch, individual and job characteristics is investigated by estimating the following cross-country binomial logit specification:

$$SMM_{i,c,t} = \Phi(\delta_1 + \delta_2 I_i + \delta_3 C_{c,t} + \delta_4 P_{c,t} + \varepsilon_{i,c,t})$$

where Φ is the normal distribution, i denotes an individual, c denotes country, t denotes year and SMMi denotes the probability that an individual i is mismatched (SMM=1 if an individual i is over- or under-skilled), and C denotes country-specific control variables, including GDP per capita and level of unemployment. A country-by-country estimation is also considered to explore cross-country differences in the determinants of mismatch (Table II.1.A1.2 in Appendix 1.A1).

The definition of mismatch used in the analysis is that of the ILO (2007). Thus, a high-qualified worker (tertiary education) is considered as overqualified if he has a job at ISCO levels 4-9. A medium- qualified worker (upper secondary) is considered as overqualified if he has a job at ISCO level 9, and as underqualified if he has a job at ISCO level 1-3. A low-qualified worker (lower sencondary) is considered as underqualified if he has a job at ISCO levels 1-8.

The explanatory variables include a vector of individual characteristics, I, which are likely to influence mismatch. These include: age category (15-24, 25-34, 35-44, 45-54 and 55-65), gender (1 if the person is male, 0 otherwise), nationality (0 if national, 1 if foreign-born), marital status (1 if married, 0 otherwise), firm size (1-10, 11-49 and 50+), contract type (1 if the person is temporary, 0 otherwise) and parttime (1 if the person is employed part-time, 0 otherwise). In addition, the Job Polariation Index ($P_{c,t}$) for country c and year t is included to investigate the impact of the polarisation of the economy on the probability of being mismatched.

The reported coefficients are marginal effects and can be interpreted as the average impact across EU Member States of a unit change in the explanatory variable on the probability of skill mismatch. These changes are relative to the probability of skill mismatch of the excluded individual: single, female, native-born, full-time young worker in a small firm on indefinite contracts.

In a second step, to study the link between skill mismatches and the task content of jobs, the specification replaces the JPI by a binary indicator of whether an individual (i) in country (c) and time (t) is in a high index occupation. This high index occupation variable ($H_{oc,t}$) takes value 1 if the occupation (o) is above the 66th percentile for the index in that year and country:

$$SMM_{i,c,t} = \Phi(\delta_1 + \delta_2 I_i + \delta_3 C_{c,t} + \delta_4 H_{o,c,t} + \varepsilon_{i,c,t})$$

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Statistical annex

APPENDIX 1
Statistical annex

Belgium	2014	2015	2016	2017	2018	2017-2018
1 - **Population** (LFS, total, 1000 pers.)	11180	11238	11295	11349	11405	0.5 %
2 - **Population** (LFS, working age:15-64, 1000 pers.)	7266	7281	7290	7266	7289	0.3 %
(% of total population)	65.0	64.8	64.5	64.0	63.9	-0.1 pps
3 - **Labour force** (15-64, 1000 pers.)	4920	4921	4929	4940	5000	1.2 %
Male	2644	2640	2649	2652	2664	0.5 %
Female	2277	2281	2281	2289	2335	2.0 %
4 - **Activity rate** (% of population 15-64)	67.7	67.6	67.6	68.0	68.6	0.6 pps
Young (15-24)	30.2	30.0	28.5	28.1	29.6	1.5 pps
Prime age (25-54)	85.6	85.1	85.1	84.8	85.0	0.1 pps
Older (55-64)	45.1	46.6	48.1	51.3	52.6	1.3 pps
Nationals (15-64)	68.1	68.0	68.0	68.3	69.0	0.6 pps
Non-nationals (15-64)	65.0	64.8	65.0	65.7	65.9	0.2 pps
Male	72.4	72.2	72.3	72.8	72.8	0.1 pps
Young (15-24)	32.3	32.8	30.7	30.6	31.4	0.8 pps
Prime age (25-54)	90.7	89.9	90.4	90.0	89.6	-0.4 pps
Older (55-64)	51.3	52.2	53.6	56.9	57.9	1.1 pps
Female	63.0	63.0	62.9	63.2	64.3	1.1 pps
Young (15-24)	28.1	27.1	26.1	25.4	27.8	2.3 pps
Prime age (25-54)	80.6	80.2	79.8	79.6	80.3	0.7 pps
Older (55-64)	39.0	41.2	42.8	45.8	47.4	1.6 pps
5 - **Employment rate** (% of population 15-64)	61.9	61.8	62.3	63.1	64.5	1.3 pps
Young (15-24)	23.2	23.4	22.7	22.7	25.0	2.3 pps
Prime age (25-54)	79.1	78.5	79.1	79.5	80.4	0.9 pps
Older (55-64)	42.6	44.0	45.4	48.3	50.3	2.1 pps
Low-skilled (15-64)	37.3	36.0	36.0	35.5	35.5	0.0 pps
Medium-skilled (15-64)	63.8	64.0	64.4	65.1	66.6	1.5 pps
High-skilled (15-64)	82.0	81.8	82.2	82.2	83.4	1.3 pps
Nationals (15-64)	62.9	62.8	63.3	64.1	65.4	1.3 pps
Non-nationals (15-64)	53.7	54.6	55.1	56.5	57.8	1.3 pps
Male	65.8	65.5	66.5	67.5	68.2	0.7 pps
Young (15-24)	24.5	25.0	24.0	24.4	26.4	1.9 pps
Prime age (25-54)	83.2	82.5	83.8	84.4	84.5	0.2 pps
Older (55-64)	48.5	48.9	50.7	53.8	55.1	1.3 pps
Female	57.9	58.0	58.1	58.7	60.7	2.0 pps
Young (15-24)	21.8	21.7	21.4	20.9	23.5	2.6 pps
Prime age (25-54)	75.0	74.5	74.3	74.6	76.2	1.6 pps
Older (55-64)	37.0	39.3	40.2	42.8	45.6	2.8 pps
6 - **Employed persons** (15-64, 1000 pers.)	4497.3	4499.3	4540.6	4587.2	4699.4	2.4 %
7 - **Employment growth** (%, National accounts)	0.4	0.9	1.3	1.4	1.3	-0.1 pps
Employment growth (%, 15-64, LFS)	0.3	0.0	0.9	1.0	2.4	1.4 pps
Male	-0.7	-0.2	1.5	1.2	1.4	0.2 pps
Female	1.5	0.4	0.2	0.9	3.7	2.8 pps
8 - **Self employed** (15-64, % of total employment)	13.2	13.8	13.5	13.1	12.7	-0.4 pps
Male	16.8	17.5	17.3	16.3	15.8	-0.6 pps
Female	9.1	9.5	9.2	9.3	9.1	-0.2 pps
9 - **Temporary employment** (15-64, % of total employment)	8.6	9.0	9.1	10.4	10.7	0.3 pps
Male	7.6	8.3	8.3	9.7	9.8	0.1 pps
Female	9.7	9.7	10.0	11.2	11.7	0.5 pps
10 - **Part-time** (15-64, % of total employment)	23.7	24.3	24.7	24.5	24.5	0.0 pps
Male	8.4	9.3	9.5	10.2	10.0	-0.2 pps
Female	41.2	41.4	42.1	41.2	41.0	-0.2 pps
11 **Involuntary part-time** (15-64, % of total employment)	2.4	2.4	2.2	1.9	1.7	-0.2 pps
12 - **Unemployment rate** (harmonised:15-74)	8.5	8.5	7.8	7.1	6.0	-1.1 pps
Young (15-24)	23.2	22.1	20.1	19.3	15.8	-3.5 pps
Prime age (25-49)	7.6	7.7	7.1	6.2	5.4	-0.8 pps
Older (55-64)	5.4	5.6	5.7	5.9	4.3	-1.6 pps
Low-skilled (15-64)	16.4	17.0	16.1	14.8	13.3	-1.5 pps
Medium-skilled (15-64)	8.8	8.7	8.1	7.2	6.0	-1.2 pps
High-skilled (15-64)	4.7	4.6	4.2	4.3	3.5	-0.8 pps
Nationals (15-64)	7.5	7.6	7.0	6.2	5.2	-1.0 pps
Non-nationals (15-64)	17.3	15.8	15.2	14.0	12.3	-1.7 pps
Male	9.0	9.1	8.1	7.1	6.3	-0.8 pps
Female	7.9	7.8	7.6	7.1	5.6	-1.5 pps
13 - **Long-term unemployment** (% of total unemployment)	49.9	51.7	51.6	48.8	48.7	-0.1 pps
14 - **Worked hours** (full-time, average actual weekly hours)	41.1	41.3	41.3	40.3	40.2	-0.2 %
Male	42.0	42.3	42.2	41.1	41.0	-0.2 %
Female	39.3	39.3	39.5	38.7	38.7	0.0 %
15 - **Sectoral employment growth** (% change)						
Agriculture	-0.3	1.0	-1.5	-1.4	0.9	2.3 pps
Building and construction	-1.5	-0.5	0.7	1.3	1.0	-0.3 pps
Services	1.0	1.8	1.7	1.8	1.6	-0.3 pps
Manufacturing industry	-2.6	-2.2	0.0	0.5	1.2	0.7 pps
16 - **Indicator board on wage developments** (% change)						
Compensation per employee	0.9	0.0	0.5	1.9	1.7	-0.2 pps
Real compensation per employee based on GDP	-0.2	-0.3	1.2	1.5	1.7	0.2 pps
Labour cost index (compens. of employees plus taxes minus subs.)	0.9	0.1	0.1	1.2	1.6	0.4 pps
Labour cost index (wages and salaries, total)	0.9	0.1	0.5	1.9	2.2	0.3 pps
Labour productivity (GDP/person employed)	0.8	0.8	0.2	0.3	0.1	-0.2 pps

Bulgaria	2014	2015	2016	2017	2018	2017-2018
1 - **Population** (LFS, total, 1000 pers.)	7224	7178	7128	7076	7049	-0.4 %
2 - **Population** (LFS, working age:15-64, 1000 pers.)	4796	4727	4659	4595	4531	-1.4 %
(% of total population)	66.4	65.8	65.4	64.9	64.3	-0.7 pps
3 - **Labour force** (15-64, 1000 pers.)	3309	3276	3200	3278	3240	-1.2 %
Male	1763	1744	1710	1751	1737	-0.8 %
Female	1546	1532	1490	1526	1503	-1.5 %
4 - **Activity rate** (% of population 15-64)	69.0	69.3	68.7	71.3	71.5	0.2 pps
Young (15-24)	27.2	26.0	23.9	26.3	23.7	-2.6 pps
Prime age (25-54)	83.3	83.2	82.0	84.3	84.3	0.0 pps
Older (55-64)	56.6	58.0	58.8	61.8	63.7	1.9 pps
Nationals (15-64)	69.0	69.3	68.7	71.4	71.5	0.2 pps
Non-nationals (15-64)	54.2	48.9	58.9	56.8	55.9	-0.9 pps
Male	72.9	73.2	72.7	75.4	75.9	0.4 pps
Young (15-24)	31.5	30.5	28.0	30.5	27.9	-2.7 pps
Prime age (25-54)	86.2	86.4	85.7	88.0	88.3	0.3 pps
Older (55-64)	62.5	62.7	63.4	66.8	69.1	2.4 pps
Female	65.0	65.4	64.6	67.1	67.0	-0.1 pps
Young (15-24)	22.6	21.2	19.6	21.8	19.3	-2.5 pps
Prime age (25-54)	80.2	79.8	78.2	80.5	80.2	-0.3 pps
Older (55-64)	51.4	53.8	54.6	57.3	58.7	1.4 pps
5 - **Employment rate** (% of population 15-64)	61.0	62.9	63.4	66.9	67.7	0.8 pps
Young (15-24)	20.7	20.3	19.8	22.9	20.7	-2.2 pps
Prime age (25-54)	74.5	76.1	76.2	79.4	80.1	0.8 pps
Older (55-64)	50.0	53.0	54.5	58.2	60.7	2.6 pps
Low-skilled (15-64)	29.7	29.6	29.6	33.4	34.8	1.4 pps
Medium-skilled (15-64)	65.2	67.2	67.8	71.7	72.4	0.8 pps
High-skilled (15-64)	81.7	84.0	84.2	85.5	86.1	0.6 pps
Nationals (15-64)	61.1	62.9	63.4	66.9	67.8	0.8 pps
Non-nationals (15-64)	52.1	45.5	53.3	52.3	53.9	1.7 pps
Male	63.9	65.9	66.7	70.6	71.5	0.9 pps
Young (15-24)	24.0	24.0	23.1	26.5	24.2	-2.3 pps
Prime age (25-54)	76.4	78.5	79.2	82.8	83.5	0.8 pps
Older (55-64)	54.5	56.8	58.3	62.5	65.4	3.0 pps
Female	58.2	59.8	60.0	63.1	63.9	0.8 pps
Young (15-24)	17.3	16.5	16.3	19.1	17.0	-2.1 pps
Prime age (25-54)	72.5	73.6	73.0	75.8	76.5	0.7 pps
Older (55-64)	46.0	49.5	51.0	54.3	56.4	2.2 pps
6 - **Employed persons** (15-64, 1000 pers.)	2927.4	2973.5	2954.3	3073.4	3068.9	-0.1 %
7 - **Employment growth** (%, National accounts)	0.4	0.4	0.5	1.8	-0.1	-1.9 pps
Employment growth (%, 15-64, LFS)	1.3	1.6	-0.6	4.0	-0.1	-4.2 pps
Male	1.7	1.8	-0.2	4.4	-0.1	-4.5 pps
Female	0.9	1.3	-1.2	3.6	-0.2	-3.8 pps
8 - **Self employed** (15-64, % of total employment)	11.5	11.1	10.8	10.8	10.6	-0.2 pps
Male	14.6	14.1	13.5	13.5	13.4	-0.1 pps
Female	8.1	7.7	7.8	7.6	7.3	-0.3 pps
9 - **Temporary employment** (15-64, % of total employment)	5.3	4.4	4.1	4.4	4.0	-0.4 pps
Male	5.6	4.7	4.5	4.9	4.4	-0.5 pps
Female	4.9	4.1	3.6	3.9	3.7	-0.2 pps
10 - **Part-time** (15-64, % of total employment)	2.5	2.2	2.0	2.2	1.8	-0.4 pps
Male	2.2	1.9	1.8	2.0	1.7	-0.3 pps
Female	2.8	2.5	2.2	2.4	2.0	-0.4 pps
11 **Involuntary part-time** (15-64, % of total employment)	1.6	1.3	1.2	1.3	1.0	-0.3 pps
12 - **Unemployment rate** (harmonised:15-74)	11.4	9.2	7.6	6.2	5.2	-1.0 pps
Young (15-24)	23.8	21.6	17.2	12.9	12.7	-0.2 pps
Prime age (25-49)	10.5	8.5	7.1	5.9	5.0	-0.9 pps
Older (55-64)	11.7	8.7	7.3	5.9	4.6	-1.3 pps
Low-skilled (15-64)	28.6	25.5	22.5	18.3	15.7	-2.6 pps
Medium-skilled (15-64)	10.7	8.4	6.8	5.3	4.6	-0.7 pps
High-skilled (15-64)	5.2	4.0	3.4	3.1	2.4	-0.7 pps
Nationals (15-64)	11.5	9.2	7.7	6.2	5.3	-0.9 pps
Non-nationals (15-64)	0.0	0.0	0.0	0.0	0.0	0.0 pps
Male	12.3	9.8	8.1	6.4	5.7	-0.7 pps
Female	10.4	8.4	7.0	6.0	4.7	-1.3 pps
13 - **Long-term unemployment** (% of total unemployment)	60.3	61.1	58.9	54.9	58.3	3.4 pps
14 - **Worked hours** (full-time, average actual weekly hours)	40.5	40.5	40.6	40.4	40.2	-0.5 %
Male	40.7	40.8	40.8	40.6	40.5	-0.2 %
Female	40.2	40.2	40.3	40.1	39.9	-0.5 %
15 - **Sectoral employment growth** (% change)						
Agriculture	1.6	-2.6	-3.7	6.4	-6.1	-12.5 pps
Building and construction	-0.8	2.5	-3.9	0.1	5.2	5.1 pps
Services	0.0	1.0	3.0	0.6	1.3	0.7 pps
Manufacturing industry	0.5	2.3	1.3	1.1	0.5	-0.6 pps
16 - **Indicator board on wage developments** (% change)						
Compensation per employee	5.6	5.6	5.8	10.5	5.6	-4.9 pps
Real compensation per employee based on GDP	0.5	2.6	-0.4	1.5	8.0	6.6 pps
Labour cost index (compens. of employees plus taxes minus subs.)	6.6	7.3	6.4	12.4	6.5	-5.9 pps
Labour cost index (wages and salaries, total)	6.3	7.6	6.4	12.3	6.2	-6.1 pps
Labour productivity (GDP/person employed)	1.5	3.1	3.4	2.0	3.2	1.2 pps

Czech Republic	2014	2015	2016	2017	2018	2017-2018
1 - **Population** (LFS, total, 1000 pers.)	10525	10543	10565	10590	10626	0.3 %
2 - **Population** (LFS, working age:15-64, 1000 pers.)	7081	7026	6968	6917	6879	-0.5 %
(% of total population)	67.3	66.6	66.0	65.3	64.7	-0.6 pps
3 - **Labour force** (15-64, 1000 pers.)	5206	5201	5226	5248	5267	0.4 %
Male	2914	2900	2906	2912	2915	0.1 %
Female	2292	2301	2321	2336	2352	0.7 %
4 - **Activity rate** (% of population 15-64)	73.5	74.0	75.0	75.9	76.6	0.7 pps
Young (15-24)	32.2	32.5	32.0	31.7	30.4	-1.2 pps
Prime age (25-54)	88.8	88.6	88.9	89.1	89.3	0.2 pps
Older (55-64)	56.8	58.0	60.8	63.6	66.5	2.8 pps
Nationals (15-64)	73.4	73.9	74.9	75.7	76.4	0.7 pps
Non-nationals (15-64)	78.8	78.0	82.6	82.0	82.9	1.0 pps
Male	81.2	81.4	82.2	82.9	83.3	0.4 pps
Young (15-24)	38.1	37.4	37.5	36.5	34.4	-2.1 pps
Prime age (25-54)	95.6	95.4	95.4	95.7	95.9	0.2 pps
Older (55-64)	67.9	68.3	70.9	73.2	75.3	2.1 pps
Female	65.6	66.5	67.6	68.7	69.6	1.0 pps
Young (15-24)	26.1	27.4	26.2	26.6	26.2	-0.3 pps
Prime age (25-54)	81.6	81.4	82.1	82.1	82.3	0.2 pps
Older (55-64)	46.3	48.3	51.2	54.5	58.0	3.4 pps
5 - **Employment rate** (% of population 15-64)	69.0	70.2	72.0	73.6	74.8	1.2 pps
Young (15-24)	27.1	28.4	28.6	29.1	28.4	-0.8 pps
Prime age (25-54)	83.8	84.5	85.7	86.7	87.5	0.8 pps
Older (55-64)	54.0	55.5	58.5	62.1	65.1	3.0 pps
Low-skilled (15-64)	22.9	22.3	23.7	26.1	26.5	0.4 pps
Medium-skilled (15-64)	73.6	75.4	77.4	78.9	80.1	1.2 pps
High-skilled (15-64)	82.2	82.6	83.4	84.2	85.6	1.4 pps
Nationals (15-64)	68.9	70.1	71.8	73.5	74.7	1.2 pps
Non-nationals (15-64)	74.1	74.4	79.3	79.8	81.2	1.4 pps
Male	77.0	77.9	79.3	80.9	81.8	0.9 pps
Young (15-24)	32.3	33.1	33.8	33.8	32.2	-1.6 pps
Prime age (25-54)	91.5	91.9	92.7	93.7	94.4	0.7 pps
Older (55-64)	64.8	65.5	68.2	71.7	74.0	2.3 pps
Female	60.7	62.4	64.4	66.2	67.6	1.5 pps
Young (15-24)	21.6	23.4	23.2	24.3	24.3	0.1 pps
Prime age (25-54)	75.7	76.7	78.4	79.3	80.1	0.8 pps
Older (55-64)	43.8	45.9	49.3	53.0	56.6	3.7 pps
6 - **Employed persons** (15-64, 1000 pers.)	4883.5	4934.3	5015.9	5093.9	5146.8	1.0 %
7 - **Employment growth** (%, National accounts)	0.6	1.4	1.6	1.6	1.3	-0.3 pps
Employment growth (%, 15-64, LFS)	0.8	1.0	1.7	1.6	1.0	-0.5 pps
Male	0.8	0.4	1.1	1.3	0.7	-0.7 pps
Female	0.8	1.8	2.4	1.8	1.5	-0.3 pps
8 - **Self employed** (15-64, % of total employment)	17.0	16.3	16.2	16.1	16.0	-0.1 pps
Male	21.3	20.2	19.5	19.8	19.9	0.1 pps
Female	11.5	11.4	11.9	11.6	11.1	-0.4 pps
9 - **Temporary employment** (15-64, % of total employment)	9.7	10.0	9.7	9.6	8.4	-1.2 pps
Male	8.4	8.4	8.1	7.8	6.5	-1.3 pps
Female	11.3	11.9	11.6	11.7	10.6	-1.1 pps
10 - **Part-time** (15-64, % of total employment)	5.5	5.3	5.7	6.2	6.3	0.1 pps
Male	2.5	2.2	2.3	2.4	2.6	0.2 pps
Female	9.5	9.3	10.0	10.9	10.9	0.0 pps
11 **Involuntary part-time** (15-64, % of total employment)	1.2	0.9	0.8	0.6	0.4	-0.2 pps
12 - **Unemployment rate** (harmonised:15-74)	6.1	5.1	4.0	2.9	2.2	-0.7 pps
Young (15-24)	15.9	12.6	10.5	7.9	6.7	-1.2 pps
Prime age (25-49)	5.6	4.6	3.5	2.7	2.0	-0.7 pps
Older (55-64)	4.9	4.4	3.8	2.4	2.0	-0.4 pps
Low-skilled (15-64)	22.4	23.1	20.9	13.3	10.8	-2.5 pps
Medium-skilled (15-64)	6.1	4.8	3.6	2.7	2.1	-0.6 pps
High-skilled (15-64)	2.9	2.4	1.9	1.5	1.2	-0.3 pps
Nationals (15-64)	6.2	5.1	4.0	2.9	2.3	-0.6 pps
Non-nationals (15-64)	6.1	4.5	4.1	2.6	2.1	-0.5 pps
Male	5.1	4.2	3.4	2.3	1.8	-0.5 pps
Female	7.4	6.1	4.7	3.6	2.8	-0.8 pps
13 - **Long-term unemployment** (% of total unemployment)	43.6	47.4	42.1	35.0	30.6	-4.4 pps
14 - **Worked hours** (full-time, average actual weekly hours)	40.4	40.2	40.5	40.3	40.1	-0.5 %
Male	41.4	41.2	41.5	41.3	41.1	-0.5 %
Female	38.9	38.7	39.2	38.8	38.8	0.0 %
15 - **Sectoral employment growth** (% change)						
Agriculture	-0.9	-1.4	-1.4	0.9	-0.9	-1.8 pps
Building and construction	-4.6	-0.5	-1.7	-0.1	0.9	1.0 pps
Services	0.6	1.0	1.4	1.3	2.1	0.8 pps
Manufacturing industry	1.3	3.5	2.7	1.3	1.1	-0.2 pps
16 - **Indicator board on wage developments** (% change)						
Compensation per employee	2.6	3.0	4.0	6.4	8.0	1.6 pps
Real compensation per employee based on GDP	3.9	3.8	5.2	2.5	2.0	-0.5 pps
Labour cost index (compens. of employees plus taxes minus subs.)	2.5	4.0	3.8	7.8	7.5	-0.3 pps
Labour cost index (wages and salaries, total)	2.7	4.1	3.8	7.8	7.5	-0.3 pps
Labour productivity (GDP/person employed)	2.2	3.8	0.8	2.8	1.6	-1.2 pps

Denmark	2014	2015	2016	2017	2018	2017-2018
1 - **Population** (LFS, total, 1000 pers.)	5643	5682	5729	5767	5794	0.5 %
2 - **Population** (LFS, working age:15-64, 1000 pers.)	3626	3644	3669	3684	3696	0.3 %
(% of total population)	64.3	64.1	64.0	63.9	63.8	-0.1 pps
3 - **Labour force** (15-64, 1000 pers.)	2831	2859	2934	2905	2935	1.0 %
Male	1482	1500	1532	1517	1533	1.0 %
Female	1350	1359	1402	1387	1402	1.0 %
4 - **Activity rate** (% of population 15-64)	78.1	78.5	80.0	78.8	79.4	0.6 pps
Young (15-24)	61.5	62.1	66.2	63.3	63.2	-0.1 pps
Prime age (25-54)	87.1	87.1	87.4	86.2	86.5	0.4 pps
Older (55-64)	66.4	67.6	70.6	71.6	73.3	1.7 pps
Nationals (15-64)	78.6	79.1	80.3	79.4	80.1	0.6 pps
Non-nationals (15-64)	73.2	73.0	77.2	74.1	74.2	0.1 pps
Male	81.1	81.6	82.6	81.5	82.1	0.6 pps
Young (15-24)	61.0	61.7	65.0	62.4	62.4	-0.1 pps
Prime age (25-54)	90.3	90.8	90.8	89.6	89.9	0.3 pps
Older (55-64)	72.6	72.8	74.9	75.6	77.7	2.0 pps
Female	75.0	75.3	77.2	76.1	76.6	0.6 pps
Young (15-24)	62.0	62.5	67.4	64.1	64.0	-0.1 pps
Prime age (25-54)	83.8	83.4	83.8	82.7	83.1	0.4 pps
Older (55-64)	60.3	62.6	66.4	67.6	69.0	1.3 pps
5 - **Employment rate** (% of population 15-64)	72.8	73.5	74.9	74.2	75.4	1.2 pps
Young (15-24)	53.7	55.4	58.2	56.3	57.3	1.0 pps
Prime age (25-54)	82.0	82.1	82.5	81.7	82.7	1.0 pps
Older (55-64)	63.2	64.7	67.8	68.9	70.7	1.7 pps
Low-skilled (15-64)	54.2	54.3	57.8	55.6	55.7	0.1 pps
Medium-skilled (15-64)	77.1	78.2	78.9	78.7	80.1	1.4 pps
High-skilled (15-64)	85.5	85.6	85.6	85.4	86.5	1.0 pps
Nationals (15-64)	73.8	74.7	75.8	75.2	76.5	1.3 pps
Non-nationals (15-64)	63.3	63.6	67.0	66.0	66.1	0.1 pps
Male	75.8	76.6	77.7	76.9	78.0	1.2 pps
Young (15-24)	52.7	54.6	56.5	55.3	55.8	0.5 pps
Prime age (25-54)	85.5	85.9	86.4	85.2	86.2	1.1 pps
Older (55-64)	68.9	69.8	72.0	72.7	75.0	2.2 pps
Female	69.8	70.4	72.0	71.5	72.6	1.1 pps
Young (15-24)	54.9	56.2	60.0	57.2	58.8	1.6 pps
Prime age (25-54)	78.4	78.3	78.5	78.1	79.0	0.9 pps
Older (55-64)	57.6	59.6	63.6	65.2	66.4	1.2 pps
6 - **Employed persons** (15-64, 1000 pers.)	2640.1	2678.3	2747.7	2734.0	2785.3	1.9 %
7 - **Employment growth** (%, National accounts)	0.9	1.4	1.5	1.7	1.8	0.1 pps
Employment growth (%, 15-64, LFS)	0.7	1.4	2.6	-0.5	1.9	2.4 pps
Male	1.4	1.7	2.3	-0.7	1.8	2.5 pps
Female	-0.1	1.1	2.9	-0.3	1.9	2.2 pps
8 - **Self employed** (15-64, % of total employment)	8.0	7.8	7.7	7.3	7.2	-0.2 pps
Male	10.8	10.5	10.2	9.8	9.6	-0.2 pps
Female	4.9	4.8	4.9	4.6	4.4	-0.2 pps
9 - **Temporary employment** (15-64, % of total employment)	8.6	8.7	13.5	12.9	11.1	-1.8 pps
Male	8.2	7.9	12.0	11.9	9.9	-2.0 pps
Female	9.0	9.4	15.1	13.9	12.5	-1.4 pps
10 - **Part-time** (15-64, % of total employment)	24.6	24.7	26.4	25.3	24.8	-0.5 pps
Male	15.2	15.6	16.8	16.2	15.6	-0.6 pps
Female	35.0	34.7	36.9	35.3	34.8	-0.5 pps
11 **Involuntary part-time** (15-64, % of total employment)	4.2	3.9	3.6	3.5	3.0	-0.5 pps
12 - **Unemployment rate** (harmonised:15-74)	6.6	6.2	6.2	5.7	5.0	-0.7 pps
Young (15-24)	12.6	10.8	12.0	11.0	9.4	-1.6 pps
Prime age (25-49)	5.9	5.7	5.5	5.2	4.5	-0.7 pps
Older (55-64)	4.8	4.4	4.0	3.7	3.6	-0.1 pps
Low-skilled (15-64)	10.6	10.0	9.4	9.3	8.2	-1.1 pps
Medium-skilled (15-64)	6.1	5.4	5.3	4.7	4.0	-0.7 pps
High-skilled (15-64)	4.8	4.9	5.0	4.8	4.1	-0.7 pps
Nationals (15-64)	6.1	5.6	5.6	5.3	4.4	-0.9 pps
Non-nationals (15-64)	13.5	12.9	13.2	11.0	10.9	-0.1 pps
Male	6.4	5.9	5.8	5.6	4.8	-0.8 pps
Female	6.8	6.4	6.6	5.9	5.2	-0.7 pps
13 - **Long-term unemployment** (% of total unemployment)	25.2	26.9	22.3	22.5	21.2	-1.3 pps
14 - **Worked hours** (full-time, average actual weekly hours)	39.4	39.6	38.9	38.9	38.6	-0.8 %
Male	40.6	40.7	40.1	40.1	39.6	-1.2 %
Female	37.7	37.8	36.9	37.2	37.1	-0.3 %
15 - **Sectoral employment growth** (% change)						
Agriculture	2.4	2.0	-2.4	-1.3	0.6	1.9 pps
Building and construction	2.1	2.8	3.2	3.3	4.1	0.8 pps
Services	1.1	2.1	2.6	2.5	2.2	-0.4 pps
Manufacturing industry	0.5	1.3	0.9	1.6	1.5	-0.1 pps
16 - **Indicator board on wage developments** (% change)						
Compensation per employee	1.5	1.7	1.5	1.7	2.0	0.3 pps
Real compensation per employee based on GDP	1.0	0.4	1.4	1.3	-0.3	-1.5 pps
Labour cost index (compens. of employees plus taxes minus subs.)	1.8	1.8	2.0	1.9	2.1	0.2 pps
Labour cost index (wages and salaries, total)	1.6	1.6	1.8	1.6	2.2	0.6 pps
Labour productivity (GDP/person employed)	0.7	1.0	0.9	0.6	-0.3	-0.9 pps

Germany	2014	2015	2016	2017	2018	2017-2018
1 - **Population** (LFS, total, 1000 pers.)	80983	81687	82349	82657	82906	0.3 %
2 - **Population** (LFS, working age:15-64, 1000 pers.)	52729	52964	53802	53797	53524	-0.5 %
(% of total population)	65.1	64.8	65.3	65.1	64.6	-0.5 pps
3 - **Labour force** (15-64, 1000 pers.)	40990	41117	41932	42094	42094	0.0 %
Male	21881	21926	22399	22504	22485	-0.1 %
Female	19109	19191	19533	19590	19609	0.1 %
4 - **Activity rate** (% of population 15-64)	77.7	77.6	77.9	78.2	78.6	0.4 pps
Young (15-24)	49.9	48.8	49.2	49.9	50.3	0.4 pps
Prime age (25-54)	87.6	87.6	87.3	87.3	87.7	0.4 pps
Older (55-64)	69.1	69.4	71.3	72.6	73.6	1.0 pps
Nationals (15-64)	78.8	78.7	79.4	79.8	80.1	0.3 pps
Non-nationals (15-64)	69.4	69.3	68.1	68.2	70.0	1.8 pps
Male	82.5	82.1	82.2	82.4	82.9	0.5 pps
Young (15-24)	52.0	50.5	50.9	51.3	52.5	1.2 pps
Prime age (25-54)	92.6	92.5	91.9	91.9	92.3	0.4 pps
Older (55-64)	75.5	75.3	76.9	77.9	78.7	0.8 pps
Female	72.9	73.1	73.6	74.0	74.3	0.3 pps
Young (15-24)	47.7	47.1	47.4	48.3	47.8	-0.5 pps
Prime age (25-54)	82.5	82.5	82.6	82.5	82.9	0.3 pps
Older (55-64)	62.9	63.8	65.9	67.5	68.6	1.2 pps
5 - **Employment rate** (% of population 15-64)	73.8	74.0	74.7	75.2	75.9	0.7 pps
Young (15-24)	46.1	45.3	45.7	46.5	47.2	0.7 pps
Prime age (25-54)	83.5	83.7	83.9	84.2	84.9	0.6 pps
Older (55-64)	65.6	66.2	68.6	70.1	71.4	1.3 pps
Low-skilled (15-64)	46.0	46.1	47.0	47.6	48.3	0.7 pps
Medium-skilled (15-64)	77.7	78.0	78.9	79.5	80.2	0.7 pps
High-skilled (15-64)	87.7	87.8	87.9	88.1	88.5	0.3 pps
Nationals (15-64)	75.1	75.4	76.5	77.3	77.8	0.5 pps
Non-nationals (15-64)	62.8	62.9	62.2	62.6	64.8	2.1 pps
Male	78.1	78.0	78.4	78.9	79.7	0.8 pps
Young (15-24)	47.7	46.5	46.9	47.4	48.8	1.4 pps
Prime age (25-54)	88.0	88.1	88.1	88.4	89.0	0.6 pps
Older (55-64)	71.4	71.3	73.7	75.0	76.1	1.1 pps
Female	69.5	69.9	70.8	71.5	72.1	0.6 pps
Young (15-24)	44.3	44.0	44.5	45.5	45.4	-0.1 pps
Prime age (25-54)	78.8	79.2	79.7	80.0	80.6	0.6 pps
Older (55-64)	60.0	61.2	63.5	65.4	66.9	1.5 pps
6 - **Employed persons** (15-64, 1000 pers.)	38907.7	39175.9	40165.1	40481.6	40635.7	0.4 %
7 - **Employment growth** (%, National accounts)	0.9	0.9	1.2	1.4	1.4	0.0 pps
Employment growth (%, 15-64, LFS)	0.7	0.7	2.5	0.8	0.4	-0.4 pps
Male	0.6	0.5	2.7	0.8	0.3	-0.6 pps
Female	0.9	0.9	2.3	0.7	0.5	-0.2 pps
8 - **Self employed** (15-64, % of total employment)	9.8	9.6	9.3	9.1	8.8	-0.3 pps
Male	12.4	12.1	11.6	11.2	10.9	-0.4 pps
Female	6.9	6.8	6.7	6.6	6.3	-0.2 pps
9 - **Temporary employment** (15-64, % of total employment)	13.1	13.2	13.2	12.9	12.6	-0.3 pps
Male	13.1	13.1	13.2	13.0	12.9	-0.1 pps
Female	13.2	13.2	13.2	12.9	12.4	-0.5 pps
10 - **Part-time** (15-64, % of total employment)	26.5	26.8	26.7	26.9	26.8	-0.1 pps
Male	9.2	9.3	9.4	9.7	9.6	-0.1 pps
Female	46.3	46.6	46.5	46.4	46.3	-0.1 pps
11 **Involuntary part-time** (15-64, % of total employment)	3.8	3.7	3.2	3.0	2.7	-0.3 pps
12 - **Unemployment rate** (harmonised:15-74)	5.0	4.6	4.1	3.8	3.4	-0.4 pps
Young (15-24)	7.7	7.2	7.1	6.8	6.2	-0.6 pps
Prime age (25-49)	4.7	4.4	3.9	3.5	3.2	-0.3 pps
Older (55-64)	5.1	4.7	3.9	3.4	2.9	-0.5 pps
Low-skilled (15-64)	12.0	11.4	10.3	9.7	9.0	-0.7 pps
Medium-skilled (15-64)	4.7	4.3	3.8	3.4	2.9	-0.5 pps
High-skilled (15-64)	2.5	2.4	2.2	2.0	1.9	-0.1 pps
Nationals (15-64)	4.6	4.2	3.6	3.2	2.9	-0.3 pps
Non-nationals (15-64)	9.4	9.2	8.6	8.1	7.5	-0.6 pps
Male	5.3	5.0	4.5	4.1	3.8	-0.3 pps
Female	4.6	4.2	3.8	3.3	2.9	-0.4 pps
13 - **Long-term unemployment** (% of total unemployment)	44.3	44.0	41.1	41.9	41.3	-0.6 pps
14 - **Worked hours** (full-time, average actual weekly hours)	41.4	41.2	41.2	40.9	40.7	-0.5 %
Male	42.1	42.0	42.0	41.6	41.4	-0.5 %
Female	39.9	39.8	39.8	39.5	39.4	-0.3 %
15 - **Sectoral employment growth** (% change)						
Agriculture	-0.5	-0.8	-1.6	-1.3	-1.1	0.2 pps
Building and construction	0.5	0.0	1.0	1.1	1.5	0.4 pps
Services	0.9	0.9	1.4	1.5	1.2	-0.2 pps
Manufacturing industry	0.6	0.4	0.3	0.8	1.7	0.9 pps
16 - **Indicator board on wage developments** (% change)						
Compensation per employee	2.9	2.8	2.3	2.6	2.9	0.3 pps
Real compensation per employee based on GDP	-0.9	-0.4	0.7	-0.8	1.3	2.1 pps
Labour cost index (compens. of employees plus taxes minus subs.)	2.5	2.5	2.2	3.4	2.1	-1.3 pps
Labour cost index (wages and salaries, total)	2.2	2.5	2.1	3.2	2.4	-0.8 pps
Labour productivity (GDP/person employed)	1.3	0.8	1.0	1.1	0.2	-0.9 pps

Estonia	2014	2015	2016	2017	2018	2017-2018
1 - **Population** (LFS, total, 1000 pers.)	1316	1313	1316	1316	1319	0.3 %
2 - **Population** (LFS, working age:15-64, 1000 pers.)	862	853	849	844	843	-0.1 %
(% of total population)	65.5	65.0	64.5	64.1	63.9	-0.2 pps
3 - **Labour force** (15-64, 1000 pers.)	648	654	658	665	666	0.2 %
Male	336	338	343	346	347	0.3 %
Female	313	316	315	320	320	0.1 %
4 - **Activity rate** (% of population 15-64)	75.2	76.7	77.5	78.8	79.1	0.2 pps
Young (15-24)	39.2	41.8	43.2	46.1	47.3	1.2 pps
Prime age (25-54)	87.1	87.9	87.8	88.6	88.3	-0.3 pps
Older (55-64)	67.7	68.7	71.0	72.2	72.9	0.7 pps
Nationals (15-64)	75.3	77.0	77.6	78.8	79.0	0.2 pps
Non-nationals (15-64)	74.9	75.0	76.6	79.2	79.4	0.3 pps
Male	79.3	80.4	81.9	82.7	82.6	-0.1 pps
Young (15-24)	41.3	45.8	46.2	49.7	49.5	-0.2 pps
Prime age (25-54)	92.2	92.6	93.7	93.3	93.4	0.1 pps
Older (55-64)	69.2	67.7	70.4	71.9	70.8	-1.1 pps
Female	71.3	73.0	73.2	75.1	75.6	0.5 pps
Young (15-24)	37.0	37.8	40.4	42.5	45.1	2.6 pps
Prime age (25-54)	82.0	83.0	81.8	83.7	83.0	-0.7 pps
Older (55-64)	66.5	69.5	71.4	72.3	74.5	2.2 pps
5 - **Employment rate** (% of population 15-64)	69.6	71.9	72.1	74.1	74.8	0.6 pps
Young (15-24)	33.4	36.3	37.5	40.5	41.7	1.2 pps
Prime age (25-54)	80.9	83.0	82.6	83.9	84.2	0.3 pps
Older (55-64)	64.0	64.5	65.2	68.0	69.0	0.9 pps
Low-skilled (15-64)	40.4	39.9	41.8	44.9	45.0	0.1 pps
Medium-skilled (15-64)	71.0	74.0	74.0	76.2	77.4	1.2 pps
High-skilled (15-64)	83.2	85.2	84.1	85.5	85.2	-0.2 pps
Nationals (15-64)	70.3	72.5	72.9	74.6	75.3	0.6 pps
Non-nationals (15-64)	65.2	68.0	67.4	71.2	71.7	0.6 pps
Male	73.0	75.3	75.7	77.4	78.1	0.7 pps
Young (15-24)	33.4	39.4	38.8	42.8	43.5	0.7 pps
Prime age (25-54)	85.6	87.7	87.9	88.5	89.5	1.0 pps
Older (55-64)	65.2	63.0	63.8	66.7	65.9	-0.8 pps
Female	66.3	68.5	68.6	70.9	71.4	0.5 pps
Young (15-24)	33.3	33.1	36.1	38.2	39.9	1.7 pps
Prime age (25-54)	76.1	78.2	77.2	79.2	78.7	-0.5 pps
Older (55-64)	63.1	65.8	66.5	69.3	71.5	2.2 pps
6 - **Employed persons** (15-64, 1000 pers.)	599.5	613.1	612.3	625.6	630.2	0.7 %
7 - **Employment growth** (%, National accounts)	0.8	2.9	0.3	2.7	1.2	-1.5 pps
Employment growth (%, 15-64, LFS)	0.5	2.3	-0.1	2.2	0.7	-1.4 pps
Male	1.3	2.6	0.2	2.0	1.3	-0.7 pps
Female	-0.4	1.9	-0.5	2.4	0.1	-2.2 pps
8 - **Self employed** (15-64, % of total employment)	8.8	9.3	9.5	9.9	10.4	0.5 pps
Male	12.1	11.9	12.1	13.3	14.0	0.7 pps
Female	5.4	6.4	6.7	6.3	6.5	0.3 pps
9 - **Temporary employment** (15-64, % of total employment)	3.1	3.4	3.7	3.1	3.5	0.4 pps
Male	3.3	3.9	3.9	3.4	3.6	0.2 pps
Female	3.0	3.0	3.5	2.9	3.3	0.4 pps
10 - **Part-time** (15-64, % of total employment)	8.3	9.5	9.9	9.5	11.1	1.6 pps
Male	5.7	6.0	6.8	6.0	7.2	1.2 pps
Female	11.2	13.4	13.3	13.3	15.3	2.0 pps
11 **Involuntary part-time** (15-64, % of total employment)	1.3	1.3	1.0	0.7	0.6	-0.1 pps
12 - **Unemployment rate** (harmonised:15-74)	7.4	6.2	6.8	5.8	5.4	-0.4 pps
Young (15-24)	15.0	13.1	13.4	12.1	11.8	-0.3 pps
Prime age (25-49)	7.2	5.5	5.9	5.3	4.6	-0.7 pps
Older (55-64)	5.4	6.0	8.1	5.7	5.4	-0.3 pps
Low-skilled (15-64)	13.2	12.8	13.4	11.4	10.7	-0.7 pps
Medium-skilled (15-64)	8.3	6.7	8.0	6.8	5.9	-0.9 pps
High-skilled (15-64)	4.9	4.0	3.8	3.3	3.5	0.2 pps
Nationals (15-64)	6.6	5.8	6.1	5.2	4.7	-0.5 pps
Non-nationals (15-64)	12.8	9.3	12.1	10.2	9.8	-0.4 pps
Male	7.9	6.2	7.4	6.2	5.4	-0.8 pps
Female	6.8	6.1	6.1	5.3	5.3	0.0 pps
13 - **Long-term unemployment** (% of total unemployment)	45.2	38.8	31.6	33.2	23.7	-9.5 pps
14 - **Worked hours** (full-time, average actual weekly hours)	39.7	39.7	40.1	40.3	39.8	-1.2 %
Male	40.2	40.2	40.8	40.9	40.6	-0.7 %
Female	39.1	39.2	39.3	39.6	38.8	-2.0 %
15 - **Sectoral employment growth** (% change)						
Agriculture	-9.2	7.5	0.8	-9.0	-3.6	5.4 pps
Building and construction	1.7	8.1	-12.1	3.1	5.5	2.4 pps
Services	2.0	0.8	4.5	6.1	0.5	-5.6 pps
Manufacturing industry	-2.3	5.8	0.7	3.5	-1.1	-4.6 pps
16 - **Indicator board on wage developments** (% change)						
Compensation per employee	6.5	3.3	6.3	6.9	8.8	1.9 pps
Real compensation per employee based on GDP	7.0	4.2	5.4	12.6	2.9	-9.7 pps
Labour cost index (compens. of employees plus taxes minus subs.)	6.2	4.6	5.4	7.7	5.6	-2.1 pps
Labour cost index (wages and salaries, total)	6.4	4.7	5.3	7.9	5.7	-2.2 pps
Labour productivity (GDP/person employed)	2.1	-0.9	3.2	2.1	2.6	0.5 pps

Ireland		2014	2015	2016	2017	2018	2017-2018
1	- **Population** (LFS, total, 1000 pers.)	4652	4696	4749	4802	4861	1.2 %
2	- **Population** (LFS, working age:15-64, 1000 pers.)	3061	3081	3110	3141	3176	1.1 %
	(% of total population)	65.8	65.6	65.5	65.4	65.3	-0.1 pps
3	- **Labour force** (15-64, 1000 pers.)	2199	2220	2260	2282	2316	1.5 %
	Male	1194	1206	1221	1227	1241	1.2 %
	Female	1006	1014	1039	1055	1075	1.9 %
4	- **Activity rate** (% of population 15-64)	71.8	72.1	72.7	72.7	72.9	0.3 pps
	Young (15-24)	48.1	47.4	50.5	46.7	46.7	0.0 pps
	Prime age (25-54)	81.8	82.0	82.0	82.9	83.2	0.3 pps
	Older (55-64)	58.2	60.2	60.7	62.0	63.3	1.3 pps
	Nationals (15-64)	71.4	71.8	72.2	72.0	72.0	0.0 pps
	Non-nationals (15-64)	74.4	73.6	75.6	76.1	78.0	1.9 pps
	Male	78.6	79.0	79.2	78.8	78.8	0.1 pps
	Young (15-24)	50.2	50.1	52.6	47.8	48.4	0.5 pps
	Prime age (25-54)	89.5	89.6	89.3	90.1	90.0	-0.2 pps
	Older (55-64)	68.0	70.7	70.1	70.8	72.1	1.3 pps
	Female	65.2	65.2	66.3	66.6	67.1	0.5 pps
	Young (15-24)	45.8	44.6	48.3	45.5	45.0	-0.5 pps
	Prime age (25-54)	74.4	74.6	74.9	75.9	76.7	0.8 pps
	Older (55-64)	48.5	49.8	51.4	53.3	54.7	1.3 pps
5	- **Employment rate** (% of population 15-64)	63.1	64.8	66.4	67.7	68.6	1.0 pps
	Young (15-24)	36.8	37.8	42.0	40.0	40.3	0.3 pps
	Prime age (25-54)	73.1	74.7	75.8	78.0	79.2	1.2 pps
	Older (55-64)	52.6	55.4	56.8	58.4	60.4	2.0 pps
	Low-skilled (15-64)	34.9	36.1	37.5	37.0	37.0	-0.1 pps
	Medium-skilled (15-64)	63.3	64.6	67.1	67.5	69.4	1.9 pps
	High-skilled (15-64)	80.5	81.9	82.5	84.2	84.6	0.4 pps
	Nationals (15-64)	63.0	64.7	66.1	67.1	67.9	0.8 pps
	Non-nationals (15-64)	63.9	65.2	68.7	70.4	72.6	2.2 pps
	Male	68.4	70.3	71.8	73.0	74.1	1.1 pps
	Young (15-24)	36.9	38.3	42.2	40.2	41.2	1.0 pps
	Prime age (25-54)	79.4	81.1	82.3	84.5	85.7	1.2 pps
	Older (55-64)	60.8	64.6	65.1	66.5	68.5	2.0 pps
	Female	58.0	59.4	61.1	62.4	63.3	0.9 pps
	Young (15-24)	36.7	37.3	41.7	39.7	39.4	-0.4 pps
	Prime age (25-54)	67.0	68.5	69.6	71.7	72.9	1.2 pps
	Older (55-64)	44.4	46.4	48.5	50.3	52.3	2.0 pps
6	- **Employed persons** (15-64, 1000 pers.)	1932.8	1994.7	2066.4	2125.1	2180.0	2.6 %
7	- **Employment growth** (%, National accounts)	2.7	3.6	3.7	3.0	3.2	0.2 pps
	Employment growth (%, 15-64, LFS)	2.5	3.2	3.6	2.8	2.6	-0.3 pps
	Male	3.0	3.3	3.3	2.7	2.6	0.0 pps
	Female	2.0	3.1	3.9	3.1	2.5	-0.6 pps
8	- **Self employed** (15-64, % of total employment)	14.7	14.3	14.0	13.4	12.9	-0.4 pps
	Male	21.3	20.5	19.9	19.1	18.3	-0.8 pps
	Female	7.0	7.0	7.1	6.8	6.8	0.0 pps
9	- **Temporary employment** (15-64, % of total employment)	10.3	9.6	9.0	9.1	9.9	0.8 pps
	Male	10.1	9.6	8.6	8.8	9.5	0.7 pps
	Female	10.5	9.7	9.4	9.4	10.4	1.0 pps
10	- **Part-time** (15-64, % of total employment)	23.0	22.2	21.9	20.1	19.5	-0.6 pps
	Male	13.7	12.9	12.9	10.9	10.6	-0.3 pps
	Female	33.7	33.1	32.4	30.6	29.9	-0.7 pps
11	**Involuntary part-time** (15-64, % of total employment)	9.4	8.3	6.7	4.7	3.5	-1.3 pps
12	- **Unemployment rate** (harmonised:15-74)	11.9	10.0	8.4	6.7	5.8	-0.9 pps
	Young (15-24)	23.4	20.2	16.8	14.4	13.8	-0.6 pps
	Prime age (25-49)	10.7	8.9	7.5	5.8	4.8	-1.0 pps
	Older (55-64)	9.6	7.9	6.5	5.8	4.6	-1.2 pps
	Low-skilled (15-64)	21.2	18.4	15.6	12.6	10.8	-1.8 pps
	Medium-skilled (15-64)	14.9	12.6	10.2	8.6	7.1	-1.5 pps
	High-skilled (15-64)	7.0	5.7	5.1	4.1	3.8	-0.3 pps
	Nationals (15-64)	11.8	9.9	8.5	6.8	5.7	-1.1 pps
	Non-nationals (15-64)	14.1	11.4	9.1	7.5	6.9	-0.6 pps
	Male	12.7	10.8	9.1	7.1	5.8	-1.3 pps
	Female	10.9	8.9	7.6	6.3	5.7	-0.6 pps
13	- **Long-term unemployment** (% of total unemployment)	56.1	55.0	52.2	46.4	37.1	-9.3 pps
14	- **Worked hours** (full-time, average actual weekly hours)	40.1	39.9	40.1	40.2	40.6	1.0 %
	Male	42.0	41.8	42.0	42.1	42.5	1.0 %
	Female	37.0	36.7	37.1	37.1	37.6	1.3 %
15	- **Sectoral employment growth** (% change)						
	Agriculture	-3.2	1.4	3.6	-2.4	-3.0	-0.6 pps
	Building and construction	9.0	16.2	9.3	8.4	11.4	3.0 pps
	Services	3.7	2.2	3.8	3.0	3.4	0.4 pps
	Manufacturing industry	1.3	5.6	6.2	1.1	-1.3	-2.4 pps
16	- **Indicator board on wage developments** (% change)						
	Compensation per employee	0.4	2.3	2.2	2.5	2.1	-0.4 pps
	Real compensation per employee based on GDP	4.6	2.1	0.9	4.5	4.2	-0.3 pps
	Labour cost index (compens. of employees plus taxes minus subs.)	0.6	0.8	1.8	2.2	3.1	0.9 pps
	Labour cost index (wages and salaries, total)	1.0	0.8	1.7	2.2	3.4	1.2 pps
	Labour productivity (GDP/person employed)	5.7	20.8	0.0	5.0	4.8	-0.2 pps

Greece	2014	2015	2016	2017	2018	2017-2018
1 - **Population** (LFS, total, 1000 pers.)	10892	10821	10776	10755	10728	-0.3 %
2 - **Population** (LFS, working age:15-64, 1000 pers.)	7040	6987	6937	6886	6831	-0.8 %
(% of total population)	64.6	64.6	64.4	64.0	63.7	-0.3 pps
3 - **Labour force** (15-64, 1000 pers.)	4747	4738	4732	4701	4657	-0.9 %
Male	2646	2621	2613	2605	2590	-0.6 %
Female	2101	2117	2119	2096	2068	-1.3 %
4 - **Activity rate** (% of population 15-64)	67.4	67.8	68.2	68.3	68.2	-0.1 pps
Young (15-24)	28.0	26.0	24.6	25.1	23.3	-1.8 pps
Prime age (25-54)	84.3	85.4	85.5	85.0	85.0	0.0 pps
Older (55-64)	41.1	41.6	44.9	46.7	48.5	1.7 pps
Nationals (15-64)	66.8	67.4	67.8	68.0	68.0	0.0 pps
Non-nationals (15-64)	75.0	73.8	73.9	71.9	70.9	-1.0 pps
Male	76.0	75.9	76.2	76.4	76.6	0.1 pps
Young (15-24)	30.0	27.7	26.4	26.2	25.1	-1.1 pps
Prime age (25-54)	93.1	93.1	93.2	93.0	93.2	0.2 pps
Older (55-64)	53.4	54.9	57.3	59.8	61.4	1.5 pps
Female	59.0	59.9	60.4	60.3	59.9	-0.3 pps
Young (15-24)	26.1	24.3	22.9	23.9	21.5	-2.5 pps
Prime age (25-54)	75.6	77.7	77.7	77.0	76.7	-0.3 pps
Older (55-64)	29.9	29.5	33.6	34.9	36.8	2.0 pps
5 - **Employment rate** (% of population 15-64)	49.4	50.8	52.0	53.5	54.9	1.4 pps
Young (15-24)	13.3	13.0	13.0	14.1	14.0	-0.2 pps
Prime age (25-54)	62.4	64.5	66.0	67.4	68.9	1.5 pps
Older (55-64)	34.0	34.3	36.3	38.3	41.1	2.8 pps
Low-skilled (15-64)	39.0	39.7	39.4	39.8	39.9	0.1 pps
Medium-skilled (15-64)	47.0	48.8	50.1	51.8	53.1	1.3 pps
High-skilled (15-64)	67.6	67.9	69.6	70.8	73.3	2.5 pps
Nationals (15-64)	49.3	50.8	52.0	53.6	55.1	1.5 pps
Non-nationals (15-64)	50.4	51.0	52.0	51.9	51.8	-0.1 pps
Male	58.0	59.3	61.0	62.7	64.7	2.0 pps
Young (15-24)	15.8	15.1	14.7	15.9	15.9	0.1 pps
Prime age (25-54)	71.7	73.7	76.0	77.5	79.6	2.1 pps
Older (55-64)	44.0	44.9	46.2	49.6	53.3	3.8 pps
Female	41.1	42.5	43.3	44.4	45.3	0.9 pps
Young (15-24)	10.9	10.9	11.3	12.4	12.0	-0.4 pps
Prime age (25-54)	53.1	55.4	55.9	57.2	58.2	1.0 pps
Older (55-64)	25.0	24.7	27.2	28.0	30.0	2.0 pps
6 - **Employed persons** (15-64, 1000 pers.)	3479.5	3548.0	3610.3	3682.7	3751.1	1.9 %
7 - **Employment growth** (%, National accounts)	0.9	0.7	0.5	1.5	1.7	0.2 pps
Employment growth (%, 15-64, LFS)	0.6	2.0	1.8	2.0	1.9	-0.1 pps
Male	-0.5	1.6	2.1	2.2	2.4	0.2 pps
Female	2.2	2.5	1.2	1.7	1.1	-0.6 pps
8 - **Self employed** (15-64, % of total employment)	30.7	29.9	29.5	29.4	29.1	-0.3 pps
Male	36.4	35.3	34.2	34.4	34.0	-0.4 pps
Female	22.9	22.5	22.9	22.4	22.1	-0.3 pps
9 - **Temporary employment** (15-64, % of total employment)	11.6	11.9	11.2	11.4	11.3	-0.1 pps
Male	11.0	11.4	10.3	9.9	9.5	-0.4 pps
Female	12.4	12.6	12.3	13.3	13.5	0.2 pps
10 - **Part-time** (15-64, % of total employment)	9.3	9.4	9.8	9.7	9.1	-0.6 pps
Male	6.5	6.7	6.9	6.6	6.1	-0.5 pps
Female	13.0	13.1	13.7	14.1	13.2	-0.9 pps
11 **Involuntary part-time** (15-64, % of total employment)	6.6	6.8	7.1	6.8	6.4	-0.4 pps
12 - **Unemployment rate** (harmonised:15-74)	26.5	24.9	23.6	21.5	19.3	-2.2 pps
Young (15-24)	52.4	49.8	47.3	43.6	39.9	-3.7 pps
Prime age (25-49)	26.0	24.4	22.8	20.7	18.9	-1.8 pps
Older (55-64)	17.2	17.5	19.2	18.1	15.3	-2.8 pps
Low-skilled (15-64)	28.7	27.2	26.9	24.8	22.8	-2.0 pps
Medium-skilled (15-64)	30.3	27.7	26.2	24.0	21.9	-2.1 pps
High-skilled (15-64)	20.1	20.0	18.1	16.6	14.3	-2.3 pps
Nationals (15-64)	26.1	24.6	23.3	21.2	19.0	-2.2 pps
Non-nationals (15-64)	32.8	30.9	29.6	27.8	26.9	-0.9 pps
Male	23.7	21.8	19.9	17.8	15.4	-2.4 pps
Female	30.2	28.9	28.1	26.1	24.2	-1.9 pps
13 - **Long-term unemployment** (% of total unemployment)	73.4	73.0	71.8	72.6	70.1	-2.5 pps
14 - **Worked hours** (full-time, average actual weekly hours)	42.8	42.8	43.1	42.9	42.6	-0.7 %
Male	44.1	44.2	44.6	44.4	44.1	-0.7 %
Female	40.7	40.6	40.8	40.7	40.4	-0.7 %
15 - **Sectoral employment growth** (% change)						
Agriculture	0.4	-3.5	-2.4	0.2	3.7	3.5 pps
Building and construction	1.2	-4.3	1.3	1.5	1.0	-0.5 pps
Services	2.5	2.3	1.6	2.0	1.3	-0.7 pps
Manufacturing industry	-3.0	1.1	-1.8	2.8	0.1	-2.7 pps
16 - **Indicator board on wage developments** (% change)						
Compensation per employee	-2.0	-2.4	-0.9	0.5	1.3	0.8 pps
Real compensation per employee based on GDP	1.3	6.1	-0.4	1.1	-0.7	-1.8 pps
Labour cost index (compens. of employees plus taxes minus subs.)	-1.1	-3.0	-1.4	2.5	2.5	0.0 pps
Labour cost index (wages and salaries, total)	-1.2	-2.7	-0.7	1.4	2.0	0.6 pps
Labour productivity (GDP/person employed)	-0.2	-1.2	-0.7	0.0	0.2	0.2 pps

Spain		2014	2015	2016	2017	2018	2017-2018
1	- **Population** (LFS, total, 1000 pers.)	46455	46410	46450	46533	46729	0.4 %
2	- **Population** (LFS, working age:15-64, 1000 pers.)	30750	30642	30536	30531	30671	0.5 %
	(% of total population)	66.2	66.0	65.7	65.6	65.6	0.0 pps
3	- **Labour force** (15-64, 1000 pers.)	22814	22767	22657	22558	22607	0.2 %
	Male	12277	12232	12120	12064	12089	0.2 %
	Female	10537	10535	10536	10495	10518	0.2 %
4	- **Activity rate** (% of population 15-64)	74.2	74.3	74.2	73.9	73.7	-0.2 pps
	Young (15-24)	35.7	34.7	33.0	33.3	33.0	-0.3 pps
	Prime age (25-54)	87.3	87.4	87.4	87.0	86.9	-0.1 pps
	Older (55-64)	55.4	57.6	59.2	59.6	60.5	0.8 pps
	Nationals (15-64)	73.7	73.8	73.8	73.5	73.4	-0.1 pps
	Non-nationals (15-64)	77.7	78.0	77.2	76.8	76.1	-0.8 pps
	Male	79.5	79.5	79.2	78.9	78.8	-0.1 pps
	Young (15-24)	37.3	36.2	34.7	35.1	35.1	0.0 pps
	Prime age (25-54)	92.6	92.6	92.5	92.0	91.9	-0.1 pps
	Older (55-64)	64.3	66.2	67.0	67.9	68.4	0.6 pps
	Female	68.8	69.0	69.2	68.8	68.6	-0.2 pps
	Young (15-24)	34.0	33.2	31.3	31.5	30.8	-0.7 pps
	Prime age (25-54)	82.0	82.0	82.3	82.0	81.8	-0.2 pps
	Older (55-64)	46.9	49.4	51.7	51.8	52.9	1.1 pps
5	- **Employment rate** (% of population 15-64)	56.0	57.8	59.5	61.1	62.4	1.3 pps
	Young (15-24)	16.7	17.9	18.4	20.5	21.7	1.2 pps
	Prime age (25-54)	67.4	69.4	71.5	73.2	74.7	1.5 pps
	Older (55-64)	44.3	46.9	49.1	50.5	52.2	1.7 pps
	Low-skilled (15-64)	44.0	46.2	48.1	49.6	51.3	1.6 pps
	Medium-skilled (15-64)	56.0	57.5	58.7	59.8	60.6	0.8 pps
	High-skilled (15-64)	75.3	76.7	77.9	79.4	80.1	0.7 pps
	Nationals (15-64)	56.6	58.3	59.9	61.4	62.8	1.4 pps
	Non-nationals (15-64)	50.8	54.2	56.6	58.5	59.4	1.0 pps
	Male	60.7	62.9	64.8	66.5	67.9	1.4 pps
	Young (15-24)	17.4	18.6	19.4	21.2	22.7	1.5 pps
	Prime age (25-54)	72.5	75.1	77.4	79.2	80.8	1.5 pps
	Older (55-64)	51.2	54.0	55.7	57.8	59.7	2.0 pps
	Female	51.2	52.7	54.3	55.7	56.9	1.2 pps
	Young (15-24)	16.0	17.3	17.2	19.7	20.5	0.8 pps
	Prime age (25-54)	62.3	63.7	65.6	67.1	68.6	1.5 pps
	Older (55-64)	37.8	40.1	42.8	43.5	44.9	1.4 pps
6	- **Employed persons** (15-64, 1000 pers.)	17210.5	17717.5	18182.7	18648.5	19136.3	2.6 %
7	- **Employment growth** (%, National accounts)	1.0	2.8	2.1	2.7	2.2	-0.5 pps
	Employment growth (%, 15-64, LFS)	1.2	2.9	2.6	2.6	2.6	0.1 pps
	Male	1.4	3.3	2.4	2.5	2.5	0.0 pps
	Female	1.1	2.5	2.9	2.6	2.7	0.1 pps
8	- **Self employed** (15-64, % of total employment)	16.7	16.4	16.1	15.7	15.2	-0.5 pps
	Male	20.7	20.2	19.7	19.3	18.6	-0.6 pps
	Female	11.9	11.8	11.9	11.4	11.1	-0.2 pps
9	- **Temporary employment** (15-64, % of total employment)	24.0	25.2	26.1	26.8	26.9	0.1 pps
	Male	23.6	25.1	25.8	26.0	26.0	0.0 pps
	Female	24.6	25.3	26.5	27.6	27.8	0.2 pps
10	- **Part-time** (15-64, % of total employment)	15.8	15.6	15.1	14.9	14.5	-0.4 pps
	Male	7.7	7.8	7.6	7.2	6.7	-0.5 pps
	Female	25.5	25.1	24.1	24.1	23.9	-0.2 pps
11	**Involuntary part-time** (15-64, % of total employment)	10.1	9.9	9.3	9.1	8.1	-1.0 pps
12	- **Unemployment rate** (harmonised:15-74)	24.5	22.1	19.6	17.2	15.3	-1.9 pps
	Young (15-24)	53.2	48.3	44.4	38.6	34.3	-4.3 pps
	Prime age (25-49)	22.8	20.6	18.2	15.9	14.0	-1.9 pps
	Older (55-64)	20.0	18.6	17.0	15.3	13.8	-1.5 pps
	Low-skilled (15-64)	34.0	31.2	28.2	25.2	22.3	-2.9 pps
	Medium-skilled (15-64)	24.2	21.6	19.2	17.0	15.5	-1.5 pps
	High-skilled (15-64)	14.8	13.3	11.7	10.0	9.0	-1.0 pps
	Nationals (15-64)	23.2	21.0	18.8	16.4	14.4	-2.0 pps
	Non-nationals (15-64)	34.6	30.5	26.7	23.9	21.9	-2.0 pps
	Male	23.6	20.8	18.1	15.7	13.7	-2.0 pps
	Female	25.4	23.6	21.4	19.0	17.0	-2.0 pps
13	- **Long-term unemployment** (% of total unemployment)	52.8	51.6	48.3	44.4	41.7	-2.7 pps
14	- **Worked hours** (full-time, average actual weekly hours)	40.7	40.6	40.4	40.1	40.3	0.5 %
	Male	41.7	41.5	41.3	41.0	41.2	0.5 %
	Female	39.3	39.1	39.0	38.8	38.9	0.3 %
15	- **Sectoral employment growth** (% change)						
	Agriculture	0.8	0.0	4.5	2.8	-0.3	-3.1 pps
	Building and construction	-2.9	6.7	1.5	5.0	7.5	2.5 pps
	Services	2.0	3.9	1.8	3.0	2.0	-1.0 pps
	Manufacturing industry	-1.1	2.2	3.5	3.4	1.5	-1.9 pps
16	- **Indicator board on wage developments** (% change)						
	Compensation per employee	0.1	1.0	-0.1	0.7	1.3	0.6 pps
	Real compensation per employee based on GDP	-0.6	-0.5	0.0	1.4	4.6	3.3 pps
	Labour cost index (compens. of employees plus taxes minus subs.)	0.1	0.2	0.2	0.8	1.8	1.0 pps
	Labour cost index (wages and salaries, total)	0.4	0.8	0.4	0.8	1.9	1.1 pps
	Labour productivity (GDP/person employed)	0.3	1.0	0.9	0.2	0.1	-0.1 pps

France	2014	2015	2016	2017	2018	2017-2018
1 - **Population** (LFS, total, 1000 pers.)	66312	66581	66828	67063	67274	0.3 %
2 - **Population** (LFS, working age:15-64, 1000 pers.)	41010	40927	40890	40947	40924	-0.1 %
(% of total population)	61.8	61.5	61.2	61.1	60.8	-0.2 pps
3 - **Labour force** (15-64, 1000 pers.)	29121	29164	29207	29288	29438	0.5 %
Male	15103	15127	15129	15194	15204	0.1 %
Female	14018	14037	14078	14094	14235	1.0 %
4 - **Activity rate** (% of population 15-64)	71.0	71.3	71.4	71.5	71.9	0.4 pps
Young (15-24)	36.5	37.1	36.9	36.9	37.7	0.8 pps
Prime age (25-54)	87.8	87.5	87.5	87.4	87.7	0.3 pps
Older (55-64)	50.7	52.6	53.7	54.9	56.0	1.1 pps
Nationals (15-64)	71.4	71.8	72.0	72.2	72.4	0.2 pps
Non-nationals (15-64)	65.4	64.1	64.1	63.9	66.4	2.4 pps
Male	75.1	75.3	75.4	75.6	75.8	0.2 pps
Young (15-24)	39.7	40.2	39.8	40.3	41.2	0.9 pps
Prime age (25-54)	92.9	92.4	92.4	92.6	92.4	-0.2 pps
Older (55-64)	53.1	55.1	56.1	56.9	58.3	1.4 pps
Female	67.1	67.3	67.6	67.6	68.2	0.6 pps
Young (15-24)	33.2	33.9	34.0	33.4	34.0	0.6 pps
Prime age (25-54)	83.0	82.7	82.7	82.4	83.2	0.7 pps
Older (55-64)	48.5	50.3	51.4	53.0	53.9	0.9 pps
5 - **Employment rate** (% of population 15-64)	63.7	63.8	64.2	64.7	65.4	0.6 pps
Young (15-24)	27.6	27.9	27.8	28.7	29.9	1.2 pps
Prime age (25-54)	79.8	79.4	79.7	80.0	80.6	0.5 pps
Older (55-64)	46.9	48.7	49.8	51.3	52.1	0.9 pps
Low-skilled (15-64)	41.1	39.7	38.8	39.7	39.6	-0.2 pps
Medium-skilled (15-64)	65.5	65.9	66.1	66.2	66.7	0.4 pps
High-skilled (15-64)	81.0	81.4	82.4	82.9	82.8	-0.1 pps
Nationals (15-64)	64.5	64.8	65.2	65.8	66.2	0.4 pps
Non-nationals (15-64)	52.4	50.8	51.4	52.1	55.2	3.1 pps
Male	67.1	67.1	67.6	68.4	68.9	0.5 pps
Young (15-24)	29.7	29.9	29.8	31.0	32.4	1.4 pps
Prime age (25-54)	84.4	83.7	84.2	85.0	85.2	0.2 pps
Older (55-64)	48.8	50.7	51.6	52.7	54.0	1.3 pps
Female	60.3	60.6	60.9	61.2	61.9	0.7 pps
Young (15-24)	25.5	26.0	25.8	26.3	27.2	0.9 pps
Prime age (25-54)	75.4	75.2	75.3	75.2	76.1	0.9 pps
Older (55-64)	45.2	46.9	48.2	49.9	50.4	0.5 pps
6 - **Employed persons** (15-64, 1000 pers.)	26108.6	26118.5	26243.4	26511.8	26744.5	0.9 %
7 - **Employment growth** (%, National accounts)	0.5	0.2	0.6	1.0	1.0	0.0 pps
Employment growth (%, 15-64, LFS)	2.2	0.0	0.5	1.0	0.9	-0.1 pps
Male	1.6	-0.2	0.6	1.4	0.5	-0.8 pps
Female	2.9	0.3	0.3	0.7	1.3	0.6 pps
8 - **Self employed** (15-64, % of total employment)	10.9	10.8	11.0	10.9	11.0	0.1 pps
Male	14.2	14.1	14.3	13.8	14.1	0.3 pps
Female	7.2	7.3	7.5	7.7	7.7	-0.1 pps
9 - **Temporary employment** (15-64, % of total employment)	15.3	16.0	16.1	16.8	16.7	-0.1 pps
Male	14.5	15.4	15.7	16.2	16.1	-0.1 pps
Female	16.1	16.6	16.6	17.4	17.3	-0.1 pps
10 - **Part-time** (15-64, % of total employment)	18.6	18.4	18.3	18.2	18.0	-0.2 pps
Male	7.4	7.4	7.5	7.7	7.8	0.1 pps
Female	30.6	30.1	29.8	29.6	28.8	-0.8 pps
11 **Involuntary part-time** (15-64, % of total employment)	7.9	8.0	8.1	7.8	7.6	-0.3 pps
12 - **Unemployment rate** (harmonised:15-74)	10.3	10.4	10.1	9.4	9.1	-0.3 pps
Young (15-24)	24.2	24.7	24.6	22.3	20.8	-1.5 pps
Prime age (25-49)	9.2	9.3	8.9	8.5	8.1	-0.4 pps
Older (55-64)	7.5	7.4	7.2	6.5	6.9	0.4 pps
Low-skilled (15-64)	17.3	17.8	18.3	17.3	16.5	-0.8 pps
Medium-skilled (15-64)	10.7	10.9	10.7	10.1	9.8	-0.3 pps
High-skilled (15-64)	6.4	6.4	5.7	5.2	5.5	0.3 pps
Nationals (15-64)	9.7	9.8	9.5	8.8	8.6	-0.2 pps
Non-nationals (15-64)	19.9	20.7	19.8	18.5	16.8	-1.7 pps
Male	10.5	10.8	10.3	9.5	9.0	-0.5 pps
Female	10.0	9.9	9.9	9.3	9.1	-0.2 pps
13 - **Long-term unemployment** (% of total unemployment)	44.2	44.2	45.8	45.3	42.0	-3.3 pps
14 - **Worked hours** (full-time, average actual weekly hours)	38.8	38.8	39.1	39.0	39.0	0.0 %
Male	39.8	39.9	40.2	39.9	40.0	0.3 %
Female	37.2	37.3	37.5	37.6	37.5	-0.3 %
15 - **Sectoral employment growth** (% change)						
Agriculture	0.7	-0.3	-0.8	-0.3	-0.1	0.2 pps
Building and construction	-0.7	-2.5	-2.3	0.0	1.3	1.3 pps
Services	0.5	0.8	1.5	2.3	2.1	-0.2 pps
Manufacturing industry	-0.5	-2.0	-0.6	-0.3	0.1	0.4 pps
16 - **Indicator board on wage developments** (% change)						
Compensation per employee	1.2	1.1	1.2	1.9	1.8	-0.1 pps
Real compensation per employee based on GDP	1.7	1.1	0.6	-0.1	0.3	0.4 pps
Labour cost index (compens. of employees plus taxes minus subs.)	0.7	0.8	1.2	1.3	2.5	1.2 pps
Labour cost index (wages and salaries, total)	1.6	1.5	1.4	1.9	1.7	-0.2 pps
Labour productivity (GDP/person employed)	0.4	0.9	0.5	1.3	0.7	-0.6 pps

Croatia	2014	2015	2016	2017	2018	2017-2018
1 - **Population** (LFS, total, 1000 pers.)	4236	4208	4172	4130	:	: %
2 - **Population** (LFS, working age:15-64, 1000 pers.)	2826	2786	2753	2720	2689	-1.2 %
(% of total population)	66.7	66.2	66.0	65.9	:	: pps
3 - **Labour force** (15-64, 1000 pers.)	1868	1865	1806	1807	1783	-1.4 %
Male	1003	998	968	973	953	-2.0 %
Female	865	867	838	835	829	-0.7 %
4 - **Activity rate** (% of population 15-64)	66.1	66.9	65.6	66.4	66.3	-0.1 pps
Young (15-24)	33.6	33.2	37.2	35.7	33.5	-2.2 pps
Prime age (25-54)	84.1	84.5	82.0	83.3	83.4	0.0 pps
Older (55-64)	41.0	44.3	42.2	43.6	44.8	1.2 pps
Nationals (15-64)	66.1	67.0	65.7	66.5	66.3	-0.2 pps
Non-nationals (15-64)	53.8	44.4	37.8	43.7	67.5	23.8 pps
Male	70.9	71.6	70.3	71.5	70.9	-0.6 pps
Young (15-24)	38.5	38.2	41.9	40.9	37.9	-3.0 pps
Prime age (25-54)	86.6	86.9	85.2	86.7	86.4	-0.3 pps
Older (55-64)	52.1	54.9	50.7	52.8	53.4	0.6 pps
Female	61.3	62.3	60.9	61.4	61.7	0.3 pps
Young (15-24)	28.5	28.0	32.3	30.2	28.8	-1.4 pps
Prime age (25-54)	81.5	82.1	78.8	79.9	80.3	0.4 pps
Older (55-64)	30.6	34.4	34.2	35.1	36.7	1.7 pps
5 - **Employment rate** (% of population 15-64)	54.6	56.0	56.9	58.9	60.6	1.7 pps
Young (15-24)	18.3	19.1	25.6	25.9	25.6	-0.4 pps
Prime age (25-54)	71.2	72.3	72.4	74.9	77.0	2.0 pps
Older (55-64)	36.2	39.2	38.1	40.4	42.8	2.5 pps
Low-skilled (15-64)	26.7	28.0	27.4	24.4	25.8	1.3 pps
Medium-skilled (15-64)	57.0	58.0	59.5	62.6	63.9	1.2 pps
High-skilled (15-64)	78.4	78.7	79.7	81.5	81.5	0.0 pps
Nationals (15-64)	54.6	56.0	57.0	59.0	60.6	1.7 pps
Non-nationals (15-64)	40.0	38.9	34.1	42.5	58.1	15.6 pps
Male	59.1	60.3	61.4	63.8	65.4	1.6 pps
Young (15-24)	21.2	22.4	28.9	29.8	30.5	0.7 pps
Prime age (25-54)	74.5	75.4	76.3	78.7	80.4	1.7 pps
Older (55-64)	45.8	48.2	45.1	49.0	51.0	2.0 pps
Female	50.0	51.6	52.4	54.0	55.9	1.8 pps
Young (15-24)	15.3	15.7	22.2	21.8	20.3	-1.5 pps
Prime age (25-54)	67.9	69.3	68.5	71.1	73.5	2.4 pps
Older (55-64)	27.3	30.7	31.6	32.3	35.2	2.9 pps
6 - **Employed persons** (15-64, 1000 pers.)	1541.8	1559.1	1566.6	1603.0	1630.2	1.7 %
7 - **Employment growth** (%, National accounts)	2.7	1.2	0.3	2.2	0.0	-2.2 pps
Employment growth (%, 15-64, LFS)	3.2	1.1	0.5	2.3	1.7	-0.6 pps
Male	4.0	0.6	0.6	2.7	1.3	-1.5 pps
Female	2.3	1.8	0.4	1.9	2.2	0.3 pps
8 - **Self employed** (15-64, % of total employment)	13.4	12.9	11.8	10.5	10.2	-0.3 pps
Male	16.7	16.4	14.9	12.6	12.2	-0.4 pps
Female	9.6	8.9	8.1	7.9	7.8	-0.1 pps
9 - **Temporary employment** (15-64, % of total employment)	16.9	20.2	22.2	20.7	19.9	-0.8 pps
Male	16.6	20.4	21.9	20.6	19.4	-1.2 pps
Female	17.1	19.9	22.4	20.7	20.6	-0.1 pps
10 - **Part-time** (15-64, % of total employment)	5.3	6.0	5.6	4.8	5.2	0.4 pps
Male	4.2	4.8	4.4	3.8	3.8	0.0 pps
Female	6.7	7.3	7.1	6.0	6.8	0.8 pps
11 **Involuntary part-time** (15-64, % of total employment)	1.4	1.6	1.7	1.7	1.8	0.0 pps
12 - **Unemployment rate** (harmonised:15-74)	17.2	16.1	13.4	11.0	8.4	-2.6 pps
Young (15-24)	45.5	42.3	31.3	27.4	23.7	-3.7 pps
Prime age (25-49)	15.3	14.4	11.6	10.1	7.7	-2.4 pps
Older (55-64)	11.6	11.6	9.6	7.5	4.4	-3.1 pps
Low-skilled (15-64)	26.5	22.5	18.1	20.5	12.1	-8.4 pps
Medium-skilled (15-64)	18.8	18.1	14.7	11.7	9.2	-2.5 pps
High-skilled (15-64)	9.6	9.4	7.9	7.2	6.1	-1.1 pps
Nationals (15-64)	17.4	16.4	13.3	11.3	8.5	-2.8 pps
Non-nationals (15-64)	0.0	0.0	0.0	0.0	14.2	14.2 pps
Male	16.6	15.6	12.7	10.3	7.7	-2.6 pps
Female	18.0	16.7	14.2	11.9	9.3	-2.6 pps
13 - **Long-term unemployment** (% of total unemployment)	58.5	63.1	50.6	41.0	40.2	-0.8 pps
14 - **Worked hours** (full-time, average actual weekly hours)	40.4	39.6	39.7	39.9	39.7	-0.5 %
Male	40.8	40.1	40.2	40.4	40.1	-0.7 %
Female	39.8	38.9	39.2	39.3	39.3	0.0 %
15 - **Sectoral employment growth** (% change)						
Agriculture	-9.4	-1.9	-17.4	-6.1	:	: pps
Building and construction	-3.8	5.0	2.8	-4.6	:	: pps
Services	4.9	2.8	3.2	5.5	:	: pps
Manufacturing industry	2.8	-1.8	2.7	2.0	:	: pps
16 - **Indicator board on wage developments** (% change)						
Compensation per employee	-5.2	0.4	1.3	-1.1	:	: pps
Real compensation per employee based on GDP	0.9	2.6	-0.9	1.1	-0.6	-1.7 pps
Labour cost index (compens. of employees plus taxes minus subs.)	-0.5	1.7	-9.6	5.0	6.5	1.5 pps
Labour cost index (wages and salaries, total)	-0.5	1.7	-9.3	5.0	6.6	1.6 pps
Labour productivity (GDP/person employed)	-2.7	1.1	3.2	0.7	:	: pps

Italy		2014	2015	2016	2017	2018	2017-2018
1	- **Population** (LFS, total, 1000 pers.)	60789	60731	60628	60537	60438	-0.2 %
2	- **Population** (LFS, working age:15-64, 1000 pers.)	39161	39035	38871	38726	38588	-0.4 %
	(% of total population)	64.4	64.3	64.1	64.0	63.8	-0.1 pps
3	- **Labour force** (15-64, 1000 pers.)	25039	24997	25243	25340	25327	0.0 %
	Male	14327	14382	14464	14467	14450	-0.1 %
	Female	10712	10615	10779	10873	10877	0.0 %
4	- **Activity rate** (% of population 15-64)	63.9	64.0	64.9	65.4	65.6	0.2 pps
	Young (15-24)	27.1	26.2	26.6	26.2	26.1	-0.1 pps
	Prime age (25-54)	77.0	76.8	77.5	77.9	77.9	0.0 pps
	Older (55-64)	48.9	51.1	53.4	55.4	57.0	1.5 pps
	Nationals (15-64)	63.2	63.3	64.3	64.8	65.0	0.2 pps
	Non-nationals (15-64)	70.4	70.3	70.4	70.8	71.2	0.4 pps
	Male	73.6	74.1	74.8	75.0	75.1	0.1 pps
	Young (15-24)	31.0	30.4	30.2	30.0	29.9	0.0 pps
	Prime age (25-54)	87.7	87.7	88.2	88.5	88.4	-0.1 pps
	Older (55-64)	60.2	63.3	65.9	67.0	68.6	1.5 pps
	Female	54.4	54.1	55.2	55.9	56.2	0.3 pps
	Young (15-24)	23.1	21.7	22.8	22.1	21.9	-0.2 pps
	Prime age (25-54)	66.4	65.9	66.8	67.3	67.4	0.1 pps
	Older (55-64)	38.3	39.6	41.7	44.5	46.1	1.6 pps
5	- **Employment rate** (% of population 15-64)	55.7	56.3	57.2	58.0	58.5	0.6 pps
	Young (15-24)	15.6	15.6	16.6	17.1	17.7	0.6 pps
	Prime age (25-54)	67.9	68.2	68.8	69.4	69.8	0.4 pps
	Older (55-64)	46.2	48.2	50.3	52.2	53.7	1.5 pps
	Low-skilled (15-64)	41.8	42.2	42.9	43.4	43.8	0.4 pps
	Medium-skilled (15-64)	62.6	62.9	63.7	64.1	64.3	0.2 pps
	High-skilled (15-64)	75.5	76.3	77.5	78.2	78.7	0.5 pps
	Nationals (15-64)	55.4	56.0	57.0	57.7	58.2	0.6 pps
	Non-nationals (15-64)	58.5	58.9	59.5	60.6	61.2	0.6 pps
	Male	64.7	65.5	66.5	67.1	67.6	0.6 pps
	Young (15-24)	18.2	18.6	19.2	20.1	20.8	0.8 pps
	Prime age (25-54)	78.2	78.6	79.3	79.9	80.3	0.4 pps
	Older (55-64)	56.5	59.3	61.7	62.8	64.2	1.4 pps
	Female	46.8	47.2	48.1	48.9	49.5	0.6 pps
	Young (15-24)	12.8	12.4	13.7	13.9	14.3	0.4 pps
	Prime age (25-54)	57.6	57.9	58.5	59.0	59.4	0.4 pps
	Older (55-64)	36.6	37.9	39.7	42.3	43.9	1.6 pps
6	- **Employed persons** (15-64, 1000 pers.)	21809.5	21972.6	22241.1	22443.6	22585.7	0.6 %
7	- **Employment growth** (%, National accounts)	0.1	0.7	1.3	1.2	0.9	-0.3 pps
	Employment growth (%, 15-64, LFS)	0.2	0.7	1.2	0.9	0.6	-0.3 pps
	Male	0.0	1.0	1.1	0.6	0.6	-0.1 pps
	Female	0.5	0.4	1.4	1.3	0.7	-0.6 pps
8	- **Self employed** (15-64, % of total employment)	22.2	21.9	21.5	20.8	20.6	-0.2 pps
	Male	26.7	26.2	25.6	25.2	24.8	-0.4 pps
	Female	16.0	15.9	15.8	14.9	14.9	0.0 pps
9	- **Temporary employment** (15-64, % of total employment)	13.6	14.1	14.0	15.5	17.1	1.6 pps
	Male	13.1	13.6	13.5	15.1	16.6	1.5 pps
	Female	14.2	14.6	14.7	16.0	17.7	1.7 pps
10	- **Part-time** (15-64, % of total employment)	18.1	18.3	18.5	18.5	18.4	-0.1 pps
	Male	7.8	8.0	8.2	8.3	8.0	-0.3 pps
	Female	32.1	32.4	32.7	32.5	32.4	-0.1 pps
11	**Involuntary part-time** (15-64, % of total employment)	11.8	12.0	11.9	11.6	12.1	0.5 pps
12	- **Unemployment rate** (harmonised:15-74)	12.7	11.9	11.7	11.2	10.6	-0.6 pps
	Young (15-24)	42.7	40.3	37.8	34.7	32.2	-2.5 pps
	Prime age (25-49)	11.8	11.2	11.1	10.9	10.3	-0.6 pps
	Older (55-64)	5.5	5.5	5.7	5.8	5.7	-0.1 pps
	Low-skilled (15-64)	17.0	15.9	16.0	15.8	14.9	-0.9 pps
	Medium-skilled (15-64)	12.0	11.5	11.2	10.6	10.2	-0.4 pps
	High-skilled (15-64)	8.0	7.2	6.9	6.5	6.1	-0.4 pps
	Nationals (15-64)	12.4	11.6	11.4	11.1	10.4	-0.7 pps
	Non-nationals (15-64)	17.0	16.3	15.4	14.4	14.1	-0.3 pps
	Male	11.9	11.3	10.9	10.3	9.7	-0.6 pps
	Female	13.8	12.7	12.8	12.4	11.8	-0.6 pps
13	- **Long-term unemployment** (% of total unemployment)	61.4	58.9	58.3	58.7	59.0	0.3 pps
14	- **Worked hours** (full-time, average actual weekly hours)	39.6	39.7	39.9	40.0	40.1	0.2 %
	Male	40.8	40.9	41.1	41.2	41.3	0.2 %
	Female	37.5	37.5	37.7	37.7	37.8	0.3 %
15	- **Sectoral employment growth** (% change)						
	Agriculture	-0.2	1.0	2.3	-0.9	0.6	1.5 pps
	Building and construction	-4.0	-1.2	-0.1	0.3	-0.3	-0.6 pps
	Services	0.5	1.6	2.2	1.7	1.2	-0.5 pps
	Manufacturing industry	-1.8	-0.9	0.9	0.6	1.4	0.8 pps
16	- **Indicator board on wage developments** (% change)						
	Compensation per employee	0.2	1.0	0.5	0.1	2.0	1.9 pps
	Real compensation per employee based on GDP	1.0	1.0	0.6	0.0	1.2	1.1 pps
	Labour cost index (compens. of employees plus taxes minus subs.)	0.7	-0.3	-0.8	0.6	1.6	1.0 pps
	Labour cost index (wages and salaries, total)	0.6	0.5	-0.1	0.4	0.9	0.5 pps
	Labour productivity (GDP/person employed)	0.0	0.3	-0.2	0.5	0.0	-0.5 pps

Cyprus	2014	2015	2016	2017	2018	2017-2018
1 - **Population** (LFS, total, 1000 pers.)	853	848	852	860	869	1.1 %
2 - **Population** (LFS, working age:15-64, 1000 pers.)	572	559	556	564	568	0.7 %
(% of total population)	67.0	65.9	65.2	65.6	65.4	-0.3 pps
3 - **Labour force** (15-64, 1000 pers.)	425	413	408	417	426	2.2 %
Male	218	210	209	215	220	2.4 %
Female	207	202	199	202	207	2.0 %
4 - **Activity rate** (% of population 15-64)	74.3	73.9	73.4	73.9	75.0	1.1 pps
Young (15-24)	40.3	37.8	37.3	36.6	39.2	2.5 pps
Prime age (25-54)	88.4	87.9	86.8	87.5	87.2	-0.3 pps
Older (55-64)	56.0	57.4	59.0	60.0	64.7	4.6 pps
Nationals (15-64)	73.2	72.9	73.0	73.7	75.3	1.7 pps
Non-nationals (15-64)	79.4	78.3	75.2	74.8	73.6	-1.2 pps
Male	80.0	78.8	78.7	78.8	79.9	1.1 pps
Young (15-24)	41.1	36.9	35.8	33.2	36.5	3.3 pps
Prime age (25-54)	93.5	92.6	92.2	93.0	92.8	-0.2 pps
Older (55-64)	69.9	70.0	70.5	71.6	75.2	3.5 pps
Female	69.1	69.4	68.5	69.3	70.4	1.0 pps
Young (15-24)	39.5	38.9	38.5	39.9	41.7	1.9 pps
Prime age (25-54)	83.9	83.8	81.8	82.5	82.1	-0.4 pps
Older (55-64)	42.3	45.3	47.8	48.9	54.7	5.8 pps
5 - **Employment rate** (% of population 15-64)	62.1	62.7	63.7	65.6	68.6	3.0 pps
Young (15-24)	25.8	25.4	26.3	27.5	31.3	3.8 pps
Prime age (25-54)	76.2	76.5	76.6	78.4	80.4	2.0 pps
Older (55-64)	46.9	48.5	52.2	55.3	60.9	5.5 pps
Low-skilled (15-64)	40.4	40.7	42.6	41.7	44.2	2.5 pps
Medium-skilled (15-64)	62.5	62.4	62.6	66.4	69.8	3.5 pps
High-skilled (15-64)	77.3	78.3	78.3	79.1	80.8	1.7 pps
Nationals (15-64)	60.8	61.6	63.2	65.2	68.8	3.6 pps
Non-nationals (15-64)	68.1	67.5	65.7	67.1	67.5	0.4 pps
Male	66.1	66.7	68.6	70.0	73.3	3.2 pps
Young (15-24)	25.9	24.0	26.5	24.2	27.3	3.1 pps
Prime age (25-54)	79.6	80.6	81.7	83.6	86.2	2.6 pps
Older (55-64)	57.2	57.7	60.9	64.9	70.3	5.4 pps
Female	58.6	59.0	59.2	61.4	64.2	2.7 pps
Young (15-24)	25.8	26.7	26.3	30.7	35.1	4.4 pps
Prime age (25-54)	73.1	72.7	72.0	73.5	75.0	1.5 pps
Older (55-64)	36.9	39.4	43.7	46.2	52.0	5.8 pps
6 - **Employed persons** (15-64, 1000 pers.)	355.1	350.0	353.9	369.8	389.7	5.4 %
7 - **Employment growth** (%, National accounts)	-1.8	1.5	4.6	4.3	4.0	-0.3 pps
Employment growth (%, 15-64, LFS)	-0.4	-1.4	1.1	4.5	5.4	0.9 pps
Male	-2.4	-0.9	2.4	4.6	5.7	1.1 pps
Female	1.7	-1.9	-0.2	4.4	5.0	0.6 pps
8 - **Self employed** (15-64, % of total employment)	15.2	13.0	12.2	11.4	11.7	0.3 pps
Male	20.3	15.9	15.5	13.7	14.1	0.4 pps
Female	10.0	9.9	8.6	8.9	9.1	0.3 pps
9 - **Temporary employment** (15-64, % of total employment)	19.0	18.4	16.5	15.3	13.8	-1.5 pps
Male	13.1	13.2	11.7	12.0	10.5	-1.5 pps
Female	24.4	23.4	21.3	18.6	17.2	-1.4 pps
10 - **Part-time** (15-64, % of total employment)	13.5	13.0	13.4	12.2	10.8	-1.4 pps
Male	10.3	10.3	11.3	9.1	7.5	-1.6 pps
Female	16.8	15.8	15.6	15.6	14.4	-1.2 pps
11 **Involuntary part-time** (15-64, % of total employment)	8.8	9.0	9.3	8.2	6.9	-1.3 pps
12 - **Unemployment rate** (harmonised:15-74)	16.1	15.0	13.0	11.1	8.4	-2.7 pps
Young (15-24)	36.0	32.8	29.1	24.7	20.2	-4.5 pps
Prime age (25-49)	13.9	13.1	11.7	10.4	7.8	-2.6 pps
Older (55-64)	16.3	15.6	11.5	7.8	5.8	-2.0 pps
Low-skilled (15-64)	20.3	19.4	16.4	14.9	10.4	-4.5 pps
Medium-skilled (15-64)	18.4	16.7	14.5	11.6	8.9	-2.7 pps
High-skilled (15-64)	13.0	12.1	10.9	9.8	7.7	-2.1 pps
Nationals (15-64)	16.9	15.5	13.4	11.5	8.6	-2.9 pps
Non-nationals (15-64)	14.1	13.7	12.6	10.5	8.3	-2.2 pps
Male	17.1	15.1	12.7	10.9	8.1	-2.8 pps
Female	15.1	14.8	13.4	11.3	8.8	-2.5 pps
13 - **Long-term unemployment** (% of total unemployment)	47.7	45.6	44.5	40.7	31.6	-9.1 pps
14 - **Worked hours** (full-time, average actual weekly hours)	40.5	40.5	40.9	40.7	40.3	-1.0 %
Male	41.7	41.7	42.0	42.0	41.4	-1.4 %
Female	39.3	39.1	39.6	39.2	38.9	-0.8 %
15 - **Sectoral employment growth** (% change)						
Agriculture	-3.9	2.1	2.0	-1.9	-0.5	1.4 pps
Building and construction	-9.5	0.0	7.8	12.7	10.1	-2.6 pps
Services	0.5	2.6	5.7	4.7	3.9	-0.8 pps
Manufacturing industry	-4.2	1.5	5.2	4.5	4.7	0.2 pps
16 - **Indicator board on wage developments** (% change)						
Compensation per employee	-3.5	-1.3	-1.1	0.7	0.1	-0.6 pps
Real compensation per employee based on GDP	-0.5	4.5	1.1	-2.2	-1.4	0.8 pps
Labour cost index (compens. of employees plus taxes minus subs.)	-2.5	-1.0	0.4	1.1	3.4	2.3 pps
Labour cost index (wages and salaries, total)	-2.9	-0.9	0.7	1.5	3.4	1.9 pps
Labour productivity (GDP/person employed)	0.5	0.5	0.2	0.2	-0.1	-0.3 pps

Latvia		2014	2015	2016	2017	2018	2017-2018
1	- **Population** (LFS, total, 1000 pers.)	1994	1977	1959	1941	1926	-0.8 %
2	- **Population** (LFS, working age:15-64, 1000 pers.)	1295	1275	1254	1230	1216	-1.1 %
	(% of total population)	65.0	64.5	64.0	63.3	63.2	-0.2 pps
3	- **Labour force** (15-64, 1000 pers.)	966	965	957	946	945	-0.1 %
	Male	486	486	479	475	475	0.0 %
	Female	480	479	478	471	470	-0.3 %
4	- **Activity rate** (% of population 15-64)	74.6	75.7	76.3	77.0	77.7	0.7 pps
	Young (15-24)	40.4	41.3	39.7	39.7	37.7	-2.0 pps
	Prime age (25-54)	87.2	87.6	87.8	88.5	89.1	0.5 pps
	Older (55-64)	62.6	65.5	67.6	67.9	70.8	2.9 pps
	Nationals (15-64)	74.9	76.1	76.9	77.5	78.2	0.7 pps
	Non-nationals (15-64)	72.6	73.3	72.8	73.2	74.3	1.1 pps
	Male	77.8	78.9	78.8	79.8	80.4	0.7 pps
	Young (15-24)	45.3	45.2	43.2	42.8	40.6	-2.3 pps
	Prime age (25-54)	90.5	90.7	90.2	91.8	92.1	0.4 pps
	Older (55-64)	63.7	68.0	69.5	69.2	72.5	3.3 pps
	Female	71.6	72.8	74.0	74.3	75.1	0.8 pps
	Young (15-24)	35.3	37.1	35.9	36.6	34.8	-1.9 pps
	Prime age (25-54)	84.0	84.6	85.5	85.4	86.0	0.6 pps
	Older (55-64)	61.7	63.6	66.1	66.9	69.4	2.5 pps
5	- **Employment rate** (% of population 15-64)	66.3	68.1	68.7	70.1	71.8	1.7 pps
	Young (15-24)	32.5	34.5	32.8	33.0	33.1	0.2 pps
	Prime age (25-54)	78.2	79.2	79.7	81.2	82.7	1.4 pps
	Older (55-64)	56.4	59.4	61.4	62.3	65.4	3.1 pps
	Low-skilled (15-64)	32.6	34.7	35.5	35.8	35.1	-0.7 pps
	Medium-skilled (15-64)	67.7	68.8	68.2	70.5	72.7	2.2 pps
	High-skilled (15-64)	83.4	85.1	86.5	86.9	88.9	2.0 pps
	Nationals (15-64)	67.0	68.8	69.6	70.9	72.7	1.8 pps
	Non-nationals (15-64)	61.9	63.6	63.5	64.4	65.9	1.5 pps
	Male	68.4	69.9	70.0	71.9	73.6	1.7 pps
	Young (15-24)	36.5	37.1	34.0	35.0	35.5	0.5 pps
	Prime age (25-54)	80.3	81.2	81.4	83.5	84.6	1.1 pps
	Older (55-64)	56.4	60.1	61.3	62.4	66.4	3.9 pps
	Female	64.4	66.4	67.6	68.4	70.1	1.7 pps
	Young (15-24)	28.2	31.9	31.6	30.9	30.6	-0.3 pps
	Prime age (25-54)	76.0	77.3	78.1	79.0	80.7	1.7 pps
	Older (55-64)	56.4	58.9	61.4	62.2	64.6	2.5 pps
6	- **Employed persons** (15-64, 1000 pers.)	858.6	867.9	862.3	861.9	873.3	1.3 %
7	- **Employment growth** (%, National accounts)	-1.3	1.4	-0.3	0.0	1.6	1.6 pps
	Employment growth (%, 15-64, LFS)	-0.9	1.1	-0.6	0.0	1.3	1.4 pps
	Male	-0.3	1.0	-1.4	0.7	1.5	0.9 pps
	Female	-1.5	1.2	0.0	-0.8	1.2	1.9 pps
8	- **Self employed** (15-64, % of total employment)	10.6	11.6	11.8	11.8	11.0	-0.9 pps
	Male	13.2	14.7	14.7	13.9	12.9	-1.0 pps
	Female	8.0	8.5	9.0	9.8	9.1	-0.7 pps
9	- **Temporary employment** (15-64, % of total employment)	3.3	3.8	3.7	3.0	2.7	-0.3 pps
	Male	4.3	4.6	4.6	3.7	3.0	-0.7 pps
	Female	2.4	3.0	2.8	2.4	2.4	0.0 pps
10	- **Part-time** (15-64, % of total employment)	6.8	7.2	8.5	7.7	7.3	-0.4 pps
	Male	4.7	4.5	6.1	4.8	4.7	-0.1 pps
	Female	8.9	10.0	10.8	10.6	9.8	-0.8 pps
11	**Involuntary part-time** (15-64, % of total employment)	2.6	2.4	3.1	2.7	2.4	-0.2 pps
12	- **Unemployment rate** (harmonised:15-74)	10.8	9.9	9.6	8.7	7.4	-1.3 pps
	Young (15-24)	19.6	16.3	17.3	17.0	12.2	-4.8 pps
	Prime age (25-49)	10.4	9.5	9.3	8.3	7.2	-1.1 pps
	Older (55-64)	9.9	9.3	9.2	8.3	7.6	-0.7 pps
	Low-skilled (15-64)	24.5	22.3	21.1	19.2	16.8	-2.4 pps
	Medium-skilled (15-64)	11.9	11.1	11.6	10.4	8.7	-1.7 pps
	High-skilled (15-64)	5.7	5.0	4.4	4.0	3.8	-0.2 pps
	Nationals (15-64)	10.5	9.6	9.5	8.5	7.1	-1.4 pps
	Non-nationals (15-64)	14.8	13.2	12.7	12.1	11.3	-0.8 pps
	Male	11.8	11.1	10.9	9.8	8.4	-1.4 pps
	Female	9.8	8.6	8.4	7.7	6.4	-1.3 pps
13	- **Long-term unemployment** (% of total unemployment)	43.0	45.5	41.5	37.4	42.0	4.6 pps
14	- **Worked hours** (full-time, average actual weekly hours)	40.0	39.8	40.3	39.9	39.9	0.0 %
	Male	40.3	40.1	40.6	40.3	40.3	0.0 %
	Female	39.7	39.5	39.9	39.5	39.5	0.0 %
15	- **Sectoral employment growth** (% change)						
	Agriculture	-3.8	7.2	-3.4	-3.4	0.2	3.6 pps
	Building and construction	3.3	-1.8	-8.0	5.4	9.4	4.0 pps
	Services	0.5	2.3	-0.1	-0.2	2.0	2.2 pps
	Manufacturing industry	-5.0	-1.3	0.4	0.0	1.1	1.1 pps
16	- **Indicator board on wage developments** (% change)						
	Compensation per employee	8.6	7.7	7.3	8.0	7.8	-0.2 pps
	Real compensation per employee based on GDP	7.6	13.6	9.0	12.3	5.3	-7.0 pps
	Labour cost index (compens. of employees plus taxes minus subs.)	6.2	7.3	6.8	6.5	12.1	5.6 pps
	Labour cost index (wages and salaries, total)	7.3	7.4	6.1	6.6	10.7	4.1 pps
	Labour productivity (GDP/person employed)	3.3	1.5	2.4	4.7	3.1	-1.6 pps

Lithuania	2014	2015	2016	2017	2018	2017-2018
1 - **Population** (LFS, total, 1000 pers.)	2932	2905	2868	2822	2800	-0.8 %
2 - **Population** (LFS, working age:15-64, 1000 pers.)	1961	1935	1899	1854	1828	-1.4 %
(% of total population)	66.9	66.6	66.2	65.7	65.3	-0.4 pps
3 - **Labour force** (15-64, 1000 pers.)	1446	1434	1433	1408	1413	0.3 %
Male	721	710	709	697	704	1.0 %
Female	724	724	724	711	709	-0.4 %
4 - **Activity rate** (% of population 15-64)	73.7	74.1	75.5	75.9	77.3	1.4 pps
Young (15-24)	34.2	33.8	35.4	35.0	36.5	1.4 pps
Prime age (25-54)	89.7	89.3	89.3	89.3	89.6	0.4 pps
Older (55-64)	63.0	66.2	70.0	71.3	73.9	2.6 pps
Nationals (15-64)	73.7	74.1	75.5	76.0	77.3	1.3 pps
Non-nationals (15-64)	82.1	73.3	70.5	73.9	77.5	3.7 pps
Male	76.0	75.8	77.1	77.4	78.9	1.5 pps
Young (15-24)	38.6	36.7	38.7	37.8	38.7	0.9 pps
Prime age (25-54)	90.8	90.4	90.2	90.4	91.0	0.6 pps
Older (55-64)	68.2	69.8	73.6	73.3	76.2	3.0 pps
Female	71.6	72.5	73.9	74.6	75.8	1.2 pps
Young (15-24)	29.6	30.8	31.8	32.2	34.1	1.9 pps
Prime age (25-54)	88.7	88.2	88.5	88.1	88.3	0.1 pps
Older (55-64)	58.9	63.3	67.2	69.6	72.0	2.3 pps
5 - **Employment rate** (% of population 15-64)	65.7	67.2	69.4	70.4	72.4	2.0 pps
Young (15-24)	27.6	28.3	30.2	30.4	32.4	2.0 pps
Prime age (25-54)	80.8	81.6	82.7	83.3	84.6	1.3 pps
Older (55-64)	56.2	60.4	64.6	66.1	68.5	2.4 pps
Low-skilled (15-64)	19.5	19.9	19.2	20.9	22.7	1.8 pps
Medium-skilled (15-64)	64.6	66.1	67.6	68.8	71.0	2.3 pps
High-skilled (15-64)	88.4	88.7	90.4	90.0	90.5	0.5 pps
Nationals (15-64)	65.6	67.2	69.4	70.4	72.4	2.0 pps
Non-nationals (15-64)	72.6	67.5	64.8	71.2	73.2	2.0 pps
Male	66.6	68.0	70.0	70.6	73.3	2.7 pps
Young (15-24)	31.0	30.9	32.5	32.3	34.1	1.8 pps
Prime age (25-54)	80.7	81.8	82.6	83.1	85.2	2.1 pps
Older (55-64)	58.8	62.4	66.9	67.1	70.5	3.4 pps
Female	64.9	66.5	68.8	70.2	71.6	1.4 pps
Young (15-24)	24.0	25.7	27.8	28.4	30.6	2.2 pps
Prime age (25-54)	80.9	81.4	82.9	83.6	84.1	0.5 pps
Older (55-64)	54.3	58.8	62.8	65.2	67.0	1.8 pps
6 - **Employed persons** (15-64, 1000 pers.)	1288.0	1300.6	1317.7	1305.6	1323.7	1.4 %
7 - **Employment growth** (%, National accounts)	2.0	1.3	2.0	-0.5	1.1	1.6 pps
Employment growth (%, 15-64, LFS)	1.9	1.0	1.3	-0.9	1.4	2.3 pps
Male	1.9	0.9	0.9	-1.1	2.9	4.0 pps
Female	1.9	1.1	1.7	-0.7	0.0	0.7 pps
8 - **Self employed** (15-64, % of total employment)	10.6	10.8	11.1	10.9	10.8	0.0 pps
Male	12.6	13.4	14.3	13.8	13.4	-0.4 pps
Female	8.6	8.4	8.1	8.1	8.3	0.2 pps
9 - **Temporary employment** (15-64, % of total employment)	2.8	2.1	2.0	1.7	1.6	-0.1 pps
Male	3.6	2.4	2.2	2.1	1.7	-0.4 pps
Female	2.0	1.8	1.7	1.3	1.4	0.1 pps
10 - **Part-time** (15-64, % of total employment)	8.6	7.6	7.1	7.6	7.1	-0.5 pps
Male	6.4	5.5	5.4	5.7	5.2	-0.5 pps
Female	10.6	9.7	8.8	9.4	8.9	-0.5 pps
11 **Involuntary part-time** (15-64, % of total employment)	2.7	2.4	2.2	2.3	1.7	-0.6 pps
12 - **Unemployment rate** (harmonised:15-74)	10.7	9.1	7.9	7.1	6.2	-0.9 pps
Young (15-24)	19.3	16.3	14.5	13.3	11.1	-2.2 pps
Prime age (25-49)	9.9	8.6	7.4	6.6	5.6	-1.0 pps
Older (55-64)	10.7	8.7	7.7	7.3	7.2	-0.1 pps
Low-skilled (15-64)	30.7	27.3	25.9	21.6	18.5	-3.1 pps
Medium-skilled (15-64)	13.7	11.9	10.6	9.6	8.2	-1.4 pps
High-skilled (15-64)	4.3	3.7	3.0	3.0	2.9	-0.1 pps
Nationals (15-64)	10.9	9.3	8.1	7.3	6.3	-1.0 pps
Non-nationals (15-64)	0.0	0.0	0.0	0.0	0.0	0.0 pps
Male	12.2	10.1	9.1	8.6	6.9	-1.7 pps
Female	9.2	8.2	6.7	5.7	5.4	-0.3 pps
13 - **Long-term unemployment** (% of total unemployment)	44.6	42.8	38.2	37.7	32.2	-5.5 pps
14 - **Worked hours** (full-time, average actual weekly hours)	39.6	39.6	39.7	39.3	39.4	0.3 %
Male	40.1	40.1	40.3	39.9	39.9	0.0 %
Female	39.1	39.1	39.1	38.7	38.9	0.5 %
15 - **Sectoral employment growth** (% change)						
Agriculture	11.0	0.2	-10.3	-3.0	-2.9	0.1 pps
Building and construction	0.0	5.8	-1.4	-4.5	1.3	5.8 pps
Services	2.6	-0.1	3.5	0.1	1.6	1.6 pps
Manufacturing industry	-0.4	2.1	3.6	-0.8	4.2	5.0 pps
16 - **Indicator board on wage developments** (% change)						
Compensation per employee	4.7	5.9	6.7	8.7	8.0	-0.7 pps
Real compensation per employee based on GDP	9.1	6.5	13.1	5.1	4.0	-1.1 pps
Labour cost index (compens. of employees plus taxes minus subs.)	4.3	5.4	8.2	9.6	10.0	0.4 pps
Labour cost index (wages and salaries, total)	4.7	5.9	8.2	8.8	9.7	0.9 pps
Labour productivity (GDP/person employed)	1.5	0.7	0.4	4.7	2.4	-2.3 pps

Luxembourg	2014	2015	2016	2017	2018	2017-2018
1 - **Population** (LFS, total, 1000 pers.)	558	569	584	597	609	2.0 %
2 - **Population** (LFS, working age:15-64, 1000 pers.)	364	386	396	407	415	1.9 %
(% of total population)	65.3	67.8	67.7	68.2	68.1	-0.1 pps
3 - **Labour force** (15-64, 1000 pers.)	258	274	277	286	295	3.2 %
Male	143	149	151	153	158	2.9 %
Female	116	125	126	133	137	3.5 %
4 - **Activity rate** (% of population 15-64)	70.8	70.9	70.0	70.2	71.1	0.9 pps
Young (15-24)	26.4	35.2	30.7	30.5	33.1	2.6 pps
Prime age (25-54)	88.0	87.7	87.2	88.0	88.4	0.4 pps
Older (55-64)	44.4	40.4	41.7	41.0	41.9	0.9 pps
Nationals (15-64)	66.3	66.8	66.1	65.7	66.1	0.4 pps
Non-nationals (15-64)	75.6	75.1	73.8	74.4	75.8	1.4 pps
Male	77.2	76.0	75.1	74.0	74.7	0.7 pps
Young (15-24)	29.5	36.3	30.5	32.5	33.8	1.3 pps
Prime age (25-54)	95.0	93.9	93.0	91.9	92.2	0.3 pps
Older (55-64)	52.0	45.4	49.1	46.7	47.4	0.7 pps
Female	64.2	65.6	64.7	66.2	67.4	1.2 pps
Young (15-24)	22.9	34.2	30.9	28.2	32.2	4.0 pps
Prime age (25-54)	80.9	81.4	81.1	84.0	84.5	0.4 pps
Older (55-64)	36.5	35.1	34.0	35.2	36.2	1.0 pps
5 - **Employment rate** (% of population 15-64)	66.6	66.1	65.6	66.3	67.1	0.8 pps
Young (15-24)	20.3	29.0	24.9	25.8	28.4	2.6 pps
Prime age (25-54)	83.8	82.6	82.5	83.7	83.9	0.2 pps
Older (55-64)	42.5	38.4	39.6	39.7	40.5	0.8 pps
Low-skilled (15-64)	41.9	46.8	42.1	42.0	44.8	2.8 pps
Medium-skilled (15-64)	65.9	65.9	65.3	67.8	67.6	-0.2 pps
High-skilled (15-64)	83.0	83.3	83.8	84.0	83.7	-0.3 pps
Nationals (15-64)	63.8	63.9	63.3	63.2	63.2	0.0 pps
Non-nationals (15-64)	69.7	68.4	67.7	69.2	70.8	1.5 pps
Male	72.6	71.3	70.5	69.9	70.6	0.7 pps
Young (15-24)	21.9	29.5	24.3	26.8	28.5	1.6 pps
Prime age (25-54)	90.6	89.3	88.5	87.4	88.0	0.6 pps
Older (55-64)	49.7	42.9	46.4	45.3	45.5	0.2 pps
Female	60.5	60.8	60.4	62.6	63.4	0.8 pps
Young (15-24)	18.8	28.9	25.5	24.7	28.4	3.7 pps
Prime age (25-54)	76.8	75.7	76.4	79.8	79.7	-0.1 pps
Older (55-64)	35.2	33.5	32.4	34.0	35.0	1.0 pps
6 - **Employed persons** (15-64, 1000 pers.)	242.8	255.2	259.4	269.9	278.4	3.1 %
7 - **Employment growth** (%, National accounts)	2.6	2.6	3.0	3.4	3.7	0.3 pps
Employment growth (%, 15-64, LFS)	2.8	5.1	1.6	4.0	3.1	-0.9 pps
Male	1.9	4.3	1.6	1.8	3.1	1.3 pps
Female	4.1	6.1	1.7	6.7	3.1	-3.6 pps
8 - **Self employed** (15-64, % of total employment)	7.8	8.6	9.0	8.9	7.5	-1.3 pps
Male	9.0	9.4	10.3	9.7	8.4	-1.3 pps
Female	6.4	7.5	7.5	8.0	6.4	-1.6 pps
9 - **Temporary employment** (15-64, % of total employment)	8.1	10.2	9.0	9.1	9.8	0.7 pps
Male	7.1	10.2	8.9	8.8	9.1	0.3 pps
Female	9.2	10.2	9.1	9.4	10.7	1.3 pps
10 - **Part-time** (15-64, % of total employment)	18.5	18.5	19.2	19.6	17.8	-1.8 pps
Male	4.7	5.6	6.2	6.1	5.8	-0.3 pps
Female	35.6	34.2	35.1	35.3	31.8	-3.5 pps
11 **Involuntary part-time** (15-64, % of total employment)	2.4	2.7	2.2	2.6	2.2	-0.4 pps
12 - **Unemployment rate** (harmonised:15-74)	6.0	6.5	6.3	5.6	5.5	-0.1 pps
Young (15-24)	22.6	17.3	18.9	15.4	14.2	-1.2 pps
Prime age (25-49)	4.9	5.8	5.3	4.9	5.0	0.1 pps
Older (55-64)	4.3	4.7	5.0	3.3	3.6	0.3 pps
Low-skilled (15-64)	10.2	10.7	9.9	8.9	8.4	-0.5 pps
Medium-skilled (15-64)	6.3	6.3	6.8	5.3	5.6	0.3 pps
High-skilled (15-64)	4.0	4.7	4.0	3.9	4.3	0.4 pps
Nationals (15-64)	3.8	4.3	4.2	3.9	4.4	0.5 pps
Non-nationals (15-64)	7.8	8.9	8.2	6.9	6.6	-0.3 pps
Male	5.8	5.9	6.1	5.6	5.3	-0.3 pps
Female	6.4	7.1	6.5	5.6	5.7	0.1 pps
13 - **Long-term unemployment** (% of total unemployment)	27.3	28.4	34.9	38.1	24.7	-13.4 pps
14 - **Worked hours** (full-time, average actual weekly hours)	41.5	41.3	41.1	40.8	40.6	-0.5 %
Male	42.1	42.2	42.0	41.6	41.3	-0.7 %
Female	40.3	39.7	39.5	39.5	39.4	-0.3 %
15 - **Sectoral employment growth** (% change)						
Agriculture	-0.9	-0.6	-0.5	-0.4	0.2	0.6 pps
Building and construction	1.4	1.8	3.0	2.4	4.1	1.7 pps
Services	2.9	2.9	3.9	4.0	4.1	0.1 pps
Manufacturing industry	-0.9	0.6	0.7	1.4	1.1	-0.3 pps
16 - **Indicator board on wage developments** (% change)						
Compensation per employee	3.5	1.6	0.9	3.3	2.1	-1.1 pps
Real compensation per employee based on GDP	0.9	-0.4	-2.7	2.6	-1.1	-3.7 pps
Labour cost index (compens. of employees plus taxes minus subs.)	3.2	0.5	1.1	2.6	1.9	-0.7 pps
Labour cost index (wages and salaries, total)	3.4	0.6	1.2	4.0	2.0	-2.0 pps
Labour productivity (GDP/person employed)	1.7	1.3	-0.6	-1.8	-1.1	0.7 pps

Hungary	2014	2015	2016	2017	2018	2017-2018
1 - **Population** (LFS, total, 1000 pers.)	9866	9843	9814	9788	9776	-0.1 %
2 - **Population** (LFS, working age:15-64, 1000 pers.)	6588	6530	6478	6415	6370	-0.7 %
(% of total population)	66.8	66.3	66.0	65.5	65.2	-0.4 pps
3 - **Labour force** (15-64, 1000 pers.)	4413	4483	4543	4565	4582	0.4 %
Male	2384	2426	2465	2485	2500	0.6 %
Female	2029	2057	2079	2080	2083	0.2 %
4 - **Activity rate** (% of population 15-64)	67.0	68.6	70.1	71.2	71.9	0.8 pps
Young (15-24)	29.5	31.0	32.3	32.4	32.3	-0.2 pps
Prime age (25-54)	85.0	85.8	86.1	86.9	87.0	0.2 pps
Older (55-64)	44.6	48.1	52.1	53.6	55.8	2.3 pps
Nationals (15-64)	66.9	68.6	70.1	71.2	72.0	0.8 pps
Non-nationals (15-64)	74.9	70.6	68.4	62.5	64.1	1.6 pps
Male	73.4	75.3	76.9	78.2	79.1	0.8 pps
Young (15-24)	33.0	34.4	36.1	36.5	37.1	0.6 pps
Prime age (25-54)	91.2	92.0	92.4	93.3	93.3	0.0 pps
Older (55-64)	53.2	57.8	62.4	64.5	67.1	2.5 pps
Female	60.7	62.2	63.5	64.2	64.9	0.7 pps
Young (15-24)	25.9	27.5	28.2	28.2	27.2	-1.0 pps
Prime age (25-54)	78.8	79.6	79.8	80.4	80.7	0.3 pps
Older (55-64)	37.4	39.9	43.5	44.3	46.3	2.0 pps
5 - **Employment rate** (% of population 15-64)	61.8	63.9	66.5	68.2	69.2	1.1 pps
Young (15-24)	23.5	25.7	28.1	29.0	29.0	0.0 pps
Prime age (25-54)	79.2	80.6	82.2	83.7	84.1	0.4 pps
Older (55-64)	41.8	45.3	49.8	51.7	54.4	2.7 pps
Low-skilled (15-64)	31.5	33.9	36.6	38.5	39.4	0.9 pps
Medium-skilled (15-64)	66.7	68.8	71.5	73.1	73.7	0.6 pps
High-skilled (15-64)	80.8	82.1	84.4	84.3	85.1	0.7 pps
Nationals (15-64)	61.7	63.9	66.5	68.2	69.3	1.1 pps
Non-nationals (15-64)	71.0	67.5	65.3	60.6	60.3	-0.2 pps
Male	67.8	70.3	73.0	75.2	76.3	1.1 pps
Young (15-24)	26.4	28.1	31.5	32.9	33.4	0.5 pps
Prime age (25-54)	85.3	86.8	88.2	90.1	90.4	0.3 pps
Older (55-64)	49.6	54.4	59.7	62.5	65.5	3.0 pps
Female	55.9	57.8	60.2	61.3	62.3	1.1 pps
Young (15-24)	20.5	23.1	24.6	24.8	24.3	-0.5 pps
Prime age (25-54)	73.2	74.4	76.2	77.2	77.7	0.5 pps
Older (55-64)	35.2	37.7	41.5	42.4	44.9	2.5 pps
6 - **Employed persons** (15-64, 1000 pers.)	4069.9	4175.8	4309.4	4373.4	4410.7	0.9 %
7 - **Employment growth** (%, National accounts)	4.8	2.4	3.1	2.0	2.2	0.2 pps
Employment growth (%, 15-64, LFS)	5.4	2.6	3.2	1.5	0.9	-0.6 pps
Male	5.7	2.8	3.2	2.2	0.9	-1.3 pps
Female	5.2	2.4	3.2	0.6	0.8	0.2 pps
8 - **Self employed** (15-64, % of total employment)	10.3	10.2	10.0	9.7	9.7	0.1 pps
Male	13.0	12.6	12.1	11.5	11.6	0.2 pps
Female	7.1	7.4	7.5	7.5	7.4	0.0 pps
9 - **Temporary employment** (15-64, % of total employment)	10.8	11.4	9.7	8.8	7.3	-1.5 pps
Male	11.2	11.6	9.4	8.2	6.7	-1.5 pps
Female	10.3	11.1	10.2	9.5	7.9	-1.6 pps
10 - **Part-time** (15-64, % of total employment)	6.0	5.7	4.8	4.3	4.2	-0.1 pps
Male	4.1	4.0	3.1	2.7	2.5	-0.2 pps
Female	8.3	7.7	6.8	6.3	6.3	0.0 pps
11 **Involuntary part-time** (15-64, % of total employment)	2.5	2.1	1.4	1.2	1.0	-0.2 pps
12 - **Unemployment rate** (harmonised:15-74)	7.7	6.8	5.1	4.2	3.7	-0.5 pps
Young (15-24)	20.4	17.3	12.9	10.7	10.2	-0.5 pps
Prime age (25-49)	6.8	6.0	4.5	3.7	3.4	-0.3 pps
Older (55-64)	6.4	5.8	4.4	3.6	2.6	-1.0 pps
Low-skilled (15-64)	18.6	17.4	13.3	11.2	10.4	-0.8 pps
Medium-skilled (15-64)	7.4	6.4	4.8	3.8	3.4	-0.4 pps
High-skilled (15-64)	3.2	2.4	1.8	1.6	1.5	-0.1 pps
Nationals (15-64)	7.8	6.9	5.2	4.2	3.7	-0.5 pps
Non-nationals (15-64)	0.0	0.0	0.0	0.0	0.0	0.0 pps
Male	7.6	6.6	5.1	3.8	3.5	-0.3 pps
Female	7.9	7.0	5.1	4.6	4.0	-0.6 pps
13 - **Long-term unemployment** (% of total unemployment)	47.4	45.5	46.5	40.4	38.6	-1.8 pps
14 - **Worked hours** (full-time, average actual weekly hours)	39.3	39.3	39.8	39.3	38.8	-1.3 %
Male	39.8	39.9	40.4	39.9	39.3	-1.5 %
Female	38.7	38.6	39.1	38.6	38.1	-1.3 %
15 - **Sectoral employment growth** (% change)						
Agriculture	1.4	-3.9	-0.6	-2.7	-4.2	-1.5 pps
Building and construction	3.3	1.9	3.0	4.3	7.5	3.2 pps
Services	6.5	2.9	4.4	3.0	3.9	0.8 pps
Manufacturing industry	2.9	-0.5	3.3	3.5	2.4	-1.1 pps
16 - **Indicator board on wage developments** (% change)						
Compensation per employee	0.6	-1.5	4.4	6.2	9.6	3.4 pps
Real compensation per employee based on GDP	5.7	5.2	1.7	-0.2	2.2	2.3 pps
Labour cost index (compens. of employees plus taxes minus subs.)	2.9	3.5	4.8	9.3	9.0	-0.3 pps
Labour cost index (wages and salaries, total)	3.3	3.9	5.1	13.4	11.3	-2.1 pps
Labour productivity (GDP/person employed)	-0.6	1.1	-0.7	2.1	2.7	0.6 pps

Malta		2014	2015	2016	2017	2018	2017-2018
1	- **Population** (LFS, total, 1000 pers.)	435	445	456	469	482	2.9 %
2	- **Population** (LFS, working age:15-64, 1000 pers.)	292	299	304	313	322	2.9 %
	(% of total population)	67.2	67.0	66.8	66.9	66.9	0.0 pps
3	- **Labour force** (15-64, 1000 pers.)	198	206	215	226	239	5.8 %
	Male	121	125	129	135	141	4.8 %
	Female	78	81	86	91	98	7.3 %
4	- **Activity rate** (% of population 15-64)	67.8	68.9	70.6	72.2	74.2	2.0 pps
	Young (15-24)	53.0	51.6	51.8	52.9	55.4	2.5 pps
	Prime age (25-54)	81.0	81.7	83.2	84.6	85.6	1.0 pps
	Older (55-64)	42.1	44.5	47.5	48.3	51.4	3.0 pps
	Nationals (15-64)	66.6	68.0	69.4	70.6	72.5	2.0 pps
	Non-nationals (15-64)	80.9	75.5	78.3	80.7	81.9	1.2 pps
	Male	80.8	81.5	82.5	83.4	84.5	1.1 pps
	Young (15-24)	53.4	53.7	54.5	54.3	54.9	0.6 pps
	Prime age (25-54)	95.4	95.4	95.8	96.1	96.3	0.2 pps
	Older (55-64)	61.4	63.3	65.0	66.1	69.2	3.0 pps
	Female	54.4	55.5	58.0	60.2	63.1	2.9 pps
	Young (15-24)	52.5	49.4	48.8	51.4	55.9	4.5 pps
	Prime age (25-54)	65.7	67.2	69.6	71.9	74.0	2.1 pps
	Older (55-64)	23.0	25.8	30.0	30.5	33.3	2.9 pps
5	- **Employment rate** (% of population 15-64)	63.9	65.1	67.2	69.2	71.4	2.1 pps
	Young (15-24)	46.8	45.6	46.2	47.3	50.3	3.0 pps
	Prime age (25-54)	77.2	78.2	80.0	81.8	83.1	1.2 pps
	Older (55-64)	39.6	42.2	45.8	47.2	49.8	2.6 pps
	Low-skilled (15-64)	51.5	53.1	55.6	56.4	57.9	1.5 pps
	Medium-skilled (15-64)	70.6	69.9	70.8	73.0	76.0	3.0 pps
	High-skilled (15-64)	87.6	88.1	89.0	90.2	90.3	0.1 pps
	Nationals (15-64)	62.7	64.2	66.0	67.9	70.1	2.3 pps
	Non-nationals (15-64)	76.6	72.1	75.5	76.4	77.3	0.8 pps
	Male	75.8	77.1	78.9	80.1	81.2	1.1 pps
	Young (15-24)	45.9	46.6	48.7	48.6	48.7	0.2 pps
	Prime age (25-54)	90.8	91.5	92.3	93.1	93.4	0.2 pps
	Older (55-64)	56.9	59.6	62.7	64.5	67.2	2.7 pps
	Female	51.6	52.5	55.0	57.6	60.8	3.2 pps
	Young (15-24)	47.2	44.5	43.5	45.9	52.0	6.1 pps
	Prime age (25-54)	62.8	64.0	66.7	69.4	71.8	2.4 pps
	Older (55-64)	22.0	25.2	29.0	29.8	32.0	2.2 pps
6	- **Employed persons** (15-64, 1000 pers.)	186.8	194.4	204.6	216.8	230.0	6.1 %
7	- **Employment growth** (%, National accounts)	5.4	4.1	4.3	8.1	5.3	-2.8 pps
	Employment growth (%, 15-64, LFS)	4.6	4.1	5.2	6.0	6.1	0.1 pps
	Male	3.1	4.3	4.4	5.0	4.8	-0.2 pps
	Female	7.0	3.7	6.5	7.4	8.1	0.8 pps
8	- **Self employed** (15-64, % of total employment)	12.8	13.3	13.6	14.4	13.6	-0.8 pps
	Male	16.9	17.4	18.7	18.6	17.6	-1.0 pps
	Female	6.6	6.9	5.9	8.1	7.8	-0.3 pps
9	- **Temporary employment** (15-64, % of total employment)	7.7	7.5	7.6	6.0	7.7	1.7 pps
	Male	6.2	6.5	6.6	5.3	7.2	1.9 pps
	Female	9.6	9.0	8.9	6.9	8.5	1.6 pps
10	- **Part-time** (15-64, % of total employment)	15.3	14.3	13.9	13.7	13.3	-0.4 pps
	Male	6.9	6.4	6.0	6.3	6.5	0.2 pps
	Female	28.1	26.5	25.9	24.6	23.0	-1.6 pps
11	**Involuntary part-time** (15-64, % of total employment)	2.3	2.3	1.7	1.5	1.3	-0.2 pps
12	- **Unemployment rate** (harmonised:15-74)	5.7	5.4	4.7	4.0	3.7	-0.3 pps
	Young (15-24)	11.7	11.6	10.7	10.6	9.2	-1.4 pps
	Prime age (25-49)	4.6	4.3	3.9	3.2	3.0	-0.2 pps
	Older (55-64)	6.1	5.2	3.4	2.5	3.2	0.7 pps
	Low-skilled (15-64)	9.2	8.8	7.5	6.2	5.8	-0.4 pps
	Medium-skilled (15-64)	3.6	3.6	3.6	3.3	3.2	-0.1 pps
	High-skilled (15-64)	2.6	2.0	1.7	2.0	2.0	0.0 pps
	Nationals (15-64)	5.9	5.6	4.9	3.8	3.3	-0.5 pps
	Non-nationals (15-64)	5.5	4.6	3.6	5.3	5.7	0.4 pps
	Male	6.1	5.4	4.4	3.8	3.8	0.0 pps
	Female	5.1	5.4	5.2	4.3	3.6	-0.7 pps
13	- **Long-term unemployment** (% of total unemployment)	47.5	44.3	39.7	40.1	30.8	-9.3 pps
14	- **Worked hours** (full-time, average actual weekly hours)	40.1	40.2	40.7	40.0	40.2	0.5 %
	Male	41.1	41.3	41.7	41.0	41.2	0.5 %
	Female	38.1	38.0	38.6	38.2	38.5	0.8 %
15	- **Sectoral employment growth** (% change)						
	Agriculture	-4.5	-0.5	2.4	5.9	4.7	-1.2 pps
	Building and construction	0.9	4.6	1.4	6.7	5.9	-0.8 pps
	Services	7.3	5.1	6.2	9.8	7.5	-2.3 pps
	Manufacturing industry	2.0	2.1	-0.8	3.4	2.2	-1.2 pps
16	- **Indicator board on wage developments** (% change)						
	Compensation per employee	1.4	5.5	2.9	-0.7	2.4	3.0 pps
	Real compensation per employee based on GDP	1.4	-0.9	1.6	0.9	1.0	0.1 pps
	Labour cost index (compens. of employees plus taxes minus subs.)	3.0	7.3	-1.7	2.2	1.1	-1.1 pps
	Labour cost index (wages and salaries, total)	3.1	7.3	-1.7	2.2	1.1	-1.1 pps
	Labour productivity (GDP/person employed)	3.2	6.5	1.3	-1.2	1.4	2.6 pps

Netherlands	2014	2015	2016	2017	2018	2017-2018
1 - **Population** (LFS, total, 1000 pers.)	16865	16940	17030	17131	17232	0.6 %
2 - **Population** (LFS, working age:15-64, 1000 pers.)	10980	10950	10988	11044	11070	0.2 %
(% of total population)	65.1	64.6	64.5	64.5	64.2	-0.2 pps
3 - **Labour force** (15-64, 1000 pers.)	8677	8719	8754	8805	8884	0.9 %
Male	4638	4641	4645	4659	4699	0.8 %
Female	4040	4078	4109	4146	4185	1.0 %
4 - **Activity rate** (% of population 15-64)	79.0	79.6	79.7	79.7	80.3	0.5 pps
Young (15-24)	67.4	68.5	68.2	68.3	68.9	0.5 pps
Prime age (25-54)	87.1	87.1	86.9	86.7	87.0	0.3 pps
Older (55-64)	64.9	67.1	68.4	69.5	70.8	1.3 pps
Nationals (15-64)	79.6	80.2	80.3	80.4	81.0	0.6 pps
Non-nationals (15-64)	69.1	69.0	68.8	68.4	68.7	0.4 pps
Male	84.2	84.6	84.4	84.2	84.7	0.5 pps
Young (15-24)	67.0	67.6	67.2	67.0	68.0	1.0 pps
Prime age (25-54)	92.2	92.1	91.7	91.3	91.7	0.3 pps
Older (55-64)	75.5	77.6	78.2	79.0	80.0	1.0 pps
Female	73.8	74.7	75.0	75.2	75.8	0.5 pps
Young (15-24)	67.7	69.4	69.2	69.7	69.8	0.1 pps
Prime age (25-54)	81.9	82.1	82.2	82.0	82.4	0.4 pps
Older (55-64)	54.3	56.7	58.6	60.2	61.8	1.7 pps
5 - **Employment rate** (% of population 15-64)	73.1	74.1	74.8	75.8	77.2	1.3 pps
Young (15-24)	58.8	60.8	60.8	62.3	63.9	1.7 pps
Prime age (25-54)	81.7	82.2	82.9	83.5	84.6	1.1 pps
Older (55-64)	59.9	61.7	63.5	65.7	67.7	2.0 pps
Low-skilled (15-64)	55.6	57.0	57.8	58.8	60.4	1.7 pps
Medium-skilled (15-64)	76.0	76.5	77.4	78.0	79.1	1.0 pps
High-skilled (15-64)	86.8	87.4	87.4	87.8	88.5	0.7 pps
Nationals (15-64)	73.9	74.9	75.6	76.7	78.1	1.4 pps
Non-nationals (15-64)	60.5	59.8	61.5	62.8	63.8	1.0 pps
Male	78.1	79.0	79.6	80.4	81.6	1.2 pps
Young (15-24)	58.7	59.9	59.6	61.0	62.8	1.7 pps
Prime age (25-54)	86.9	87.5	88.1	88.4	89.2	0.9 pps
Older (55-64)	69.4	71.1	72.8	74.8	76.6	1.8 pps
Female	68.1	69.2	70.1	71.3	72.8	1.5 pps
Young (15-24)	58.8	61.7	62.1	63.6	65.2	1.6 pps
Prime age (25-54)	76.5	77.0	77.7	78.6	79.9	1.3 pps
Older (55-64)	50.4	52.4	54.2	56.6	58.8	2.2 pps
6 - **Employed persons** (15-64, 1000 pers.)	8028.5	8115.5	8223.4	8376.4	8543.3	2.0 %
7 - **Employment growth** (%, National accounts)	-0.1	1.0	1.5	2.2	2.5	0.3 pps
Employment growth (%, 15-64, LFS)	-0.9	1.1	1.3	1.9	2.0	0.1 pps
Male	-0.5	0.7	1.1	1.5	1.7	0.2 pps
Female	-1.5	1.5	1.6	2.3	2.3	0.1 pps
8 - **Self employed** (15-64, % of total employment)	15.1	15.3	15.5	15.5	15.4	-0.1 pps
Male	18.4	18.3	18.6	18.4	18.4	0.0 pps
Female	11.4	12.0	12.1	12.2	12.0	-0.2 pps
9 - **Temporary employment** (15-64, % of total employment)	21.1	20.0	20.6	21.7	21.4	-0.3 pps
Male	20.2	18.8	19.3	20.4	19.9	-0.5 pps
Female	22.0	21.2	22.0	23.1	23.0	-0.1 pps
10 - **Part-time** (15-64, % of total employment)	49.6	50.0	49.7	49.8	50.1	0.3 pps
Male	26.1	26.5	26.2	27.0	27.5	0.5 pps
Female	76.7	76.9	76.4	75.8	75.6	-0.2 pps
11 **Involuntary part-time** (15-64, % of total employment)	5.4	5.0	4.9	4.1	3.5	-0.6 pps
12 - **Unemployment rate** (harmonised:15-74)	7.4	6.9	6.0	4.9	3.8	-1.1 pps
Young (15-24)	12.7	11.3	10.8	8.9	7.2	-1.7 pps
Prime age (25-49)	6.2	5.6	4.6	3.7	2.8	-0.9 pps
Older (55-64)	7.7	8.1	7.2	5.5	4.5	-1.0 pps
Low-skilled (15-64)	12.3	11.3	10.0	8.5	6.7	-1.8 pps
Medium-skilled (15-64)	7.5	7.0	6.1	4.8	3.6	-1.2 pps
High-skilled (15-64)	4.0	3.8	3.5	2.9	2.4	-0.5 pps
Nationals (15-64)	7.2	6.6	5.8	4.7	3.6	-1.1 pps
Non-nationals (15-64)	12.4	13.3	10.6	8.2	7.2	-1.0 pps
Male	7.2	6.5	5.6	4.5	3.7	-0.8 pps
Female	7.8	7.3	6.5	5.3	4.0	-1.3 pps
13 - **Long-term unemployment** (% of total unemployment)	39.4	43.2	42.4	40.0	36.8	-3.2 pps
14 - **Worked hours** (full-time, average actual weekly hours)	41.7	41.5	41.7	41.5	41.3	-0.5 %
Male	42.2	42.1	42.3	42.0	41.8	-0.5 %
Female	39.8	39.6	39.9	39.8	39.5	-0.8 %
15 - **Sectoral employment growth** (% change)						
Agriculture	-0.5	-0.5	1.0	1.5	1.0	-0.5 pps
Building and construction	-2.8	-0.9	0.7	2.2	2.8	0.6 pps
Services	1.0	2.4	2.5	2.9	2.9	0.0 pps
Manufacturing industry	-0.7	0.1	0.5	0.9	1.9	1.0 pps
16 - **Indicator board on wage developments** (% change)						
Compensation per employee	1.6	-0.3	1.6	1.0	1.9	0.9 pps
Real compensation per employee based on GDP	1.5	-0.3	-1.0	1.1	1.6	0.5 pps
Labour cost index (compens. of employees plus taxes minus subs.)	1.3	0.0	0.5	1.4	2.2	0.8 pps
Labour cost index (wages and salaries, total)	-0.3	1.9	0.6	1.6	1.9	0.3 pps
Labour productivity (GDP/person employed)	1.5	1.0	0.6	0.7	0.1	-0.6 pps

Austria	2014	2015	2016	2017	2018	2017-2018
1 - **Population** (LFS, total, 1000 pers.)	8544	8630	8740	8795	8844	0.6 %
2 - **Population** (LFS, working age:15-64, 1000 pers.)	5676	5721	5790	5800	5809	0.2 %
(% of total population)	66.4	66.3	66.3	65.9	65.7	-0.3 pps
3 - **Labour force** (15-64, 1000 pers.)	4279	4319	4412	4433	4461	0.6 %
Male	2260	2287	2340	2350	2369	0.8 %
Female	2018	2032	2072	2083	2092	0.4 %
4 - **Activity rate** (% of population 15-64)	75.4	75.5	76.2	76.4	76.8	0.4 pps
Young (15-24)	58.0	57.4	57.5	56.1	56.6	0.6 pps
Prime age (25-54)	88.0	88.0	88.4	88.7	88.5	-0.2 pps
Older (55-64)	46.9	48.6	51.7	53.6	56.2	2.6 pps
Nationals (15-64)	76.0	76.2	77.2	77.3	77.4	0.1 pps
Non-nationals (15-64)	71.6	71.5	71.3	72.4	74.0	1.7 pps
Male	80.0	80.1	80.7	81.0	81.6	0.6 pps
Young (15-24)	60.7	60.7	60.2	58.4	59.5	1.1 pps
Prime age (25-54)	91.5	91.6	91.8	92.3	92.1	-0.2 pps
Older (55-64)	56.8	57.4	61.2	63.0	66.0	3.0 pps
Female	70.8	70.9	71.7	71.8	72.0	0.1 pps
Young (15-24)	55.4	54.1	54.6	53.7	53.8	0.1 pps
Prime age (25-54)	84.5	84.4	84.9	85.0	84.8	-0.2 pps
Older (55-64)	37.5	40.2	42.7	44.5	46.6	2.1 pps
5 - **Employment rate** (% of population 15-64)	71.1	71.1	71.5	72.2	73.0	0.8 pps
Young (15-24)	52.1	51.4	51.0	50.6	51.3	0.7 pps
Prime age (25-54)	83.4	83.5	83.6	84.1	84.5	0.4 pps
Older (55-64)	45.1	46.3	49.2	51.3	54.0	2.7 pps
Low-skilled (15-64)	47.5	47.2	47.3	46.9	48.2	1.3 pps
Medium-skilled (15-64)	73.8	73.5	73.8	74.5	75.4	0.9 pps
High-skilled (15-64)	83.3	83.3	84.0	84.6	84.5	-0.1 pps
Nationals (15-64)	72.3	72.5	73.3	73.8	74.4	0.6 pps
Non-nationals (15-64)	63.6	63.3	62.6	64.5	66.7	2.2 pps
Male	75.3	75.1	75.4	76.2	77.4	1.3 pps
Young (15-24)	54.3	54.0	52.9	52.1	53.9	1.7 pps
Prime age (25-54)	86.6	86.6	86.6	87.2	87.8	0.6 pps
Older (55-64)	54.3	54.1	57.6	60.1	63.5	3.4 pps
Female	66.9	67.1	67.7	68.2	68.6	0.4 pps
Young (15-24)	49.9	48.7	49.0	49.0	48.7	-0.3 pps
Prime age (25-54)	80.3	80.3	80.6	81.0	81.3	0.3 pps
Older (55-64)	36.4	38.8	41.1	42.8	44.8	2.0 pps
6 - **Employed persons** (15-64, 1000 pers.)	4034.2	4067.6	4142.7	4185.3	4241.1	1.3 %
7 - **Employment growth** (%, National accounts)	1.0	0.6	1.3	1.7	1.7	0.0 pps
Employment growth (%, 15-64, LFS)	0.1	0.8	1.8	1.0	1.3	0.3 pps
Male	-0.3	0.9	2.0	1.0	1.8	0.8 pps
Female	0.6	0.8	1.7	1.1	0.8	-0.2 pps
8 - **Self employed** (15-64, % of total employment)	10.9	11.0	10.8	10.6	10.4	-0.2 pps
Male	13.3	13.3	13.2	12.9	12.6	-0.4 pps
Female	8.3	8.4	8.1	7.9	7.9	-0.1 pps
9 - **Temporary employment** (15-64, % of total employment)	9.2	9.1	9.0	9.2	9.1	-0.1 pps
Male	9.2	9.1	8.9	9.2	8.8	-0.4 pps
Female	9.2	9.1	9.1	9.2	9.4	0.2 pps
10 - **Part-time** (15-64, % of total employment)	26.9	27.3	27.8	27.9	27.3	-0.6 pps
Male	9.6	9.8	10.5	10.6	10.0	-0.6 pps
Female	46.3	46.8	47.1	47.2	46.9	-0.3 pps
11 **Involuntary part-time** (15-64, % of total employment)	3.1	3.4	3.6	3.5	2.9	-0.6 pps
12 - **Unemployment rate** (harmonised:15-74)	5.6	5.7	6.0	5.5	4.9	-0.6 pps
Young (15-24)	10.3	10.6	11.2	9.8	9.4	-0.4 pps
Prime age (25-49)	5.2	5.2	5.4	5.1	4.4	-0.7 pps
Older (55-64)	3.8	4.7	5.0	4.2	3.9	-0.3 pps
Low-skilled (15-64)	11.8	11.5	13.0	13.3	11.6	-1.7 pps
Medium-skilled (15-64)	5.1	5.5	5.8	5.1	4.3	-0.8 pps
High-skilled (15-64)	4.0	3.9	3.6	3.2	3.3	0.1 pps
Nationals (15-64)	4.8	4.9	5.0	4.5	3.9	-0.6 pps
Non-nationals (15-64)	11.3	11.4	12.1	10.9	10.0	-0.9 pps
Male	5.9	6.1	6.5	5.9	5.0	-0.9 pps
Female	5.4	5.3	5.6	5.0	4.7	-0.3 pps
13 - **Long-term unemployment** (% of total unemployment)	27.2	29.2	32.2	33.3	28.9	-4.4 pps
14 - **Worked hours** (full-time, average actual weekly hours)	41.3	40.9	41.0	40.7	40.8	0.2 %
Male	42.0	41.5	41.7	41.4	41.4	0.0 %
Female	39.9	39.5	39.5	39.4	39.4	0.0 %
15 - **Sectoral employment growth** (% change)						
Agriculture	3.2	-6.3	-2.7	-2.4	-5.9	-3.5 pps
Building and construction	1.3	-0.3	1.3	2.2	2.7	0.5 pps
Services	0.9	0.6	1.5	2.2	2.2	0.0 pps
Manufacturing industry	-0.1	0.5	0.5	1.4	3.0	1.6 pps
16 - **Indicator board on wage developments** (% change)						
Compensation per employee	1.9	1.9	2.4	1.5	2.5	1.1 pps
Real compensation per employee based on GDP	0.3	-0.5	1.2	0.7	1.3	0.6 pps
Labour cost index (compens. of employees plus taxes minus subs.)	2.8	3.2	1.0	3.5	2.9	-0.6 pps
Labour cost index (wages and salaries, total)	3.0	3.3	1.1	2.7	2.8	0.1 pps
Labour productivity (GDP/person employed)	-0.3	0.5	0.7	0.8	1.0	0.2 pps

Poland	2014	2015	2016	2017	2018	2017-2018
1 - **Population** (LFS, total, 1000 pers.)	38484	38455	38427	38422	38413	0.0 %
2 - **Population** (LFS, working age:15-64, 1000 pers.)	25278	25128	24649	24317	23941	-1.5 %
(% of total population)	65.7	65.3	64.1	63.3	62.3	-1.0 pps
3 - **Labour force** (15-64, 1000 pers.)	17153	17112	16961	16919	16790	-0.8 %
Male	9419	9389	9315	9304	9213	-1.0 %
Female	7734	7723	7646	7616	7577	-0.5 %
4 - **Activity rate** (% of population 15-64)	67.9	68.1	68.8	69.6	70.1	0.6 pps
Young (15-24)	33.9	32.8	34.5	34.8	35.1	0.3 pps
Prime age (25-54)	85.1	85.1	84.9	84.9	85.2	0.3 pps
Older (55-64)	45.6	46.9	48.3	50.1	50.3	0.2 pps
Nationals (15-64)	67.8	68.1	68.8	69.5	70.1	0.5 pps
Non-nationals (15-64)	73.7	67.8	67.9	77.6	78.3	0.8 pps
Male	74.6	74.8	75.7	76.6	77.0	0.4 pps
Young (15-24)	38.8	38.4	39.8	39.7	39.2	-0.5 pps
Prime age (25-54)	90.5	90.6	90.8	91.1	91.0	0.0 pps
Older (55-64)	57.2	57.5	58.6	60.8	61.9	1.1 pps
Female	61.1	61.4	62.0	62.6	63.3	0.7 pps
Young (15-24)	28.7	26.9	28.9	29.7	30.7	1.1 pps
Prime age (25-54)	79.6	79.6	79.0	78.7	79.3	0.6 pps
Older (55-64)	35.2	37.3	39.0	40.5	39.9	-0.6 pps
5 - **Employment rate** (% of population 15-64)	61.7	62.9	64.5	66.1	67.4	1.3 pps
Young (15-24)	25.8	26.0	28.4	29.6	31.0	1.3 pps
Prime age (25-54)	78.4	79.5	80.3	81.4	82.4	1.0 pps
Older (55-64)	42.5	44.3	46.2	48.3	48.9	0.6 pps
Low-skilled (15-64)	22.7	23.3	23.0	23.3	23.6	0.3 pps
Medium-skilled (15-64)	62.9	64.0	65.6	67.0	68.1	1.1 pps
High-skilled (15-64)	83.9	85.0	85.8	86.8	87.6	0.9 pps
Nationals (15-64)	61.7	62.9	64.5	66.1	67.4	1.2 pps
Non-nationals (15-64)	66.0	62.4	60.5	71.2	74.1	2.9 pps
Male	68.2	69.2	71.0	72.8	74.0	1.2 pps
Young (15-24)	30.0	30.5	32.9	33.9	34.7	0.8 pps
Prime age (25-54)	83.9	84.9	86.1	87.3	88.1	0.8 pps
Older (55-64)	53.1	54.2	55.7	58.3	59.8	1.5 pps
Female	55.2	56.6	58.1	59.5	60.8	1.3 pps
Young (15-24)	21.4	21.3	23.7	25.2	27.0	1.8 pps
Prime age (25-54)	72.7	73.9	74.5	75.3	76.5	1.3 pps
Older (55-64)	32.9	35.5	37.6	39.3	39.1	-0.2 pps
6 - **Employed persons** (15-64, 1000 pers.)	15591.0	15811.6	15901.8	16078.8	16133.4	0.3 %
7 - **Employment growth** (%, National accounts)	1.7	1.5	0.8	1.3	0.3	-1.0 pps
Employment growth (%, 15-64, LFS)	1.8	1.4	0.6	1.1	0.3	-0.8 pps
Male	1.4	1.0	0.5	1.2	0.1	-1.1 pps
Female	2.3	2.0	0.6	1.0	0.6	-0.4 pps
8 - **Self employed** (15-64, % of total employment)	17.9	17.9	17.7	17.4	17.4	0.0 pps
Male	21.9	21.8	21.7	21.8	21.6	-0.2 pps
Female	13.0	13.1	12.7	12.0	12.3	0.3 pps
9 - **Temporary employment** (15-64, % of total employment)	28.3	28.0	27.5	26.1	24.3	-1.8 pps
Male	28.5	28.0	27.3	25.6	23.5	-2.1 pps
Female	28.0	27.9	27.6	26.6	25.1	-1.5 pps
10 - **Part-time** (15-64, % of total employment)	7.1	6.8	6.4	6.6	6.4	-0.2 pps
Male	4.4	4.2	3.7	3.7	3.8	0.1 pps
Female	10.3	9.9	9.7	10.0	9.7	-0.3 pps
11 **Involuntary part-time** (15-64, % of total employment)	2.3	2.1	1.6	1.4	1.0	-0.4 pps
12 - **Unemployment rate** (harmonised:15-74)	9.0	7.5	6.2	4.9	3.9	-1.0 pps
Young (15-24)	23.9	20.8	17.7	14.8	11.7	-3.1 pps
Prime age (25-49)	7.9	6.6	5.4	4.2	3.4	-0.8 pps
Older (55-64)	6.8	5.4	4.4	3.7	2.8	-0.9 pps
Low-skilled (15-64)	19.7	17.3	14.9	12.6	10.3	-2.3 pps
Medium-skilled (15-64)	10.2	8.4	7.0	5.7	4.5	-1.2 pps
High-skilled (15-64)	4.7	4.0	3.3	2.5	2.0	-0.5 pps
Nationals (15-64)	9.1	7.6	6.2	5.0	3.9	-1.1 pps
Non-nationals (15-64)	0.0	0.0	11.0	8.2	5.4	-2.8 pps
Male	8.5	7.3	6.1	4.9	3.9	-1.0 pps
Female	9.6	7.7	6.2	4.9	3.9	-1.0 pps
13 - **Long-term unemployment** (% of total unemployment)	42.7	39.3	34.9	31.0	26.9	-4.1 pps
14 - **Worked hours** (full-time, average actual weekly hours)	41.1	41.1	41.2	40.8	40.2	-1.5 %
Male	42.3	42.3	42.3	41.9	41.2	-1.7 %
Female	39.4	39.4	39.6	39.3	38.8	-1.3 %
15 - **Sectoral employment growth** (% change)						
Agriculture	-2.6	2.1	-7.6	-2.4	-6.0	-3.6 pps
Building and construction	-0.9	1.9	1.3	-0.2	1.6	1.8 pps
Services	3.6	1.9	1.7	1.6	0.1	-1.5 pps
Manufacturing industry	2.2	3.0	5.4	4.4	0.7	-3.7 pps
16 - **Indicator board on wage developments** (% change)						
Compensation per employee	2.2	1.7	4.8	5.8	7.8	2.0 pps
Real compensation per employee based on GDP	-2.4	-0.5	0.4	2.0	4.2	2.3 pps
Labour cost index (compens. of employees plus taxes minus subs.)	3.4	3.8	4.4	6.6	7.0	0.4 pps
Labour cost index (wages and salaries, total)	3.4	3.8	4.4	6.6	7.0	0.4 pps
Labour productivity (GDP/person employed)	1.6	2.3	2.2	3.4	4.8	1.4 pps

Portugal	2014	2015	2016	2017	2018	2017-2018
1 - **Population** (LFS, total, 1000 pers.)	10401	10358	10326	10300	10284	-0.2 %
2 - **Population** (LFS, working age:15-64, 1000 pers.)	6794	6743	6700	6659	6623	-0.5 %
(% of total population)	65.3	65.1	64.9	64.6	64.4	-0.2 pps
3 - **Labour force** (15-64, 1000 pers.)	4976	4949	4940	4972	4976	0.1 %
Male	2523	2501	2498	2506	2499	-0.3 %
Female	2454	2448	2441	2466	2477	0.4 %
4 - **Activity rate** (% of population 15-64)	73.2	73.4	73.7	74.7	75.1	0.5 pps
Young (15-24)	34.3	33.5	33.2	34.0	34.2	0.2 pps
Prime age (25-54)	88.6	88.8	89.1	89.6	89.8	0.2 pps
Older (55-64)	55.3	57.0	58.5	61.5	63.4	1.9 pps
Nationals (15-64)	73.2	73.3	73.6	74.6	75.1	0.5 pps
Non-nationals (15-64)	76.3	76.7	78.7	79.3	77.1	-2.2 pps
Male	76.7	76.7	77.2	77.9	78.1	0.2 pps
Young (15-24)	34.8	34.2	35.0	35.6	36.6	1.0 pps
Prime age (25-54)	91.6	91.7	91.9	92.3	92.6	0.3 pps
Older (55-64)	64.0	65.0	66.9	69.2	69.0	-0.3 pps
Female	70.0	70.3	70.5	71.6	72.4	0.7 pps
Young (15-24)	33.8	32.8	31.3	32.3	31.7	-0.7 pps
Prime age (25-54)	85.8	86.0	86.6	87.0	87.3	0.2 pps
Older (55-64)	47.5	49.9	51.0	54.6	58.4	3.8 pps
5 - **Employment rate** (% of population 15-64)	62.6	63.9	65.2	67.8	69.7	1.9 pps
Young (15-24)	22.4	22.8	23.9	25.9	27.2	1.4 pps
Prime age (25-54)	77.4	78.8	80.2	82.5	84.3	1.8 pps
Older (55-64)	47.8	49.9	52.1	56.2	59.2	3.0 pps
Low-skilled (15-64)	55.4	56.3	57.0	59.8	61.3	1.5 pps
Medium-skilled (15-64)	65.9	66.9	68.3	70.5	72.0	1.4 pps
High-skilled (15-64)	79.4	80.4	81.8	83.5	85.5	2.0 pps
Nationals (15-64)	62.7	64.0	65.3	67.8	69.7	1.9 pps
Non-nationals (15-64)	59.4	61.4	65.1	68.3	68.3	0.0 pps
Male	65.8	66.9	68.3	71.1	72.7	1.6 pps
Young (15-24)	22.9	24.1	25.5	27.6	29.3	1.7 pps
Prime age (25-54)	80.6	81.8	83.0	85.6	87.5	1.8 pps
Older (55-64)	54.3	56.0	58.5	63.0	64.5	1.5 pps
Female	59.6	61.1	62.4	64.8	66.9	2.1 pps
Young (15-24)	21.9	21.5	22.2	24.1	25.1	1.0 pps
Prime age (25-54)	74.3	76.1	77.6	79.7	81.4	1.8 pps
Older (55-64)	42.0	44.5	46.3	50.2	54.6	4.3 pps
6 - **Employed persons** (15-64, 1000 pers.)	4254.5	4309.0	4371.2	4515.4	4615.0	2.2 %
7 - **Employment growth** (%, National accounts)	1.4	1.4	1.6	3.3	2.3	-1.0 pps
Employment growth (%, 15-64, LFS)	2.3	1.3	1.4	3.3	2.2	-1.1 pps
Male	2.2	0.8	1.3	3.4	1.8	-1.7 pps
Female	2.4	1.7	1.6	3.2	2.6	-0.5 pps
8 - **Self employed** (15-64, % of total employment)	15.5	14.5	13.9	13.4	13.1	-0.4 pps
Male	19.3	17.8	17.1	16.6	16.2	-0.4 pps
Female	11.7	11.1	10.7	10.1	9.8	-0.3 pps
9 - **Temporary employment** (15-64, % of total employment)	21.4	22.0	22.3	22.0	22.0	0.0 pps
Male	21.6	22.4	22.5	22.3	22.0	-0.3 pps
Female	21.1	21.5	22.1	21.7	22.0	0.3 pps
10 - **Part-time** (15-64, % of total employment)	10.1	9.8	9.5	8.9	8.1	-0.8 pps
Male	7.6	7.1	6.8	6.1	5.7	-0.4 pps
Female	12.6	12.5	12.1	11.7	10.5	-1.2 pps
11 **Involuntary part-time** (15-64, % of total employment)	5.0	4.9	4.6	4.2	3.7	-0.6 pps
12 - **Unemployment rate** (harmonised:15-74)	14.1	12.6	11.2	9.0	7.0	-2.0 pps
Young (15-24)	34.8	32.0	28.0	23.9	20.3	-3.6 pps
Prime age (25-49)	12.7	11.2	10.0	7.9	6.1	-1.8 pps
Older (55-64)	13.5	12.5	11.0	8.5	6.5	-2.0 pps
Low-skilled (15-64)	16.2	14.2	12.7	10.2	7.7	-2.5 pps
Medium-skilled (15-64)	15.3	14.0	12.3	10.0	8.3	-1.7 pps
High-skilled (15-64)	10.1	9.3	8.4	6.6	5.4	-1.2 pps
Nationals (15-64)	14.3	12.7	11.4	9.1	7.1	-2.0 pps
Non-nationals (15-64)	22.1	20.0	17.3	13.8	11.4	-2.4 pps
Male	13.8	12.4	11.1	8.6	6.6	-2.0 pps
Female	14.5	12.9	11.3	9.5	7.4	-2.1 pps
13 - **Long-term unemployment** (% of total unemployment)	59.5	57.2	55.2	49.6	43.4	-6.2 pps
14 - **Worked hours** (full-time, average actual weekly hours)	41.5	41.4	40.7	40.6	40.4	-0.5 %
Male	42.4	42.4	41.7	41.6	41.5	-0.2 %
Female	40.4	40.3	39.6	39.4	39.3	-0.3 %
15 - **Sectoral employment growth** (% change)						
Agriculture	-4.6	-5.7	-3.7	-2.7	-1.7	1.0 pps
Building and construction	-4.7	1.3	1.2	5.8	4.4	-1.4 pps
Services	4.8	3.3	3.3	5.1	3.5	-1.7 pps
Manufacturing industry	2.3	3.1	1.7	3.8	3.0	-0.8 pps
16 - **Indicator board on wage developments** (% change)						
Compensation per employee	-1.8	0.4	1.7	1.6	2.0	0.4 pps
Real compensation per employee based on GDP	0.4	1.3	-1.3	0.5	0.9	0.4 pps
Labour cost index (compens. of employees plus taxes minus subs.)	-0.6	2.0	1.5	2.0	1.9	-0.1 pps
Labour cost index (wages and salaries, total)	-0.7	2.3	1.9	2.1	1.9	-0.2 pps
Labour productivity (GDP/person employed)	-0.5	0.4	0.3	-0.5	-0.2	0.3 pps

Romania	2014	2015	2016	2017	2018	2017-2018
1 - **Population** (LFS, total, 1000 pers.)	19916	19820	19707	19592	19531	-0.3 %
2 - **Population** (LFS, working age:15-64, 1000 pers.)	13527	13404	13263	13095	12930	-1.3 %
(% of total population)	67.9	67.6	67.3	66.8	66.2	-0.6 pps
3 - **Labour force** (15-64, 1000 pers.)	8883	8858	8696	8812	8761	-0.6 %
Male	5061	5099	5006	5034	5036	0.0 %
Female	3822	3759	3690	3778	3725	-1.4 %
4 - **Activity rate** (% of population 15-64)	65.7	66.1	65.6	67.3	67.8	0.5 pps
Young (15-24)	29.6	31.3	28.0	29.9	29.5	-0.4 pps
Prime age (25-54)	82.1	82.5	81.9	83.4	83.6	0.2 pps
Older (55-64)	44.6	42.7	44.2	46.0	47.5	1.5 pps
Nationals (15-64)	65.7	66.1	65.6	67.3	67.8	0.5 pps
Non-nationals (15-64)	0.0	0.0	0.0	74.5	72.1	-2.4 pps
Male	74.3	75.3	74.8	76.2	76.9	0.8 pps
Young (15-24)	34.8	37.0	33.9	34.6	34.6	-0.1 pps
Prime age (25-54)	90.5	91.6	91.0	92.2	92.5	0.3 pps
Older (55-64)	55.4	53.8	55.1	57.4	59.7	2.2 pps
Female	56.9	56.7	56.2	58.2	58.3	0.1 pps
Young (15-24)	23.9	25.2	21.8	25.0	24.2	-0.9 pps
Prime age (25-54)	73.3	72.9	72.4	74.2	74.2	0.0 pps
Older (55-64)	35.0	32.8	34.4	35.7	36.4	0.7 pps
5 - **Employment rate** (% of population 15-64)	61.0	61.4	61.6	63.9	64.8	1.0 pps
Young (15-24)	22.5	24.5	22.3	24.5	24.7	0.2 pps
Prime age (25-54)	77.1	77.4	77.6	79.9	80.6	0.7 pps
Older (55-64)	43.1	41.1	42.8	44.5	46.3	1.7 pps
Low-skilled (15-64)	44.4	42.6	41.0	42.5	42.6	0.1 pps
Medium-skilled (15-64)	65.0	64.9	65.2	67.5	68.6	1.1 pps
High-skilled (15-64)	82.5	85.3	86.2	87.9	88.4	0.4 pps
Nationals (15-64)	61.0	61.4	61.6	63.9	64.8	1.0 pps
Non-nationals (15-64)	0.0	0.0	0.0	68.2	68.6	0.4 pps
Male	68.7	69.5	69.7	71.8	73.2	1.4 pps
Young (15-24)	26.6	29.4	27.2	28.4	29.0	0.6 pps
Prime age (25-54)	84.6	85.2	85.5	87.6	88.7	1.0 pps
Older (55-64)	53.2	51.2	53.0	55.3	57.9	2.6 pps
Female	53.3	53.2	53.3	55.8	56.2	0.4 pps
Young (15-24)	18.0	19.3	17.1	20.4	20.3	-0.1 pps
Prime age (25-54)	69.3	69.2	69.2	71.8	72.1	0.3 pps
Older (55-64)	34.2	32.1	33.6	34.9	35.7	0.8 pps
6 - **Employed persons** (15-64, 1000 pers.)	8254.4	8234.8	8166.1	8363.2	8381.8	0.2 %
7 - **Employment growth** (%, National accounts)	0.8	-1.3	-1.1	2.6	0.2	-2.4 pps
Employment growth (%, 15-64, LFS)	0.9	-0.2	-0.8	2.4	0.2	-2.2 pps
Male	1.2	0.6	-0.8	1.6	1.0	-0.6 pps
Female	0.5	-1.3	-0.9	3.5	-0.8	-4.3 pps
8 - **Self employed** (15-64, % of total employment)	18.4	17.6	16.5	16.4	15.5	-0.8 pps
Male	23.8	22.5	21.2	21.1	19.9	-1.3 pps
Female	11.5	11.1	10.2	10.1	9.8	-0.4 pps
9 - **Temporary employment** (15-64, % of total employment)	1.5	1.4	1.4	1.2	1.1	-0.1 pps
Male	1.7	1.6	1.7	1.4	1.2	-0.2 pps
Female	1.2	1.1	1.0	0.9	0.9	0.0 pps
10 - **Part-time** (15-64, % of total employment)	8.7	8.8	7.4	6.8	6.5	-0.3 pps
Male	8.2	8.5	7.3	6.7	6.2	-0.5 pps
Female	9.5	9.2	7.7	6.9	6.9	0.0 pps
11 **Involuntary part-time** (15-64, % of total employment)	5.0	5.2	4.3	3.8	3.5	-0.3 pps
12 - **Unemployment rate** (harmonised:15-74)	6.8	6.8	5.9	4.9	4.2	-0.7 pps
Young (15-24)	24.0	21.7	20.6	18.3	16.2	-2.1 pps
Prime age (25-49)	6.1	6.2	5.3	4.2	3.6	-0.6 pps
Older (55-64)	3.3	3.7	3.2	3.2	2.5	-0.7 pps
Low-skilled (15-64)	7.7	9.1	8.6	7.6	6.6	-1.0 pps
Medium-skilled (15-64)	7.2	7.3	6.3	5.2	4.4	-0.8 pps
High-skilled (15-64)	5.9	4.1	3.1	2.4	2.1	-0.3 pps
Nationals (15-64)	7.1	7.0	6.1	5.1	4.3	-0.8 pps
Non-nationals (15-64)	0.0	0.0	0.0	0.0	0.0	0.0 pps
Male	7.3	7.5	6.6	5.6	4.7	-0.9 pps
Female	6.1	5.8	5.0	4.0	3.5	-0.5 pps
13 - **Long-term unemployment** (% of total unemployment)	41.1	43.9	50.0	41.5	44.1	2.6 pps
14 - **Worked hours** (full-time, average actual weekly hours)	40.4	40.1	40.2	40.1	40.0	-0.2 %
Male	40.8	40.5	40.6	40.5	40.4	-0.2 %
Female	39.8	39.5	39.6	39.6	39.5	-0.3 %
15 - **Sectoral employment growth** (% change)						
Agriculture	-2.4	-11.0	-10.7	1.2	-1.8	-3.0 pps
Building and construction	1.3	-0.3	6.6	2.6	-2.7	-5.3 pps
Services	3.0	4.5	2.4	3.4	2.9	-0.4 pps
Manufacturing industry	4.1	-2.8	2.9	4.4	0.5	-3.9 pps
16 - **Indicator board on wage developments** (% change)						
Compensation per employee	6.9	1.9	15.0	12.6	18.4	5.7 pps
Real compensation per employee based on GDP	-1.4	15.2	1.9	-6.2	15.4	21.7 pps
Labour cost index (compens. of employees plus taxes minus subs.)	5.4	5.0	10.4	14.3	10.5	-3.8 pps
Labour cost index (wages and salaries, total)	6.8	7.6	10.5	14.2	33.1	18.9 pps
Labour productivity (GDP/person employed)	2.6	5.2	6.0	4.3	3.9	-0.4 pps

Slovenia	2014	2015	2016	2017	2018	2017-2018
1 - **Population** (LFS, total, 1000 pers.)	2062	2063	2065	2066	2072	0.3 %
2 - **Population** (LFS, working age:15-64, 1000 pers.)	1397	1382	1371	1362	1352	-0.7 %
(% of total population)	67.8	67.0	66.4	65.9	65.3	-0.7 pps
3 - **Labour force** (15-64, 1000 pers.)	991	992	982	1011	1015	0.4 %
Male	535	536	524	538	544	1.2 %
Female	456	456	458	473	470	-0.6 %
4 - **Activity rate** (% of population 15-64)	70.9	71.8	71.6	74.2	75.0	0.8 pps
Young (15-24)	33.6	35.3	33.7	39.1	38.5	-0.6 pps
Prime age (25-54)	90.3	90.8	90.5	91.9	92.0	0.2 pps
Older (55-64)	38.4	39.7	41.2	45.6	49.5	3.9 pps
Nationals (15-64)	71.0	71.5	71.4	74.1	75.1	1.0 pps
Non-nationals (15-64)	67.8	77.6	76.7	76.1	74.4	-1.6 pps
Male	74.3	75.4	74.5	77.1	78.2	1.1 pps
Young (15-24)	36.6	38.9	36.9	42.9	42.4	-0.5 pps
Prime age (25-54)	92.2	92.9	92.0	93.4	94.0	0.7 pps
Older (55-64)	45.7	46.3	47.1	51.7	55.1	3.3 pps
Female	67.2	67.9	68.6	71.2	71.7	0.5 pps
Young (15-24)	30.5	31.7	30.5	34.9	34.4	-0.5 pps
Prime age (25-54)	88.3	88.6	88.9	90.2	89.9	-0.3 pps
Older (55-64)	31.1	32.9	35.2	39.5	43.9	4.4 pps
5 - **Employment rate** (% of population 15-64)	63.9	65.2	65.8	69.3	71.1	1.9 pps
Young (15-24)	26.8	29.6	28.6	34.7	35.1	0.4 pps
Prime age (25-54)	81.9	82.9	83.5	86.1	87.5	1.4 pps
Older (55-64)	35.4	36.6	38.5	42.7	47.0	4.3 pps
Low-skilled (15-64)	36.1	35.7	32.3	35.4	36.3	0.9 pps
Medium-skilled (15-64)	64.9	65.9	67.4	70.7	72.8	2.1 pps
High-skilled (15-64)	82.0	83.1	84.0	86.2	88.0	1.8 pps
Nationals (15-64)	64.2	65.2	65.8	69.3	71.3	2.0 pps
Non-nationals (15-64)	55.1	66.3	66.4	69.1	68.8	-0.3 pps
Male	67.5	69.2	68.9	72.5	74.5	2.0 pps
Young (15-24)	29.5	32.0	31.1	38.6	38.8	0.2 pps
Prime age (25-54)	84.6	86.1	85.6	88.5	90.1	1.5 pps
Older (55-64)	41.7	42.6	43.6	48.0	52.2	4.2 pps
Female	60.0	61.0	62.6	65.8	67.5	1.7 pps
Young (15-24)	23.9	27.0	26.0	30.4	31.0	0.6 pps
Prime age (25-54)	79.1	79.5	81.2	83.5	84.8	1.3 pps
Older (55-64)	29.0	30.5	33.4	37.4	41.9	4.5 pps
6 - **Employed persons** (15-64, 1000 pers.)	892.5	901.6	902.5	943.5	961.9	2.0 %
7 - **Employment growth** (%, National accounts)	0.4	1.3	1.8	3.0	3.2	0.2 pps
Employment growth (%, 15-64, LFS)	0.5	1.0	0.1	4.5	2.0	-2.6 pps
Male	0.3	1.2	-1.6	4.6	2.5	-2.1 pps
Female	0.7	0.8	2.1	4.5	1.3	-3.1 pps
8 - **Self employed** (15-64, % of total employment)	12.1	12.1	11.5	11.4	12.1	0.7 pps
Male	15.9	15.7	15.1	14.3	15.4	1.1 pps
Female	7.7	7.8	7.4	8.1	8.3	0.2 pps
9 - **Temporary employment** (15-64, % of total employment)	16.5	17.8	16.9	17.6	15.7	-1.9 pps
Male	16.0	17.0	15.9	16.4	14.4	-2.0 pps
Female	17.1	18.7	18.0	18.9	17.1	-1.8 pps
10 - **Part-time** (15-64, % of total employment)	10.0	10.1	9.3	10.3	9.7	-0.6 pps
Male	6.8	7.0	6.0	6.7	5.9	-0.8 pps
Female	13.7	13.7	13.1	14.5	14.3	-0.2 pps
11 **Involuntary part-time** (15-64, % of total employment)	1.0	1.3	1.3	1.1	0.6	-0.5 pps
12 - **Unemployment rate** (harmonised:15-74)	9.7	9.0	8.0	6.6	5.1	-1.5 pps
Young (15-24)	20.2	16.3	15.2	11.2	8.8	-2.4 pps
Prime age (25-49)	9.3	8.7	7.7	6.3	4.9	-1.4 pps
Older (55-64)	7.8	7.8	6.5	6.4	4.9	-1.5 pps
Low-skilled (15-64)	16.4	14.6	15.1	11.5	9.1	-2.4 pps
Medium-skilled (15-64)	10.5	10.0	8.1	6.8	5.6	-1.2 pps
High-skilled (15-64)	6.3	5.8	6.2	5.3	3.7	-1.6 pps
Nationals (15-64)	9.6	8.9	7.9	6.5	5.1	-1.4 pps
Non-nationals (15-64)	18.8	14.6	13.4	9.2	7.6	-1.6 pps
Male	9.0	8.1	7.5	5.8	4.6	-1.2 pps
Female	10.6	10.1	8.6	7.5	5.7	-1.8 pps
13 - **Long-term unemployment** (% of total unemployment)	54.5	52.3	53.3	47.5	42.9	-4.6 pps
14 - **Worked hours** (full-time, average actual weekly hours)	41.0	41.0	40.5	39.9	40.1	0.5 %
Male	41.5	41.6	41.2	40.5	40.7	0.5 %
Female	40.4	40.2	39.6	39.2	39.3	0.3 %
15 - **Sectoral employment growth** (% change)						
Agriculture	-1.7	-0.9	-1.3	-1.0	-0.5	0.5 pps
Building and construction	-1.1	0.6	-0.8	2.3	6.5	4.2 pps
Services	1.0	1.8	2.2	4.0	3.2	-0.8 pps
Manufacturing industry	0.2	1.7	3.1	3.7	4.6	0.9 pps
16 - **Indicator board on wage developments** (% change)						
Compensation per employee	1.2	1.5	3.1	3.0	3.9	0.9 pps
Real compensation per employee based on GDP	4.2	4.4	3.1	1.9	2.6	0.7 pps
Labour cost index (compens. of employees plus taxes minus subs.)	2.4	1.4	1.8	5.6	3.3	-2.3 pps
Labour cost index (wages and salaries, total)	2.5	1.0	1.4	5.1	3.6	-1.5 pps
Labour productivity (GDP/person employed)	2.3	0.9	1.3	1.8	0.9	-0.9 pps

Slovak Republic	2014	2015	2016	2017	2018	2017-2018
1 - **Population** (LFS, total, 1000 pers.)	5419	5422	5431	5438	5446	0.1 %
2 - **Population** (LFS, working age:15-64, 1000 pers.)	3853	3834	3810	3781	3749	-0.8 %
(% of total population)	71.1	70.7	70.2	69.5	68.8	-0.7 pps
3 - **Labour force** (15-64, 1000 pers.)	2707	2719	2738	2726	2713	-0.5 %
Male	1501	1493	1499	1489	1487	-0.1 %
Female	1206	1226	1239	1237	1225	-0.9 %
4 - **Activity rate** (% of population 15-64)	70.3	70.9	71.9	72.1	72.4	0.3 pps
Young (15-24)	31.0	31.7	32.4	33.2	32.3	-0.9 pps
Prime age (25-54)	87.3	87.3	87.6	86.6	86.5	0.0 pps
Older (55-64)	50.1	51.8	53.9	56.4	57.2	0.9 pps
Nationals (15-64)	70.2	70.9	71.8	72.1	72.3	0.3 pps
Non-nationals (15-64)	81.5	81.8	75.8	79.6	78.6	-1.1 pps
Male	77.6	77.5	78.3	78.2	78.7	0.5 pps
Young (15-24)	38.0	38.3	39.7	39.6	39.7	0.1 pps
Prime age (25-54)	94.0	93.6	93.5	93.1	93.2	0.0 pps
Older (55-64)	58.9	58.4	60.1	60.0	61.1	1.1 pps
Female	62.9	64.3	65.4	65.9	65.9	0.0 pps
Young (15-24)	23.6	24.9	24.7	26.5	24.5	-2.0 pps
Prime age (25-54)	80.4	80.8	81.5	79.8	79.7	-0.1 pps
Older (55-64)	42.2	45.8	48.2	53.0	53.7	0.6 pps
5 - **Employment rate** (% of population 15-64)	61.0	62.7	64.9	66.2	67.6	1.4 pps
Young (15-24)	21.8	23.3	25.2	26.9	27.5	0.6 pps
Prime age (25-54)	76.8	78.2	80.0	80.0	81.2	1.2 pps
Older (55-64)	44.8	47.0	49.0	53.0	54.2	1.3 pps
Low-skilled (15-64)	17.7	18.4	19.8	21.4	21.1	-0.3 pps
Medium-skilled (15-64)	66.9	68.6	70.9	72.5	74.1	1.6 pps
High-skilled (15-64)	75.6	76.5	77.3	78.5	79.3	0.8 pps
Nationals (15-64)	60.9	62.7	64.9	66.2	67.6	1.4 pps
Non-nationals (15-64)	77.8	77.3	69.7	75.0	70.4	-4.6 pps
Male	67.6	69.5	71.4	72.0	73.9	1.9 pps
Young (15-24)	26.9	28.4	31.9	32.4	34.0	1.6 pps
Prime age (25-54)	83.2	85.1	86.3	86.3	87.9	1.5 pps
Older (55-64)	53.2	53.6	55.1	56.6	58.4	1.7 pps
Female	54.3	55.9	58.3	60.3	61.2	0.9 pps
Young (15-24)	16.5	18.0	18.2	21.1	20.6	-0.6 pps
Prime age (25-54)	70.2	71.0	73.5	73.4	74.4	0.9 pps
Older (55-64)	37.2	41.0	43.5	49.6	50.4	0.8 pps
6 - **Employed persons** (15-64, 1000 pers.)	2349.2	2405.1	2471.7	2502.1	2533.3	1.2 %
7 - **Employment growth** (%, National accounts)	1.4	2.0	2.4	2.2	2.0	-0.2 pps
Employment growth (%, 15-64, LFS)	1.4	2.4	2.8	1.2	1.2	0.0 pps
Male	1.5	2.3	2.2	0.2	1.8	1.6 pps
Female	1.2	2.5	3.5	2.5	0.6	-1.9 pps
8 - **Self employed** (15-64, % of total employment)	15.2	14.9	15.2	15.0	14.6	-0.4 pps
Male	19.6	18.8	19.1	19.0	18.7	-0.3 pps
Female	9.7	10.0	10.4	10.2	9.6	-0.7 pps
9 - **Temporary employment** (15-64, % of total employment)	8.8	10.5	9.9	9.4	8.1	-1.3 pps
Male	9.0	9.8	9.7	9.1	7.5	-1.6 pps
Female	8.5	11.3	10.2	9.8	8.7	-1.1 pps
10 - **Part-time** (15-64, % of total employment)	5.1	5.8	5.8	5.8	4.9	-0.9 pps
Male	3.7	4.0	4.1	4.0	3.2	-0.8 pps
Female	6.8	8.0	7.9	8.0	7.0	-1.0 pps
11 **Involuntary part-time** (15-64, % of total employment)	1.7	1.7	2.0	1.8	1.3	-0.5 pps
12 - **Unemployment rate** (harmonised:15-74)	13.2	11.5	9.7	8.1	6.5	-1.6 pps
Young (15-24)	29.7	26.5	22.2	18.9	14.9	-4.0 pps
Prime age (25-49)	12.0	10.5	8.7	7.6	6.1	-1.5 pps
Older (55-64)	10.6	9.3	9.0	6.0	5.3	-0.7 pps
Low-skilled (15-64)	41.4	37.7	31.7	29.9	30.0	0.1 pps
Medium-skilled (15-64)	12.6	11.0	9.2	7.6	5.8	-1.8 pps
High-skilled (15-64)	6.4	6.1	5.7	4.2	3.1	-1.1 pps
Nationals (15-64)	13.2	11.6	9.7	8.2	6.6	-1.6 pps
Non-nationals (15-64)	0.0	0.0	0.0	0.0	0.0	0.0 pps
Male	12.8	10.3	8.8	7.9	6.1	-1.8 pps
Female	13.6	12.9	10.8	8.4	7.0	-1.4 pps
13 - **Long-term unemployment** (% of total unemployment)	70.2	65.8	60.2	62.4	61.7	-0.7 pps
14 - **Worked hours** (full-time, average actual weekly hours)	40.0	40.2	40.1	39.7	39.8	0.3 %
Male	40.9	40.9	40.8	40.5	40.5	0.0 %
Female	38.9	39.2	39.1	38.7	38.9	0.5 %
15 - **Sectoral employment growth** (% change)						
Agriculture	-2.1	1.3	-1.1	-0.3	-0.6	-0.3 pps
Building and construction	-1.4	-0.6	1.6	2.3	3.9	1.6 pps
Services	1.6	2.8	2.5	1.8	2.1	0.3 pps
Manufacturing industry	2.0	2.4	3.7	3.9	2.1	-1.8 pps
16 - **Indicator board on wage developments** (% change)						
Compensation per employee	1.8	3.5	2.1	5.2	5.4	0.3 pps
Real compensation per employee based on GDP	2.1	6.5	4.9	7.5	3.7	-3.8 pps
Labour cost index (compens. of employees plus taxes minus subs.)	5.2	3.4	2.9	6.7	6.9	0.2 pps
Labour cost index (wages and salaries, total)	5.4	3.7	2.8	6.1	6.7	0.6 pps
Labour productivity (GDP/person employed)	1.3	2.2	0.7	1.0	2.1	1.1 pps

Finland	2014	2015	2016	2017	2018	2017-2018
1 - **Population** (LFS, total, 1000 pers.)	5463	5481	5495	5508	5516	0.1 %
2 - **Population** (LFS, working age:15-64, 1000 pers.)	3472	3455	3445	3434	3421	-0.4 %
(% of total population)	63.6	63.0	62.7	62.3	62.0	-0.3 pps
3 - **Labour force** (15-64, 1000 pers.)	2617	2619	2615	2635	2665	1.1 %
Male	1344	1343	1350	1362	1375	0.9 %
Female	1274	1277	1265	1273	1290	1.4 %
4 - **Activity rate** (% of population 15-64)	75.4	75.8	75.9	76.7	77.9	1.2 pps
Young (15-24)	52.1	52.2	52.2	53.2	53.1	-0.2 pps
Prime age (25-54)	86.6	86.6	86.3	86.8	87.8	1.0 pps
Older (55-64)	63.8	65.2	66.4	67.8	70.3	2.4 pps
Nationals (15-64)	75.6	76.1	76.3	77.1	78.3	1.2 pps
Non-nationals (15-64)	68.8	67.9	67.3	68.7	68.9	0.2 pps
Male	76.8	77.2	77.7	78.5	79.5	1.0 pps
Young (15-24)	51.5	51.1	51.2	52.3	51.5	-0.9 pps
Prime age (25-54)	89.5	89.6	89.7	89.8	90.8	1.0 pps
Older (55-64)	61.9	63.2	65.2	67.5	69.7	2.2 pps
Female	73.9	74.4	74.1	74.9	76.3	1.4 pps
Young (15-24)	52.6	53.3	53.2	54.2	54.7	0.5 pps
Prime age (25-54)	83.6	83.6	82.8	83.6	84.6	1.0 pps
Older (55-64)	65.5	67.2	67.6	68.2	70.8	2.6 pps
5 - **Employment rate** (% of population 15-64)	68.7	68.5	69.1	70.0	72.1	2.1 pps
Young (15-24)	41.4	40.5	41.7	42.5	44.0	1.5 pps
Prime age (25-54)	80.5	80.0	79.9	80.6	82.5	1.8 pps
Older (55-64)	59.1	60.0	61.4	62.5	65.4	2.9 pps
Low-skilled (15-64)	39.3	37.9	38.6	38.5	39.5	1.0 pps
Medium-skilled (15-64)	70.6	70.2	70.6	71.1	73.2	2.0 pps
High-skilled (15-64)	83.3	82.9	82.9	84.4	86.2	1.8 pps
Nationals (15-64)	69.2	69.0	69.7	70.5	72.7	2.2 pps
Non-nationals (15-64)	56.7	55.9	55.5	58.2	57.7	-0.5 pps
Male	69.5	69.3	70.5	71.4	73.5	2.1 pps
Young (15-24)	39.8	38.2	40.1	41.3	42.6	1.2 pps
Prime age (25-54)	82.7	82.5	83.0	83.3	85.3	2.0 pps
Older (55-64)	56.8	57.4	59.8	61.6	64.3	2.6 pps
Female	68.0	67.7	67.6	68.5	70.6	2.1 pps
Young (15-24)	43.0	42.8	43.3	43.7	45.5	1.8 pps
Prime age (25-54)	78.1	77.3	76.7	77.9	79.5	1.7 pps
Older (55-64)	61.4	62.5	63.0	63.4	66.5	3.1 pps
6 - **Employed persons** (15-64, 1000 pers.)	2385.9	2367.9	2379.5	2402.6	2464.8	2.6 %
7 - **Employment growth** (%, National accounts)	-0.5	-0.1	0.5	1.0	2.5	1.5 pps
Employment growth (%, 15-64, LFS)	-0.7	-0.8	0.5	1.0	2.6	1.6 pps
Male	-1.1	-0.7	1.6	1.0	2.6	1.5 pps
Female	-0.4	-0.8	-0.6	0.9	2.6	1.7 pps
8 - **Self employed** (15-64, % of total employment)	12.6	12.7	12.4	11.6	11.6	-0.1 pps
Male	16.5	16.7	16.4	15.0	14.8	-0.2 pps
Female	8.4	8.5	8.2	8.1	8.2	0.1 pps
9 - **Temporary employment** (15-64, % of total employment)	15.4	15.1	15.6	15.8	16.2	0.4 pps
Male	12.3	12.3	12.9	12.9	13.1	0.2 pps
Female	18.2	17.8	18.2	18.6	19.2	0.6 pps
10 - **Part-time** (15-64, % of total employment)	14.1	14.1	14.9	15.1	15.1	0.0 pps
Male	9.2	9.7	10.0	9.9	10.0	0.1 pps
Female	19.3	18.7	20.2	20.5	20.6	0.1 pps
11 **Involuntary part-time** (15-64, % of total employment)	4.1	4.4	5.1	4.8	4.8	0.1 pps
12 - **Unemployment rate** (harmonised:15-74)	8.7	9.4	8.8	8.6	7.4	-1.2 pps
Young (15-24)	20.5	22.4	20.1	20.1	17.0	-3.1 pps
Prime age (25-49)	7.1	7.7	7.4	7.1	6.0	-1.1 pps
Older (55-64)	7.3	8.0	7.5	7.8	6.9	-0.9 pps
Low-skilled (15-64)	18.0	18.7	17.6	18.9	16.7	-2.2 pps
Medium-skilled (15-64)	9.5	10.4	9.7	9.6	8.4	-1.2 pps
High-skilled (15-64)	5.1	6.1	5.9	5.3	4.3	-1.0 pps
Nationals (15-64)	8.5	9.3	8.7	8.6	7.2	-1.4 pps
Non-nationals (15-64)	17.6	17.6	17.6	15.2	16.2	1.0 pps
Male	9.3	9.9	9.0	8.9	7.4	-1.5 pps
Female	8.0	8.8	8.6	8.4	7.3	-1.1 pps
13 - **Long-term unemployment** (% of total unemployment)	22.4	24.6	25.9	24.4	21.9	-2.5 pps
14 - **Worked hours** (full-time, average actual weekly hours)	38.4	38.5	38.8	38.7	38.5	-0.5 %
Male	39.8	40.0	40.2	40.0	39.8	-0.5 %
Female	36.7	36.7	37.1	37.0	37.0	0.0 %
15 - **Sectoral employment growth** (% change)						
Agriculture	-0.9	-2.8	-3.1	-0.5	-0.1	0.4 pps
Building and construction	-1.3	1.8	4.8	3.6	4.4	0.8 pps
Services	0.4	-0.2	0.8	1.2	2.9	1.7 pps
Manufacturing industry	-2.8	-1.5	-0.9	0.1	1.6	1.5 pps
16 - **Indicator board on wage developments** (% change)						
Compensation per employee	1.0	1.4	1.1	-1.0	1.0	1.9 pps
Real compensation per employee based on GDP	2.9	2.5	2.5	0.5	1.2	0.6 pps
Labour cost index (compens. of employees plus taxes minus subs.)	1.7	1.4	0.6	-0.7	1.5	2.2 pps
Labour cost index (wages and salaries, total)	1.5	1.2	0.2	0.4	2.1	1.7 pps
Labour productivity (GDP/person employed)	-0.2	0.6	2.3	2.0	-0.8	-2.8 pps

Sweden	2014	2015	2016	2017	2018	2017-2018
1 - **Population** (LFS, total, 1000 pers.)	9696	9799	9923	10058	10175	1.2 %
2 - **Population** (LFS, working age:15-64, 1000 pers.)	6141	6170	6214	6290	6347	0.9 %
(% of total population)	63.3	63.0	62.6	62.5	62.4	-0.2 pps
3 - **Labour force** (15-64, 1000 pers.)	5005	5044	5100	5190	5264	1.4 %
Male	2612	2624	2658	2709	2744	1.3 %
Female	2393	2420	2442	2481	2519	1.5 %
4 - **Activity rate** (% of population 15-64)	81.5	81.7	82.1	82.5	82.9	0.4 pps
Young (15-24)	55.4	55.1	54.8	54.7	54.2	-0.5 pps
Prime age (25-54)	90.8	90.9	90.9	91.2	91.6	0.3 pps
Older (55-64)	78.2	78.7	79.7	80.5	81.6	1.1 pps
Nationals (15-64)	82.2	82.5	82.9	83.2	83.7	0.5 pps
Non-nationals (15-64)	73.5	73.1	73.7	75.9	75.9	0.0 pps
Male	83.6	83.5	83.9	84.3	84.6	0.3 pps
Young (15-24)	54.9	53.8	54.2	54.1	53.1	-1.0 pps
Prime age (25-54)	93.5	93.3	93.3	93.6	93.9	0.2 pps
Older (55-64)	81.5	81.8	82.5	83.2	84.4	1.2 pps
Female	79.3	79.9	80.2	80.7	81.2	0.5 pps
Young (15-24)	56.1	56.5	55.5	55.4	55.4	0.0 pps
Prime age (25-54)	88.0	88.4	88.5	88.8	89.2	0.4 pps
Older (55-64)	74.9	75.5	76.9	77.8	78.8	0.9 pps
5 - **Employment rate** (% of population 15-64)	74.9	75.5	76.2	76.9	77.5	0.7 pps
Young (15-24)	42.8	43.9	44.5	44.9	45.1	0.2 pps
Prime age (25-54)	85.4	85.6	85.9	86.3	86.8	0.4 pps
Older (55-64)	74.0	74.5	75.5	76.4	77.9	1.5 pps
Low-skilled (15-64)	45.9	46.0	45.8	46.5	46.6	0.0 pps
Medium-skilled (15-64)	80.2	80.9	81.6	82.6	83.4	0.9 pps
High-skilled (15-64)	87.3	87.7	88.1	88.1	88.9	0.8 pps
Nationals (15-64)	76.2	77.0	78.0	78.6	79.6	1.0 pps
Non-nationals (15-64)	58.4	57.7	57.6	59.8	59.0	-0.7 pps
Male	76.5	77.0	77.5	78.3	79.0	0.8 pps
Young (15-24)	41.6	42.4	43.1	43.9	43.5	-0.4 pps
Prime age (25-54)	87.9	87.9	88.1	88.5	89.1	0.7 pps
Older (55-64)	76.5	76.8	77.5	78.4	80.0	1.6 pps
Female	73.1	74.0	74.8	75.4	76.0	0.6 pps
Young (15-24)	44.0	45.5	45.9	46.0	46.8	0.8 pps
Prime age (25-54)	82.8	83.3	83.7	84.1	84.3	0.1 pps
Older (55-64)	71.5	72.1	73.5	74.4	75.8	1.3 pps
6 - **Employed persons** (15-64, 1000 pers.)	4597.5	4659.9	4735.6	4833.9	4921.3	1.8 %
7 - **Employment growth** (%, National accounts)	1.4	1.5	1.9	2.3	1.8	-0.5 pps
Employment growth (%, 15-64, LFS)	0.9	1.4	1.6	2.1	1.8	-0.3 pps
Male	0.7	1.2	1.6	2.3	1.9	-0.4 pps
Female	1.2	1.5	1.7	1.8	1.7	-0.1 pps
8 - **Self employed** (15-64, % of total employment)	9.1	8.9	8.7	8.6	8.4	-0.2 pps
Male	12.4	12.1	11.8	11.8	11.6	-0.2 pps
Female	5.4	5.4	5.3	5.1	5.0	-0.1 pps
9 - **Temporary employment** (15-64, % of total employment)	16.8	16.6	16.1	16.1	15.6	-0.5 pps
Male	14.7	14.9	14.5	14.5	14.0	-0.5 pps
Female	18.8	18.3	17.7	17.7	17.2	-0.5 pps
10 - **Part-time** (15-64, % of total employment)	24.6	24.3	23.9	23.3	22.8	-0.5 pps
Male	12.8	13.2	13.0	13.1	13.1	0.0 pps
Female	37.3	36.3	35.6	34.4	33.3	-1.1 pps
11 **Involuntary part-time** (15-64, % of total employment)	7.3	7.1	6.8	6.3	5.4	-0.8 pps
12 - **Unemployment rate** (harmonised:15-74)	7.9	7.4	6.9	6.7	6.3	-0.4 pps
Young (15-24)	22.9	20.4	18.9	17.9	16.8	-1.1 pps
Prime age (25-49)	6.0	5.8	5.5	5.4	5.3	-0.1 pps
Older (55-64)	5.4	5.3	5.3	5.1	4.5	-0.6 pps
Low-skilled (15-64)	20.0	19.7	19.7	19.4	19.9	0.5 pps
Medium-skilled (15-64)	7.1	6.4	5.8	5.2	4.6	-0.6 pps
High-skilled (15-64)	4.4	4.3	4.1	4.1	3.6	-0.5 pps
Nationals (15-64)	7.2	6.6	5.9	5.5	4.9	-0.6 pps
Non-nationals (15-64)	20.6	21.1	21.8	21.3	22.3	1.0 pps
Male	8.2	7.5	7.3	6.9	6.4	-0.5 pps
Female	7.7	7.3	6.5	6.4	6.3	-0.1 pps
13 - **Long-term unemployment** (% of total unemployment)	19.0	20.8	19.4	19.6	19.9	0.3 pps
14 - **Worked hours** (full-time, average actual weekly hours)	39.2	39.1	39.4	39.1	39.0	-0.3 %
Male	39.9	39.8	40.1	39.8	39.7	-0.3 %
Female	38.1	37.9	38.3	38.0	38.0	0.0 %
15 - **Sectoral employment growth** (% change)						
Agriculture	-0.1	-1.6	-2.9	-0.4	-4.1	-3.7 pps
Building and construction	2.5	2.9	1.8	5.5	4.2	-1.3 pps
Services	1.5	2.5	1.8	2.2	2.6	0.3 pps
Manufacturing industry	-1.1	-4.3	-1.8	1.7	1.0	-0.7 pps
16 - **Indicator board on wage developments** (% change)						
Compensation per employee	2.2	2.7	2.5	2.0	3.4	1.4 pps
Real compensation per employee based on GDP	3.8	2.3	1.3	2.4	0.3	-2.1 pps
Labour cost index (compens. of employees plus taxes minus subs.)	2.7	2.8	3.8	2.8	2.0	-0.8 pps
Labour cost index (wages and salaries, total)	2.5	2.5	2.6	2.3	1.5	-0.8 pps
Labour productivity (GDP/person employed)	1.2	2.9	0.8	-0.2	0.5	0.7 pps

United Kingdom	2014	2015	2016	2017	2018	2017-2018
1 - **Population** (LFS, total, 1000 pers.)	64597	65110	65648	66040	66466	0.6 %
2 - **Population** (LFS, working age:15-64, 1000 pers.)	41116	41287	41430	41539	41656	0.3 %
(% of total population)	63.6	63.4	63.1	62.9	62.7	-0.2 pps
3 - **Labour force** (15-64, 1000 pers.)	31532	31746	32025	32215	32442	0.7 %
Male	16754	16843	16982	17003	17102	0.6 %
Female	14778	14903	15043	15212	15340	0.8 %
4 - **Activity rate** (% of population 15-64)	76.7	76.9	77.3	77.6	77.9	0.3 pps
Young (15-24)	57.8	58.5	58.3	57.5	57.1	-0.4 pps
Prime age (25-54)	86.0	85.8	86.1	86.5	86.9	0.3 pps
Older (55-64)	63.5	64.4	65.8	66.4	67.5	1.1 pps
Nationals (15-64)	76.9	77.0	77.5	77.7	77.9	0.2 pps
Non-nationals (15-64)	74.9	75.9	75.9	76.5	77.5	1.1 pps
Male	82.2	82.2	82.4	82.3	82.6	0.3 pps
Young (15-24)	59.5	60.0	59.2	58.2	58.5	0.4 pps
Prime age (25-54)	92.2	91.9	92.2	92.4	92.5	0.1 pps
Older (55-64)	70.9	71.4	72.6	72.1	72.7	0.6 pps
Female	71.3	71.7	72.2	72.9	73.2	0.4 pps
Young (15-24)	56.1	57.0	57.5	56.8	55.6	-1.2 pps
Prime age (25-54)	79.9	79.8	80.1	80.8	81.3	0.5 pps
Older (55-64)	56.4	57.7	59.2	60.9	62.5	1.6 pps
5 - **Employment rate** (% of population 15-64)	71.9	72.7	73.5	74.1	74.7	0.6 pps
Young (15-24)	48.0	50.0	50.7	50.5	50.6	0.1 pps
Prime age (25-54)	82.1	82.4	82.9	83.8	84.3	0.5 pps
Older (55-64)	61.0	62.2	63.4	64.1	65.3	1.3 pps
Low-skilled (15-64)	55.0	55.9	58.3	59.6	61.1	1.6 pps
Medium-skilled (15-64)	72.7	73.3	73.8	74.2	74.4	0.1 pps
High-skilled (15-64)	84.3	84.7	84.9	85.0	85.3	0.3 pps
Nationals (15-64)	72.2	72.9	73.7	74.3	74.8	0.4 pps
Non-nationals (15-64)	69.4	71.0	71.5	72.4	74.0	1.5 pps
Male	76.8	77.6	78.2	78.6	79.1	0.6 pps
Young (15-24)	48.2	50.3	50.4	50.3	51.4	1.1 pps
Prime age (25-54)	88.0	88.3	89.0	89.6	89.8	0.2 pps
Older (55-64)	67.8	68.6	69.5	69.2	70.3	1.0 pps
Female	67.1	67.9	68.8	69.7	70.3	0.6 pps
Young (15-24)	47.8	49.7	51.1	50.8	49.9	-0.9 pps
Prime age (25-54)	76.2	76.6	77.0	78.1	78.8	0.7 pps
Older (55-64)	54.4	56.0	57.4	59.1	60.6	1.5 pps
6 - **Employed persons** (15-64, 1000 pers.)	29558.8	30019.6	30443.6	30785.5	31112.0	1.1 %
7 - **Employment growth** (%, National accounts)	2.4	1.7	1.5	1.0	1.2	0.2 pps
Employment growth (%, 15-64, LFS)	2.2	1.6	1.4	1.1	1.1	-0.1 pps
Male	2.2	1.5	1.4	0.7	1.0	0.3 pps
Female	2.2	1.6	1.4	1.6	1.1	-0.5 pps
8 - **Self employed** (15-64, % of total employment)	14.0	13.6	14.1	14.0	13.8	-0.2 pps
Male	18.0	17.4	17.9	17.7	17.4	-0.3 pps
Female	9.5	9.4	9.9	10.0	9.8	-0.2 pps
9 - **Temporary employment** (15-64, % of total employment)	6.3	6.1	5.9	5.6	5.5	-0.1 pps
Male	5.8	5.6	5.4	5.2	5.1	-0.1 pps
Female	6.8	6.5	6.5	6.1	5.8	-0.3 pps
10 - **Part-time** (15-64, % of total employment)	25.4	25.2	25.2	24.9	24.6	-0.3 pps
Male	11.2	11.2	11.3	11.1	11.1	0.0 pps
Female	41.3	41.0	40.9	40.4	39.7	-0.7 pps
11 **Involuntary part-time** (15-64, % of total employment)	4.8	4.5	4.0	3.6	3.4	-0.3 pps
12 - **Unemployment rate** (harmonised:15-74)	6.1	5.3	4.8	4.3	4.0	-0.3 pps
Young (15-24)	17.0	14.6	13.0	12.1	11.3	-0.8 pps
Prime age (25-49)	4.6	4.0	3.6	3.2	3.0	-0.2 pps
Older (55-64)	4.0	3.4	3.7	3.5	3.3	-0.2 pps
Low-skilled (15-64)	11.7	10.0	8.6	7.6	6.6	-1.0 pps
Medium-skilled (15-64)	7.0	6.1	5.5	4.9	4.8	-0.1 pps
High-skilled (15-64)	3.2	3.0	3.0	2.8	2.5	-0.3 pps
Nationals (15-64)	6.2	5.3	4.8	4.3	4.0	-0.3 pps
Non-nationals (15-64)	7.2	6.5	5.8	5.3	4.6	-0.7 pps
Male	6.4	5.5	5.0	4.5	4.1	-0.4 pps
Female	5.8	5.1	4.7	4.2	4.0	-0.2 pps
13 - **Long-term unemployment** (% of total unemployment)	35.7	30.6	27.1	25.9	26.3	0.4 pps
14 - **Worked hours** (full-time, average actual weekly hours)	41.3	41.3	41.4	41.2	40.9	-0.7 %
Male	42.6	42.6	42.7	42.5	42.2	-0.7 %
Female	39.1	39.0	39.2	38.9	38.8	-0.3 %
15 - **Sectoral employment growth** (% change)						
Agriculture	16.6	-8.6	0.8	4.7	-7.8	-12.5 pps
Building and construction	3.3	2.5	3.8	4.2	1.2	-3.0 pps
Services	2.9	2.6	2.1	0.7	0.9	0.2 pps
Manufacturing industry	0.6	0.9	-0.4	1.6	1.8	0.2 pps
16 - **Indicator board on wage developments** (% change)						
Compensation per employee	0.6	1.1	2.8	3.1	2.7	-0.4 pps
Real compensation per employee based on GDP	2.1	0.9	2.8	2.8	-2.2	-5.0 pps
Labour cost index (compens. of employees plus taxes minus subs.)	1.5	4.2	1.5	3.1	3.3	0.2 pps
Labour cost index (wages and salaries, total)	1.6	3.8	1.8	2.7	3.0	0.3 pps
Labour productivity (GDP/person employed)	0.6	0.6	0.3	0.8	0.2	-0.6 pps

European Union (28 countries)	2014	2015	2016	2017	2018	2017-2018
1 - **Population** (LFS, total, 1000 pers.)	508293	509753	511308	512401	513691	0.3 %
2 - **Population** (LFS, working age:15-64, 1000 pers.)	329514	329008	328881	328157	327255	-0.3 %
(% of total population)	64.8	64.5	64.3	64.0	63.7	-0.3 pps
3 - **Labour force** (15-64, 1000 pers.)	238216	238629	239839	240670	241199	0.2 %
Male	128286	128473	129014	129324	129472	0.1 %
Female	109931	110155	110825	111346	111727	0.3 %
4 - **Activity rate** (% of population 15-64)	72.3	72.5	72.9	73.3	73.7	0.4 pps
Young (15-24)	41.7	41.6	41.6	41.6	41.7	0.0 pps
Prime age (25-54)	85.5	85.4	85.5	85.7	85.9	0.2 pps
Older (55-64)	55.9	57.3	59.1	60.6	61.9	1.4 pps
Nationals (15-64)	72.3	72.6	73.1	73.5	73.8	0.3 pps
Non-nationals (15-64)	71.7	71.6	71.3	71.4	72.4	1.0 pps
Male	78.1	78.3	78.5	78.9	79.2	0.3 pps
Young (15-24)	44.4	44.2	44.0	44.0	44.3	0.3 pps
Prime age (25-54)	91.5	91.4	91.4	91.6	91.7	0.1 pps
Older (55-64)	63.9	65.0	66.6	67.8	69.1	1.3 pps
Female	66.5	66.8	67.3	67.8	68.2	0.4 pps
Young (15-24)	38.9	38.8	39.0	39.1	38.9	-0.2 pps
Prime age (25-54)	79.5	79.4	79.6	79.7	80.1	0.3 pps
Older (55-64)	48.4	50.0	52.0	53.8	55.2	1.4 pps
5 - **Employment rate** (% of population 15-64)	64.8	65.6	66.6	67.6	68.6	0.9 pps
Young (15-24)	32.4	33.1	33.8	34.6	35.4	0.7 pps
Prime age (25-54)	77.4	78.0	78.7	79.6	80.4	0.8 pps
Older (55-64)	51.8	53.3	55.2	57.1	58.7	1.6 pps
Low-skilled (15-64)	43.3	43.7	44.5	45.5	46.3	0.8 pps
Medium-skilled (15-64)	68.4	69.0	69.9	70.9	71.6	0.7 pps
High-skilled (15-64)	82.0	82.7	83.4	84.0	84.5	0.5 pps
Nationals (15-64)	65.2	66.0	67.1	68.1	69.0	0.9 pps
Non-nationals (15-64)	59.9	60.8	61.5	62.5	64.1	1.5 pps
Male	70.1	70.8	71.8	72.9	73.8	0.9 pps
Young (15-24)	34.2	34.9	35.5	36.3	37.3	1.0 pps
Prime age (25-54)	83.1	83.8	84.6	85.5	86.2	0.7 pps
Older (55-64)	58.8	60.1	62.0	63.7	65.4	1.7 pps
Female	59.6	60.4	61.4	62.4	63.3	0.9 pps
Young (15-24)	30.6	31.3	32.0	32.8	33.3	0.4 pps
Prime age (25-54)	71.7	72.2	72.9	73.7	74.6	0.9 pps
Older (55-64)	45.2	46.9	48.9	50.8	52.4	1.6 pps
6 - **Employed persons** (15-64, 1000 pers.)	213486.0	215821.0	218991.8	221994.9	224407.6	1.1 %
7 - **Employment growth** (%, National accounts)	1.1	1.1	1.3	1.5	1.3	-0.2 pps
Employment growth (%, 15-64, LFS)	1.3	1.1	1.5	1.4	1.1	-0.3 pps
Male	1.1	1.1	1.5	1.3	1.0	-0.3 pps
Female	1.4	1.1	1.5	1.4	1.2	-0.3 pps
8 - **Self employed** (15-64, % of total employment)	14.4	14.1	14.0	13.7	13.5	-0.2 pps
Male	18.2	17.8	17.5	17.2	16.9	-0.3 pps
Female	9.9	9.9	9.9	9.7	9.6	-0.1 pps
9 - **Temporary employment** (15-64, % of total employment)	13.9	14.1	14.2	14.3	14.2	-0.1 pps
Male	13.5	13.8	13.8	13.9	13.6	-0.3 pps
Female	14.3	14.5	14.7	14.8	14.7	-0.1 pps
10 - **Part-time** (15-64, % of total employment)	19.6	19.6	19.5	19.4	19.2	-0.2 pps
Male	8.8	8.9	8.9	8.8	8.7	-0.1 pps
Female	32.2	32.1	31.9	31.7	31.3	-0.4 pps
11 **Involuntary part-time** (15-64, % of total employment)	5.8	5.7	5.4	5.1	4.8	-0.4 pps
12 - **Unemployment rate** (harmonised:15-74)	10.2	9.4	8.6	7.6	6.8	-0.8 pps
Young (15-24)	22.2	20.3	18.7	16.8	15.2	-1.6 pps
Prime age (25-49)	9.4	8.7	7.9	7.0	6.3	-0.7 pps
Older (55-64)	7.4	7.0	6.5	5.8	5.2	-0.6 pps
Low-skilled (15-64)	19.0	17.8	16.6	15.2	13.7	-1.5 pps
Medium-skilled (15-64)	9.5	8.8	7.9	7.0	6.3	-0.7 pps
High-skilled (15-64)	6.2	5.7	5.2	4.6	4.2	-0.4 pps
Nationals (15-64)	9.9	9.1	8.2	7.3	6.5	-0.8 pps
Non-nationals (15-64)	16.5	15.2	13.7	12.5	11.5	-1.0 pps
Male	10.1	9.3	8.4	7.4	6.6	-0.8 pps
Female	10.3	9.5	8.8	7.9	7.1	-0.8 pps
13 - **Long-term unemployment** (% of total unemployment)	49.6	48.5	46.8	45.1	43.5	-1.6 pps
14 - **Worked hours** (full-time, average actual weekly hours)	40.5	40.5	40.6	40.3	40.2	-0.2 %
Male	41.5	41.5	41.5	41.3	41.1	-0.5 %
Female	38.9	38.9	39.0	38.8	38.7	-0.3 %
15 - **Sectoral employment growth** (% change)						
Agriculture	-0.5	-3.2	-4.1	0.0	-2.5	-2.5 pps
Building and construction	-0.4	0.8	1.2	2.1	2.2	0.1 pps
Services	1.7	1.9	2.0	1.9	1.7	-0.2 pps
Manufacturing industry	0.3	0.4	1.4	1.8	1.4	-0.4 pps
16 - **Indicator board on wage developments** (% change)						
Compensation per employee	1.8	3.2	-0.5	1.0	2.4	1.4 pps
Real compensation per employee based on GDP	0.5	0.6	0.7	0.6	0.6	0.1 pps
Labour cost index (compens. of employees plus taxes minus subs.)	1.6	2.0	1.5	2.6	2.7	0.1 pps
Labour cost index (wages and salaries, total)	1.6	2.3	1.6	2.6	2.8	0.2 pps
Labour productivity (GDP/person employed)	0.7	1.2	0.7	1.0	0.7	-0.3 pps

Euro Area	2014	2015	2016	2017	2018	2017-2018
1 - **Population** (LFS, total, 1000 pers.)	338105	339115	340195	340940	341743	0.2 %
2 - **Population** (LFS, working age:15-64, 1000 pers.)	218536	218307	218797	218585	218216	-0.2 %
(% of total population)	64.6	64.4	64.3	64.1	63.9	-0.3 pps
3 - **Labour force** (15-64, 1000 pers.)	158017	158186	159348	159732	160136	0.3 %
Male	84895	84952	85472	85636	85740	0.1 %
Female	73123	73235	73876	74096	74397	0.4 %
4 - **Activity rate** (% of population 15-64)	72.3	72.5	72.8	73.1	73.4	0.3 pps
Young (15-24)	40.1	39.7	39.7	39.8	40.0	0.2 pps
Prime age (25-54)	85.4	85.3	85.5	85.5	85.6	0.2 pps
Older (55-64)	56.4	58.0	59.8	61.3	62.6	1.3 pps
Nationals (15-64)	72.4	72.7	73.1	73.4	73.6	0.2 pps
Non-nationals (15-64)	71.0	70.6	70.1	70.1	71.1	1.0 pps
Male	78.0	78.1	78.3	78.5	78.7	0.3 pps
Young (15-24)	42.6	42.1	41.9	42.1	42.6	0.6 pps
Prime age (25-54)	91.5	91.4	91.4	91.4	91.5	0.1 pps
Older (55-64)	63.7	65.2	66.9	68.1	69.3	1.2 pps
Female	66.6	66.9	67.4	67.7	68.0	0.3 pps
Young (15-24)	37.5	37.2	37.3	37.4	37.3	-0.1 pps
Prime age (25-54)	79.3	79.3	79.6	79.6	79.8	0.3 pps
Older (55-64)	49.5	51.1	53.1	54.8	56.3	1.5 pps
5 - **Employment rate** (% of population 15-64)	63.8	64.5	65.4	66.4	67.3	0.9 pps
Young (15-24)	30.6	30.8	31.4	32.3	33.3	0.9 pps
Prime age (25-54)	76.0	76.6	77.4	78.1	79.0	0.8 pps
Older (55-64)	51.7	53.3	55.3	57.1	58.8	1.6 pps
Low-skilled (15-64)	43.6	44.1	44.7	45.6	46.3	0.7 pps
Medium-skilled (15-64)	68.4	68.9	69.7	70.3	71.1	0.7 pps
High-skilled (15-64)	81.0	81.6	82.4	83.1	83.6	0.5 pps
Nationals (15-64)	64.4	65.1	66.1	67.1	67.9	0.8 pps
Non-nationals (15-64)	57.8	58.5	59.2	60.2	61.9	1.7 pps
Male	68.9	69.6	70.5	71.5	72.5	0.9 pps
Young (15-24)	32.3	32.4	33.0	33.9	35.2	1.3 pps
Prime age (25-54)	81.8	82.4	83.2	84.1	84.8	0.8 pps
Older (55-64)	58.0	59.5	61.5	63.2	64.9	1.7 pps
Female	58.7	59.4	60.3	61.2	62.1	0.9 pps
Young (15-24)	28.8	29.2	29.7	30.6	31.2	0.6 pps
Prime age (25-54)	70.3	70.8	71.6	72.2	73.1	0.9 pps
Older (55-64)	45.7	47.4	49.4	51.3	52.9	1.6 pps
6 - **Employed persons** (15-64, 1000 pers.)	139421.7	140774.3	143150.9	145055.7	146817.3	1.2 %
7 - **Employment growth** (%, National accounts)	0.6	1.0	1.4	1.6	1.5	-0.1 pps
Employment growth (%, 15-64, LFS)	0.9	1.0	1.7	1.3	1.2	-0.1 pps
Male	0.7	0.9	1.7	1.3	1.1	-0.2 pps
Female	1.2	1.0	1.6	1.3	1.4	0.0 pps
8 - **Self employed** (15-64, % of total employment)	14.2	14.0	13.8	13.5	13.3	-0.2 pps
Male	17.9	17.6	17.3	16.9	16.6	-0.3 pps
Female	9.9	9.9	9.9	9.7	9.5	-0.2 pps
9 - **Temporary employment** (15-64, % of total employment)	15.1	15.4	15.6	16.1	16.2	0.1 pps
Male	14.6	15.1	15.2	15.6	15.7	0.1 pps
Female	15.6	15.8	16.0	16.5	16.7	0.2 pps
10 - **Part-time** (15-64, % of total employment)	21.6	21.6	21.6	21.5	21.3	-0.2 pps
Male	9.2	9.3	9.4	9.4	9.3	-0.1 pps
Female	36.0	36.0	35.8	35.7	35.3	-0.4 pps
11 **Involuntary part-time** (15-64, % of total employment)	6.8	6.8	6.6	6.3	5.9	-0.4 pps
12 - **Unemployment rate** (harmonised:15-74)	11.6	10.9	10.0	9.1	8.2	-0.9 pps
Young (15-24)	23.7	22.3	20.9	18.8	16.9	-1.9 pps
Prime age (25-49)	11.0	10.3	9.5	8.6	7.8	-0.8 pps
Older (55-64)	8.4	8.1	7.6	6.8	6.2	-0.6 pps
Low-skilled (15-64)	20.6	19.4	18.2	16.8	15.2	-1.6 pps
Medium-skilled (15-64)	10.2	9.7	9.0	8.2	7.5	-0.7 pps
High-skilled (15-64)	7.3	6.9	6.2	5.5	5.1	-0.4 pps
Nationals (15-64)	11.1	10.4	9.6	8.7	7.8	-0.9 pps
Non-nationals (15-64)	18.6	17.2	15.6	14.1	13.0	-1.1 pps
Male	11.5	10.7	9.7	8.7	7.9	-0.8 pps
Female	11.8	11.0	10.4	9.5	8.6	-0.9 pps
13 - **Long-term unemployment** (% of total unemployment)	52.6	51.5	50.1	48.9	46.8	-2.1 pps
14 - **Worked hours** (full-time, average actual weekly hours)	40.4	40.4	40.4	40.2	40.2	0.0 %
Male	41.4	41.4	41.4	41.2	41.1	-0.2 %
Female	38.7	38.7	38.8	38.6	38.6	0.0 %
15 - **Sectoral employment growth** (% change)						
Agriculture	-0.2	-1.0	-0.3	-0.6	-0.4	0.2 pps
Building and construction	-1.3	0.2	0.3	1.8	2.6	0.8 pps
Services	1.1	1.7	1.9	2.1	1.8	-0.2 pps
Manufacturing industry	-0.4	0.2	0.9	1.2	1.5	0.3 pps
16 - **Indicator board on wage developments** (% change)						
Compensation per employee	1.4	1.4	1.3	1.6	2.1	0.5 pps
Real compensation per employee based on GDP	0.4	0.4	0.4	0.2	1.5	1.2 pps
Labour cost index (compens. of employees plus taxes minus subs.)	1.4	1.3	1.2	2.2	2.2	0.0 pps
Labour cost index (wages and salaries, total)	1.5	1.7	1.3	2.2	2.1	-0.1 pps
Labour productivity (GDP/person employed)	0.8	1.0	0.5	0.9	0.4	-0.5 pps

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