Chapter 5

Wage developments in the European Union during a severe economic downturn[1]

1. Introduction

Setting the scene.

In the current severe economic downturn, wage developments are of major concern for policy makers, social partners and the public in general.

There is a general consensus that wage issues matter for the success of the strategy to bring the European economy back to a path of smart, sustainable and inclusive growth.

Much of the current policy debate is focussed on the impact of wages on international competitiveness and aggregate demand, and their potential to contribute to the efforts to reverse rising poverty within the Member States and at the EU level as a whole.

Wage developments affect employment and social cohesion…

This chapter contributes to this debate by assessing wage developments before and during the crisis from a socio-economic perspective, and by highlighting the transmission mechanisms through which they impact the realization of the Europe 2020 targets of reaching a 75 % employment rate among 20-64 year-olds by 2020 and of reducing the number of people in or at risk of poverty and social exclusion by at least 20 million by 2020[2].

Both the demand and supply side of the economy, as well as the differential impact of 'average' national wages and their distribution must be considered when analysing the impact of wages on the Europe 2020 targets related to employment and social cohesion.

… via international cost competitiveness and external aggregate demand…

First, the impact of wages on external aggregate demand via the international cost competitiveness channel will be analysed.

In this analysis the developments in the nominal unit labour cost are the main focus. The nominal unit labour cost is defined as nominal compensation per employee adjusted for productivity in constant prices. Developments in the nominal unit labour cost have an impact on domestic inflationary cost-push pressures which affect international cost competitiveness (if compared with the developments in the nominal unit labour cost of the trading partners – yielding a measure called the 'the real effective exchange rate').

Developments in international cost competitiveness affect net exports which is an important determinant of external aggregate demand and thus also of effective employment.

… the labour income share and domestic aggregate demand…

Second, the impact of wages on domestic aggregate demand will be analysed. In this analysis the developments in the real unit labour cost are the main focus. The real unit labour cost is defined as the nominal unit labour cost deflated by the GDP deflator, which is also an indicator for the labour income share (i.e. the wage share).

Depending on the economic situation an increase in the labour income share (i.e. a decrease in the profit share) may provide stimulus to aggregate domestic demand[3], which is an important determinant of effective employment.

(1) By Eric Meyermans.

(2) More particularly, this chapter provides information on dimensions of the wage developments additional to those considered in the scoreboard of the Macroeconomic Imbalance Procedure (MIP). The policy relevance of these indicators in the context of monitoring the emergence of macroeconomic imbalances is discussed in more detail, for instance, in *European Commission* (2012).

(3) Provided that the marginal propensity to consume disposable household income is higher than the marginal propensity to invest profits.

This analysis also leads into dimensions of social cohesion. First, factor income distribution (measured by the real unit labour cost) is a major determinant of personal income distribution, whereas inflation, which may result from labour cost pressure (measured by the nominal unit labour cost) can have an impact on the purchasing power of non-indexed income, usually of the poor, who do not have the opportunity to diversify their wealth, thereby affecting their relative income situation within the population.

... labour costs and production decisions...

Third, the analysis also takes into consideration that on the supply side firms are willing to hire workers until the cost of producing one more unit of goods or services equals the revenue generated from producing one more unit of goods or services, that is, when real labour costs (i.e. nominal compensation per employee deflated by the producer price) equal productivity levels (which is measured by the real unit labour cost). When productivity increases, wages increase proportionally. However, when real labour costs increase above productivity levels, firms adjust either by increasing prices, if they have market power, decreasing working hours or decreasing headcount – creating involuntary unemployment which will put downward pressure on wages so that wages fall back in line with productivity. As this process takes place at sectoral and company level, the sectoral wage distribution and specificities can be important drivers of the sectoral employment composition, which in turn is an important driver of average national productivity and unit labour costs.

... wage distribution and social cohesion...

Fourth, the study of developments in national average wages described in the previous sections will be complemented by a study of developments in wage distribution along the personal and regional dimension which have an important impact on social cohesion within Member States and the EU as a whole.

Personal income distribution, including distribution along the gender dimension, is to a large extent related to factor income distribution, including both the wage and profit components. Regional income differences are largely determined by the regional concentration of factor income differentials.

... but their net outcomes are not always unambiguous.

The above-mentioned transmission mechanisms of wages on employment and social cohesion do not all point in the same direction and their impact may change with the prevailing macroeconomic environment. Box 1 briefly describes the conditions that affect the net outcome of wage developments.

Chapter outline

This chapter is organised as follows.

- Section 2 investigates how wages, in combination with productivity, affect employment through their impact on international cost competitiveness. In this analysis the focus is on developments in nominal unit labour costs within countries and with their trading partners. The analysis in this section and the following sections covers the period from 2001 until 2012.
- Section 3 examines the impact of wages together with productivity and prices on employment through their impact on the distribution of factor income and on factor demand in the production of goods and services. In this analysis the focus is on the real unit labour cost at the level of the economy.
- Section 4 studies the impact of wage distribution on social cohesion from the personal (i.e. gender) perspective, and from the standpoint of regions and labour market institutions (i.e. the minimum wage).
- Section 5 focuses on the composition of sectoral employment and its impact on 'average' national variables such as productivity and unit labour cost. In this analysis the focus is on nominal and real unit labour costs at the sectoral level.
- Section 6 draws some conclusions and assesses their policy implications.

There are also five annexes. Annex 1 defines various basic concepts used in this chapter. Annex 2 describes the data. Annex 3 sheds some light on the interaction between wages, productivity, prices and employment in imperfect markets. Annex 4 briefly discusses the scope and limitations of the indicators used. Annex 5 provides further details concerning the regional dimension of labour costs and productivity.

Box 1: Conditions affecting the setting and adjustment of wages

The classic theory

According to classical economic theory, firms are willing to hire workers until their marginal product equals their marginal costs, that is, when labour costs equal productivity levels. When productivity increases, wages will increase proportionally. However, when wages increase above productivity levels, firms adjust either by increasing prices (if they have market power), decreasing working hours or decreasing headcounts – creating involuntary unemployment which will put downward pressure on wages so that wages fall back in line with productivity.

Labour market imperfections

Labour market imperfections with respect to competition and information may have an important impact on the level at which wages, productivity and (un)employment reach their equilibrium (determining the so-called 'natural rate of unemployment').

For example, risk-averse workers may prefer to accept a wage that is on average lower than the wage level that would be equivalent to marginal productivity during economic upturns in exchange for the same wage which, during economic downturns, is above marginal productivity; younger workers may accept wages below their actual productivity under the implicit commitment by employers to increase their wages above productivity when they age so that they remain loyal to the firm and firm-specific human capital is not lost. See Annex 3 for other examples yielding similar results with regard to the discrepancy between real wages and productivity, including bargaining power, minimum wages, shirking, etc.

Wage versus employment adjustment

The above-mentioned imperfections may also delay the speed of adjustment, and there are significantly different views on how the equilibrium will be reached.

On the one hand, there is the view that one must focus on the long run, i.e. the period in which prices have cleared the markets. Discipline is needed in order to avoid the creation of obstacles that may hinder a smooth adjustment. This therefore requires the discipline to keep wages in line with productivity growth in the short, medium and long run, i.e. the so-called 'golden rule' for wages.

Other views acknowledge that prices will clear the markets in the long run but stress that it may take a long time before full adjustment has been reached if one leaves it to the self-correcting mechanisms of free markets. During this adjustment process wages and prices will adjust only sluggishly (due to a range of market imperfections, as discussed in Annex 4) so that it is quantities, including the quantity of employment, which will adjust in the short to medium-run. As this involves severe socio-economic costs there is a need to take the necessary measures to address the adjustment burden through appropriate policy measures, which may include wage policies that deviate from the 'golden rule.'

Depending on the scope of the adjustment needed one could give preference to one or the other strategy to resolve the adjustment process. Experience shows that in 'normal times' preference has been given to the first interpretation of adjustment – although it was not always practiced in this way. In such times unemployment is mainly the result of structural factors, not aggregate demand falling short.

Social dialogue

Collective wage bargaining is an important institutional feature that characterises wage setting in the European labour markets, taking place at different levels and with variations in the coverage of collective agreements, and conducted by autonomous social partners, with different national traditions and practices.

At its extremes, bargaining is characterized by complete centralisation with nation-wide determination of all wages, or by complete decentralisation with independent bargaining at the level of individual firms.

Coordination is characterised as horizontal or vertical. Horizontal coordination requires the synchronization of players at the same bargaining level , while vertical coordination refers to the synchronization across different bargaining levels required to achieve a consensus on a joint macroeconomic strategy.

Wage-indexation

Wage-indexation is another important institutional feature that characterizes wage setting in the European Labour markets.

Employers are highly critical of automatic price adjustment mechanisms because they prevent wages from reflecting actual worker productivity and productivity differences across economic sectors and geographical areas.

In contrast, trade unions strongly support wage indexation systems as they protect real wages against increases in the cost of living and guarantee fairness and social cohesion by ensuring a more equal distribution of income (redistribution from employers to workers).

Profit- or wage-led regime

The impact of wages on the demand side points in different directions, i.e. a wage increase (decrease) will increase (decrease) domestic demand, while it will decrease (increase) net exports [1]. If the former effect dominates the latter, the net impact of a wage increase (decrease) will be a rise (fall) in total demand, i.e. a wage-led regime; if the latter effect dominates the former effect, the net effect of a wage increase (decrease) will be a fall (rise) in total demand, i.e. a profit-led regime.

It is an empirical matter to investigate for each specific Member State and the European Union and the euro area overall whether they fall under wage-led or profit-led regimes.

(1) Provided that the marginal propensity to consume disposable household income is higher than the marginal propensity to invest profits.

2. International cost competitiveness: Nominal wages, productivity and derived indicators

The first transmission mechanism through which wages affect employment and social cohesion is the nominal unit labour cost (ULC), which is defined as nominal compensation per employee adjusted for labour productivity. Box 2 provides a brief overview of the main indicators used in this chapter.

Developments in nominal unit labour costs have two major effects:

- they have the potential to generate inflationary (deflationary) cost-push pressures domestically if nominal wages grow at a stronger (weaker) rate than labour productivity, raising the risk of a wage-price spiral effect;
- they affect a country's external balance and international cost competitiveness, which can be measured through the real effective exchange rate, defined as the country's nominal unit labour cost compared with a trade-weighted average of the nominal unit labour costs of its trading partners (adjusted for nominal exchange rate fluctuations).

These two transmission mechanisms of wages on the internal and external balance, and hence on employment and social conditions, will be analysed in relation to nominal unit labour costs and derived indicators of domestic and external economic performance. The reference period will be 2001-12, with a special focus on the period from 2008 until mid-2012.

Annex 4 reflects on the scope and limitations of these indicators.

2.1. Nominal compensation per employee

Nominal compensation per employee refers to total remuneration, including gross wages and salaries (before the deduction of taxes and employee social security contributions), employers' social security contributions, and bonuses and overtime payments paid in cash or in kind by employers to employees in return for work performed by the latter during the accounting period.

Table 1 shows the evolution of nominal compensation per employee in the EU, the euro area and the Member States for the 2001-12 period.

In Table 1 and subsequent tables, quarterly growth rates measure growth compared with the same quarter in the previous year. The compound growth rates measure cumulative growth over the 2001-07 period, i.e. the period covering the run-up to the crisis, the 2008-11 period, i.e. the current economic downturn, and the 2001-11 period.

Box 2: Key indicators of the relationship between wages and employment

Note that when assessing wages (nominal compensation per employee) they should be corrected for:

- labour productivity, yielding the nominal unit labour cost (ULC);
- producer prices, yielding the real labour cost for producers;
- consumer prices and taxes, yielding real disposable labour income for households;
- labour productivity and prices combined, yielding the real unit labour cost (RULC);
- a weighting of average nominal wages of other countries, adjusted for productivity differences (and exchange rate fluctuations), yielding the real effective exchange rate (REER).

For further details see Annex 1.

Strong labour cost growth during the run-up to the crisis…

On average, compensation per employee grew by 20.2% in the European Union over the 2001-07 period. However, there were notable differences across Member States.

The highest growth rate by far was recorded for Romania (+340.5%), followed by the Baltic States (Latvia (+174.1%), Estonia (+130.6%), and Lithuania (+98.8%)). At the other end of the scale was Germany, which showed a very modest increase (+6.6%), followed at some distance by Austria (+15.6%) and Italy (+19.1%).

For most other Member States in the euro area, the growth rate hovered between 20% and 30%. Notable exceptions were Greece and Ireland, where the nominal compensation per employee rose by 41.3% and 47.7% respectively.

Denmark (+28.7%), Sweden (+27.6%) and the United Kingdom (+34.1%), which are outside the euro area, all showed growth rates well above the euro area average (which increased by 17.4%).

Most Member States that acceded to the EU in 2004 or later, except Cyprus and Malta and the countries mentioned above, recorded growth rates between 58% and 100%.

… but notable decreases since the onset of the crisis…

In contrast to the strong growth recorded in previous years, nominal compensation per employee grew by a modest 5.2% over the 2008-11 period.

With the onset of the crisis, growth in nominal compensation per employee decelerated markedly in most Member States. However, Germany, with growth of 6.6% over the 2001-07 period, chalked up growth of 8.3% over the 2008-11 period which was close to the 9.1% euro area average.

Table 1: Nominal compensation per employee

	Annual % change				Compound growth rate			% change on previous year					
								2011				2012	
	2008	2009	2010	2011	2001-2007	2008-2011	2001-2011	q1	q2	q3	q4	q1	q2
EU-27	0.7	-1.0	3.3	2.2	20.2	5.2	26.6	2.9	1.9	1.8	2.3	2.4	:
EURO	3.3	1.6	1.7	2.2	17.4	9.1	28.0	2.1	2.2	2.3	2.2	1.9	:
BE	3.6	1.2	1.4	3.1	21.3	9.6	32.9	3.3	2.6	3.5	3.2	3.1	3.0
BG	16.0	9.8	10.9	7.2	72.4	51.4	161.1	:	:	:	:	:	:
CZ	4.2	-1.1	3.8	1.6	58.4	8.7	72.1	2.8	3.0	2.0	2.1	3.6	2.3
DK	3.7	2.1	2.7	1.7	28.7	10.6	42.3	1.9	1.2	1.3	2.2	1.7	1.8
DE	2.2	0.4	2.5	3.0	6.6	8.3	15.4	3.0	3.4	2.9	2.8	2.3	2.3
EE	10.3	-3.1	2.3	-0.2	130.6	9.1	151.6	1.4	1.1	-0.4	3.8	4.8	:
IE	5.6	-1.2	-2.9	:	47.7	:	:	-0.4	-0.1	0.7	1.1	2.0	:
EL	6.2	4.2	-3.4	-3.2	41.3	3.5	46.2	-5.7	:	:	:	:	:
ES	6.6	4.3	0.2	0.5	24.3	12.0	39.2	0.4	-0.2	0.8	1.2	1.4	0.6
FR	2.6	1.8	2.3	2.8	23.3	9.8	35.5	2.7	2.8	2.9	3.0	2.2	1.9
IT	3.1	0.1	2.0	1.1	19.1	6.4	26.7	1.6	1.1	1.1	0.8	0.6	1.3
CY	3.2	5.4	-0.2	2.0	29.9	10.7	43.9	2.3	2.3	1.6	1.9	2.5	:
LV	16.5	-13.2	-5.1	16.9	174.1	12.2	207.5	18.8	16.6	20.9	15.4	2.9	3.0
LT	14.0	-10.0	-0.4	3.6	98.8	5.9	110.5	1.9	1.2	3.6	7.3	7.4	6.4
LU	2.4	2.4	2.5	2.1	23.9	9.7	36.0	4.0	2.0	1.1	1.9	1.5	:
HU	6.7	-1.3	-2.3	5.1	88.3	8.1	103.7	4.5	6.6	5.3	3.9	3.0	2.4
MT	5.0	3.7	-0.3	0.8	27.6	9.4	39.6	1.3	1.7	-0.6	1.1	1.0	1.3
NL	3.3	2.3	1.2	1.5	24.4	8.5	35.0	2.0	1.1	1.8	1.1	1.0	0.9
AT	3.2	1.9	1.2	1.9	15.6	8.4	25.4	1.7	1.9	1.9	2.0	2.5	3.0
PL	8.7	3.4	4.7	5.1	27.3	23.7	57.4	2.5	4.3	5.3	3.5	4.4	:
PT	3.0	2.8	1.5	-0.8	26.1	6.6	34.4	0.2	-1.4	-1.7	-0.7	-0.3	:
RO	30.2	-1.8	7.7	3.7	340.5	42.8	529.0	:	:	:	:	:	:
SI	7.2	2.4	3.9	1.6	65.3	15.9	91.5	2.9	2.4	1.6	0.5	0.4	-1.3
SK	6.8	3.9	4.5	0.9	70.2	17.0	99.2	1.9	0.6	1.0	0.2	1.8	2.7
FI	4.5	2.9	1.8	3.4	25.0	13.2	41.5	3.9	3.6	3.5	2.6	4.3	4.5
SE	1.6	1.7	3.1	0.9	27.6	7.5	37.1	:	:	:	:	:	:
UK	1.6	2.9	2.8	1.8	34.1	9.4	46.7	0.3	0.7	3.0	3.4	4.3	4.9

Source: DG EMPL calculations based on Eurostat National Accounts Labour productivity [nama_aux_lp and namq_aux_lp], and nominal unit labour cost [nama_aux_ulc and namq_aux_ulc].

Note: Break in series of LV, provisional series for EL.

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A notable development in the euro area was the sharp deceleration of compensation per employee in Greece and Portugal, down from respective compound growth rates of 41.3% and 26.1% during the 2001-07 period to 3.5% and 6.6% during the 2008-11 period [4].

In the Member States that acceded to the EU in 2004 or later, the deceleration in nominal compensation growth was even more remarkable: down in Romania and Latvia from respective rates of 340.5% and 174.1% over the 2001-07 period to 42.8% and 12.2% over the 2008-11 period.

... that persisted in some Member States during the first half of 2012.

In the first half of 2012, nominal compensation per employee continued to grow in all Member States for which data are available, except Slovenia. High labour cost growth was recorded for Lithuania as well as for Finland and the United Kingdom, albeit to a lesser extent than for the latter Member States. For Greece no data on nominal compensation per employee are available at the time of writing, however, the available data on hourly labour costs confirm that Greece continues its path of sharp decreases in nominal labour costs that started in the second quarter of 2010 [5].

Significant differences in labour costs are seen across Member States

Chart 1 shows the average national compensation per employee (€) in the Member States for which data are available for 2011.

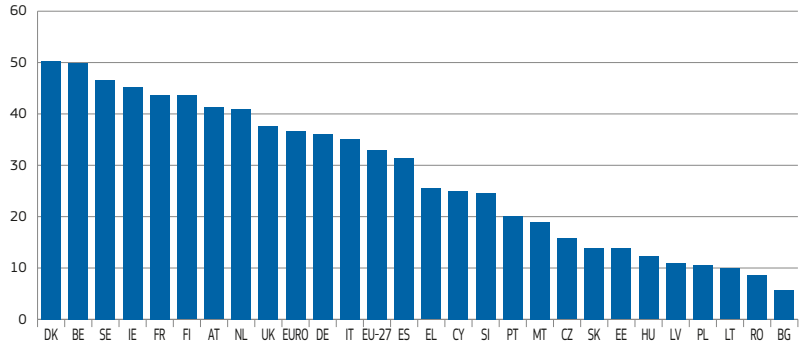
Compared across the EU, the average national compensation per employee is highest in Denmark and Belgium (at about €50 000 per annum), while it is lowest in Bulgaria, Romania and Lithuania (all below €10 000).

Within the euro area, Belgium (about €50 000) and Ireland (about €45 300) list the highest average compensation per employee. Slovakia (about €13 960), Portugal (about €20 130), and Slovenia (about €24 640) record the lowest numbers. Germany is closest to the euro average (about €36 650).

(4) For Ireland, the full range of 2008-2011 data is unavailable.

(5) According to flash GDP estimates for Greece for the 2nd quarter of 2012 published on 13 August 2012, real GDP on a non-seasonally-adjusted basis (NSA) fell by 6.2% year-on-year (YOY); thus, the rate of decline moderated somewhat in comparison to the 1st quarter of 2012 (YOY: -6.5%) and significantly with respect to the 4th quarter of 2011 (YOY: -7.5%). It is also worth noting that nominal GDP fell by 6.6% YOY in 2012-Q2, following a (revised) 6.1% YOY fall in 2012-Q1; this implies that the GDP deflator fell by 0.4% YOY in 2012-Q2, following an average YOY rise of 0.5% in 2012-Q1, 1.4% in 2011-Q4 and 1.6% in 2011.

Chart 1: Compensation per employee across the EU – 2011 (€1 000)



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Source: DG EMPL calculations based on Eurostat National Accounts [nama_nace10_c] and [nama_nace10_e] (Annex 2).

Note: IE and PL 2010 values. LU not available.

With the exception of Cyprus and Malta, in the Member States that acceded to the EU in 2004 or later, the average compensation per employee is highest in Slovenia (at about €24 640), and lowest in Bulgaria (about €5 780).

2.2. Productivity per person employed

Table 2 shows developments in labour productivity in the EU over the 2001-11 period.

Labour productivity is the ratio between the real value of output and the input of labour. In this sub-section, the input of labour is measured using the number of employed persons as the denominator [6].

In the long run, productivity (i.e. trend productivity) is determined by the available technology and the way in which resources are organised in the production process. The quality of human capital is of great significance in this process. In this respect it should be noted that wage developments can have an important impact on human capital formation by creating the incentive to acquire skills [7].

In the short run, cyclical deviations from trend productivity may be observed over the business cycle, due to the lag in the response of employment to changes in output levels [8]. In other words, during a downturn output decreases faster than employment and productivity falls. In contrast, during an upturn, output grows faster than employment and productivity increases. The slower adjustment of labour may be due to market rigidities, e.g. employment protection legislation, or to market perceptions that a downturn will be temporary, or to the attempt to limit firing and hiring costs by holding employment stable. In addition, employers may use their employees currently on the payroll with varying intensity (extra hours during peaks, reduced hours in troughs) before considering layoffs or hiring.

Robust productivity growth in the New Member States over the 2001-07 period…

In the EU as a whole labour productivity grew by 9.6 % over the 2000-07 period, but differences in performance were notable across the Member States.

Romania (+74.2 %) and the Baltic States (Estonia (+48.9 %), Latvia (+52.4 %) and Lithuania (+57.7 %)), had very strong compound productivity growth over the period 2000-07, while the other Member States that acceded to the EU in 2004, apart from Cyprus and Malta, also showed strong labour productivity growth, all close to or within the 30-40 % range. This strong growth primarily reflected the catch-up in productivity resulting from ongoing restructuring of the inefficient production structure inherited from the past and the expectation of accession to the EU in 2004.

In the Member States of the euro area – except Slovenia (26.6 %) and Slovakia (41.5 %) – productivity growth was more subdued, with only Ireland (12.6 %), Greece (17.2 %) and Finland (15.5 %) recording compound growth rates greater than 10 % during the 2001-07 period. Also striking was the very low productivity growth in Spain (0.1 %) and the decline in Italy (-0.6 %).

… but much weaker growth over the 2008-11 period, particularly in the euro area…

The EU as a whole recorded a very low 0.6 % increase in productivity over the 2008-11 period.

Most Member States of the euro area saw a decrease in their labour productivity over the 2008-11 period, with Luxembourg topping the list with a decline of 10 %, followed by Greece (-5.7 %), Italy (-2.8 %) and Austria (-1.5 %). Nevertheless, notable increases in labour productivity were recorded in Ireland (6.1 %), Spain (8.4 %) and Slovakia (+6.7 %).

With the exception of Malta, the Member States that acceded to the EU in 2004 or later showed positive productivity growth, with Bulgaria (12.3 %), Latvia (9.0 %) and Poland (9.4 %) chalking up very robust productivity growth.

Denmark (-1.3 %) and the United Kingdom (-2.3 %) saw their labour productivity decrease, while Sweden (2.3 %) showed a modest increase.

… followed by further weakening in the first half of 2012.

In the first half of 2012 the decline in labour productivity accelerated in almost all Member States for which data are available. Notable exceptions are Spain and the Baltic States, particularly Latvia and Lithuania, where labour productivity grew at a strong pace.

(6) Although it is considered appropriate to use the number of hours as the labour input indicator, the most common practice is to use the number of employees as the denominator because this data is easier to obtain. This may pose some problems if the number of employees is not expressed in full-time equivalents, and if part-time workers participate in the production process.

(7) See, for instance, Meager and Speckesser (2011).

(8) When analysing developments in productivity it should be recognized that the rule to measure productivity as GDP divided by the number of employed persons is an accounting rule: it does not constitute a behavioural relationship that indicates a direction of causality. I.e., it still allows that causality runs from (predetermined) productivity and GDP to a (endogenous) number of employed persons, from (predetermined) productivity and number of employed persons to (endogenous) GDP, or from (predetermined) GDP and number of employed persons to (endogenous) productivity.

Table 2: Labour productivity per employed person

	Annual % change				Compound growth rate			% change on previous year					
								2011				2012	
	2008	2009	2010	2011	2001-2007	2008-2011	2001-2011	q1	q2	q3	q4	q1	q2
EU-27	-0.6	-2.6	2.6	1.3	9.6	0.6	10.3	2.0	1.2	1.2	0.8	0.3	:
EURO	-0.4	-2.6	2.6	1.3	5.9	0.8	6.8	2.2	1.3	1.1	0.8	0.4	:
BE	-0.8	-2.6	1.7	0.4	7.2	-1.3	5.7	1.4	0.5	0.2	-0.2	-0.3	-0.5
BG	3.5	-2.9	5.3	6.1	28.8	12.3	44.6	7.8	6.3	6.4	3.5	2.5	3.1
CZ	0.8	-3.5	4.5	1.4	31.9	3.1	36.0	2.4	1.7	1.1	0.5	-0.6	-1.3
DK	-2.4	-3.5	3.6	1.2	6.3	-1.3	5.0	2.3	1.9	0.1	0.4	0.6	-0.5
DE	-0.1	-5.2	3.6	1.6	8.9	-0.3	8.6	3.3	1.6	1.3	0.6	-0.2	-0.2
EE	-4.3	-4.5	8.5	1.2	48.9	0.4	49.4	2.8	0.3	-0.8	0.3	0.5	:
IE	-1.9	1.2	4.0	2.8	12.6	6.1	19.5	2.2	4.8	3.3	3.9	3.4	:
EL	-0.9	-3.0	-1.7	-0.2	17.2	-5.7	10.6	-0.5	:	:	:	:	:
ES	1.0	3.0	2.2	2.0	0.1	8.4	8.5	1.7	1.3	2.4	2.6	2.9	2.8
FR	-0.6	-1.9	1.7	1.2	7.6	0.4	8.0	1.9	1.1	1.0	0.9	0.1	0.2
IT	-1.4	-3.9	2.5	0.1	-0.6	-2.8	-3.4	1.3	0.4	-0.3	-0.5	-0.8	-2.1
CY	1.4	-1.3	1.1	0.0	4.7	1.2	6.0	0.4	0.5	-0.6	-0.2	0.9	0.5
LV	-4.2	-5.3	4.7	14.8	52.4	9.0	66.2	13.4	14.4	15.9	14.6	3.2	2.7
LT	3.6	-8.6	6.9	3.8	57.7	5.1	65.6	4.4	2.3	4.5	4.2	2.2	1.8
LU	-3.8	-6.2	0.8	-1.1	5.6	-10.0	-5.0	-0.4	-2.0	-0.3	-1.5	-2.3	:
HU	2.4	-4.2	0.9	1.3	29.1	0.3	29.4	1.8	1.5	0.9	1.1	-1.7	-1.9
MT	1.4	-2.1	1.0	-0.5	3.4	-0.2	3.2	0.6	0.5	-0.4	-2.6	-3.4	-0.8
NL	0.3	-3.0	2.0	0.3	8.1	-0.5	7.6	1.2	0.9	0.3	-1.0	-0.9	-0.7
AT	-0.5	-3.1	1.2	1.0	9.4	-1.5	7.8	2.1	1.9	0.3	-0.4	-0.5	-0.6
PL	1.2	1.2	3.4	3.3	26.6	9.4	38.4	2.7	4.0	3.7	3.2	2.8	2.1
PT	-0.5	-0.3	3.0	-0.1	6.2	2.1	8.4	0.9	-0.3	-1.2	0.0	1.9	1.0
RO	7.3	-4.7	-0.2	2.0	74.2	4.1	81.3	:	:	:	:	:	:
SI	0.8	-6.1	3.5	2.2	26.6	0.1	26.7	4.2	3.4	2.7	0.2	0.0	-1.3
SK	2.4	-3.0	5.8	1.5	41.5	6.7	51.0	1.6	1.3	1.3	2.0	2.4	2.6
FI	-2.2	-6.1	3.4	1.6	15.5	-3.5	11.4	3.7	0.7	2.7	-0.7	1.0	-0.1
SE	-1.5	-2.7	5.0	1.7	17.0	2.3	19.8	3.2	2.4	1.8	-0.4	0.9	1.8
UK	-1.7	-2.4	1.6	0.2	15.5	-2.3	12.8	-0.1	-0.3	0.9	0.5	-0.3	-1.4

Source: DG EMPL calculations based on Eurostat, National Accounts, Labour productivity [nama_aux_lp and namq_aux_lp].

Note: Break in series of LV, provisional series for EL.

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2.3. Nominal unit labour cost

Table 3 shows the average nominal unit labour costs for each country, measuring nominal compensation per employee, adjusted for labour productivity per employed person over the period from 2001 until mid-2012 [9].

Strong differences in nominal unit labour cost growth across Member States over the 2001-07 period…

In the EU as a whole, the nominal unit labour cost increased by 9.9% over the 2001-07 period, while it increased by 10.9% in the euro area over the same period.

In the euro area, Ireland and Slovenia (both +31.6%) recorded the strongest growth (well above a sustainable rate just under 2% per annum), followed by Spain (+24.2%), Slovakia (+21.3%), Greece (+20.7%) and Portugal (18.8%). In Belgium (13.2%) and France (14.7%) developments were closely in line with a 2% per annum inflation target. In Austria the nominal unit labour cost increased by a modest 5.5%, while in Germany it decreased by -2.2%.

The Member States that acceded to the EU in 2004 or later recorded strong compound increases, with 166.3% in Romania followed by 86.3% in Latvia at the upper end of the scale, a modest 20.8% in the Czech Republic and 21.3% in Slovakia, and the very low increase of 0.5% in Poland at the lower end of the scale.

… modest nominal unit labour cost growth in most Member States during the 2008-11 period…

The overall increase in nominal unit labour costs was modest in most Member States during the 2008-11 period, however Bulgaria and Romania were notable exceptions, with increases exceeding 20% over this period. In Denmark (11.6%), Luxembourg (21.0%), Slovenia (15.2%), Finland (16.5%) and the United Kingdom (11.8%), the increases were in excess of 10%.

Several Member States of the euro area showed a notable decrease in their nominal unit labour costs, particularly in 2010 and 2011. Most notably, negative growth accelerated in Greece from -1.7% in 2010 to -3.0% in 2011. In Germany the notable 8.3% increase over this period was mainly due to the strong upturn (by 5.6%) in 2009,

(9) See Annex 1 for a more detailed discussion of the definition of these basic concepts. Annex 4 provides a discussion of the theoretical limitations of using average productivity as a measure for marginal productivity (to which real wages must be equal according to the classical paradigm).

Table 3: Nominal unit labour cost

	Annual % change				Compound growth rate			% change on previous year					
								2011				2012	
	2008	2009	2010	2011	2001-2007	2008-2011	2001-2011	q1	q2	q3	q4	q1	q2
EU-27	1.3	1.6	0.7	0.9	9.9	4.6	14.9	0.9	0.7	0.6	1.5	2.1	:
EURO	3.7	4.2	-0.9	0.9	10.9	8.0	19.8	-0.1	0.9	1.2	1.4	1.5	:
BE	4.4	3.8	-0.3	2.7	13.2	11.0	25.6	1.9	2.1	3.3	3.4	3.4	3.5
BG	12.5	12.7	5.6	1.1	35.3	35.4	83.2	:	:	:	:	:	:
CZ	3.4	2.4	-0.7	0.2	20.8	5.4	27.2	0.4	1.3	0.9	1.6	4.2	3.6
DK	6.1	5.6	-0.9	0.5	21.1	11.6	35.2	-0.4	-0.7	1.2	1.8	1.1	2.3
DE	2.3	5.6	-1.1	1.4	-2.2	8.3	5.9	-0.3	1.8	1.6	2.2	2.5	2.5
EE	14.6	1.4	-6.2	-1.4	58.7	7.5	70.6	-1.4	0.8	0.4	3.5	4.3	:
IE	7.5	-2.4	-6.9	:	31.6	:	:	-2.6	-4.9	-2.6	-2.8	-1.4	:
EL	7.1	7.2	-1.7	-3.0	20.7	9.5	32.1	-5.2	:	:	:	:	:
ES	5.6	1.3	-2.0	-1.5	24.2	3.3	28.2	-1.3	-1.5	-1.6	-1.4	-1.5	-2.2
FR	3.2	3.7	0.6	1.6	14.7	9.4	25.5	0.8	1.7	1.9	2.1	2.1	1.7
IT	4.5	4.0	-0.5	1.0	19.8	9.2	30.8	0.3	0.7	1.4	1.3	1.4	3.4
CY	1.8	6.7	-1.3	2.0	24.0	9.4	35.6	1.9	1.8	2.2	2.1	1.6	:
LV	20.7	-7.9	-9.8	2.1	86.3	2.4	90.7	5.4	2.2	5.0	0.8	-0.3	0.3
LT	10.4	-1.4	-7.3	-0.2	27.6	0.7	28.5	-2.5	-1.1	-0.9	3.1	5.2	4.6
LU	6.2	8.6	1.7	3.2	17.3	21.0	41.9	4.4	4.0	1.4	3.4	3.8	:
HU	4.3	2.9	-3.2	3.8	47.8	7.8	59.4	2.7	5.1	4.4	2.8	4.7	4.3
MT	3.6	5.8	-1.3	1.3	23.0	9.6	34.8	0.7	1.2	-0.2	3.7	4.4	2.1
NL	3.0	5.3	-0.8	1.2	15.1	8.9	25.3	0.8	0.2	1.5	2.1	1.9	1.6
AT	3.7	5.0	0.0	0.9	5.7	9.9	16.2	-0.4	0.0	1.6	2.4	3.0	3.6
PL	7.5	2.2	1.3	1.8	0.5	13.3	13.8	-0.2	0.3	1.6	0.3	1.6	:
PT	3.5	3.1	-1.5	-0.7	18.8	4.4	24.0	-0.7	-1.1	-0.5	-0.7	-2.2	:
RO	22.9	2.9	7.9	1.7	166.3	38.8	269.6	:	:	:	:	:	:
SI	6.4	8.5	0.4	-0.6	31.6	15.2	51.6	-1.3	-1.0	-1.1	0.3	0.4	0.0
SK	4.4	6.9	-1.3	-0.6	21.3	9.5	32.8	0.3	-0.7	-0.3	-1.8	-0.6	0.1
FI	6.7	9.0	-1.6	1.8	8.3	16.5	26.2	0.2	2.9	0.8	3.3	3.3	4.6
SE	3.1	4.4	-1.9	-0.8	9.0	4.7	14.1	:	:	:	:	:	:
UK	3.3	5.3	1.2	1.6	16.4	11.8	30.2	0.4	1.0	2.1	2.9	4.6	6.3

Source: DG EMPL calculations based on Eurostat, National, Accounts, Unit labour Cost [nama_aux_ulc and namq_aux_ulc].

Note: Break in series of LV, provisional series for EL.

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which was only partly offset by the modest decrease (-1.1 %) recorded in the following year.

... which continued to weaken in several Member States in the beginning of 2012.

In several Member States for which data are available (at the time of writing) the growth rate for nominal unit labour costs was well below 2 % in the second quarter of 2012 (compared with the second quarter of 2011); included among these are Spain (-2.2 %), France (1.7 %), Latvia (0.3 %), the Netherlands (1.6 %), Slovenia (0.0 %) and Slovakia (0.1 %).

For the 10th consecutive quarter, Spain recorded a drop in its nominal unit labour cost, which was down by -2.2 % in the second quarter of 2012. In contrast, Slovakia ended a steady decline over the previous four quarters with a modest 0.1 % increase in the second quarter of 2012. Nominal unit labour costs in the United Kingdom spiked to 6.3 % in the second quarter of 2012, reinforcing the upward cost-push pressures that were observed in the first quarter of 2012.

No data for EU-27 or the euro area as a whole are available for the second quarter of 2012 (at the time of writing). Nevertheless, in the four quarters preceding the second quarter of 2012 the unit labour cost growth in these areas was very modest, i.e. below 2 % when compared with the same period in 2011.

2.4. Inflationary cost-push pressures

Average national nominal unit labour cost growth affects domestic price levels...

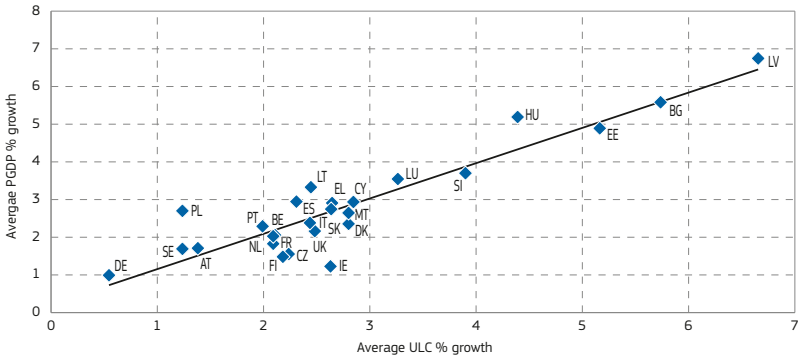
The nominal unit labour cost indicator gives an indication of domestic cost-push inflationary pressures.

When nominal unit labour costs (ULC) increase, it is an indication that nominal wages are increasing faster than productivity. When this occurs, there is the risk that prices may need to increase by more than the sustainable inflation target of just under 2 % per annum in the medium run in order to restore the equilibrium between wage costs and output revenue, assuming there are no structural changes which affect equilibrium labour income. In contrast, when nominal labour costs increase much less than productivity, there is the risk of deflationary pressures arising.

Chart 2 shows the strong correlation between ULC growth expressed in the national currency and inflation measured as the change in the GDP price deflator for each country, averaged over the 2001-11 period.

The correlation between the two variables is very high. Nevertheless, it is

Chart 2: ULC and GDP price deflator growth (2001-11 averages)



Source: DG EMPL calculations based on Eurostat, National Accounts, Labour productivity [nama_aux_ulc] and Price indices [nama_gdp_p].

Notes: 1) Outlier Romania omitted. 2) Coefficient of correlation is 0.92.

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important to note that this correlation does not necessarily indicate a causal relationship between ULC and inflation as suggested by the classical paradigm – see Annex 4.

... resulting in strong deflationary pressures in Ireland over the 2008-11 period

Table 4 describes developments in the GDP deflator in more detail for the Member States.

Changes in this deflator together with developments in productivity and nominal compensation have a direct impact on the labour income share (i.e. the real unit labour cost), which has a direct impact on employment, as discussed in the following sections.

Moreover, nominal unit labour cost developments generate inflationary pressures that may affect social cohesion within the Member States since inflation affects purchasing power and all nominal income streams that are not indexed to inflation, and this has a direct impact on social cohesion (as may be the case, for example, with minimum wages – see following sections).

Of note are the strong deflationary pressures that emerged in Ireland over the 2008-11 period, i.e. a compound decrease of 9.5%; this was also mirrored in the 2009-10 cost trend for nominal unit labour (see Table 3).

... and affecting purchasing power of wage earners.

Table 5 shows the changes in gross wages and salaries adjusted for changes in the harmonized consumer price index, henceforth labelled 'real wage.' Net of taxes and employee social security contributions, these real wages are an adequate measure of the evolution of the purchasing power of the average worker [10].

Strong real wage growth in the new Member States during the 2001-07 period...

With the exceptions of Cyprus and Malta, the Member States that acceded to the EU in 2004 or later for which data are available showed strong growth in real wages over the 2001-07 period.

The strongest compound growth by far was recorded in the Baltic States, i.e. Latvia (+122.6%), Estonia (+82.0%) and Lithuania (+76.7%).

The Czech Republic (+38.1%), Hungary (+35.5%) and Bulgaria (+31.5%) showed compound growth rates of between 30% and 40% over the 2001-07 period, while Slovakia (+24.4%) and Slovenia (+18.7%) recorded compound growth between 18% and 25%.

... Germany was the only Member State that recorded a decrease in its real wage over the 2001-07 period...

Among the other Member States, Ireland (18.8%) recorded the strongest increase, followed by the United Kingdom (+16.2%), Finland (+15.2%), Sweden (12.2%), Greece (12.1%) and Denmark (10.4%). The other Member States (except Germany) recorded increases of between 0% and 10%, with Portugal (+0.5%) at the lower end and Malta (9.3%), France (+8.5%) and Cyprus (+8.3%) at the upper end. Germany (-4.5%) was the only Member State that recorded a decrease in real wages over the 2001-07 period.

... and with the onset of the crisis, decreases in the real wages were strong in some Member States...

Over the 2008-11 period, Bulgaria (+25.7%) recorded the strongest increase in real wages by far, followed at some distance by Poland (+7.1%) and Slovakia (6.5%).

Among the other Member States, modest gains in real wages were recorded over the 2008-11 period for one small group which included Germany (+1.5%) and France (+1.7%).

In contrast, 13 Member States recorded decreases in their real wages. The Baltic States (Latvia (-10.5%), Estonia (-11.7%) and Lithuania (-12.7%)) and Greece (-12.0%) registered the most severe decreases by far. In the United Kingdom (-6.3%) and Hungary (-5.9%) the decreases were also sharp.

... yielding a diverse set of outcomes across Member States.

On balance, over the entire 2001-11 period, real wages decreased in Germany (-3.1%), Greece (-1.4%) and Italy -1.2%). The strongest increase was found in Latvia (+99.2%), followed by

(10) Employee compensation covers total remuneration – including gross wages and salaries (before deduction of taxes and employee social security contributions), employers social security contributions, as well as bonuses and overtime payments -, that is paid, in cash or in kind, by employers to employees in return for work performed by the latter during the accounting period. Compensation per employee is obtained by dividing compensation of employees by the number of employees.
Wages and salaries are defined as the total remuneration, in cash or in kind, paid to all persons on the payroll (including home workers), in return for work performed during the accounting period regardless of whether it is paid on the basis of working time, output or piecework and whether it is paid regularly or not. Included are taxes and employee social security contributions. See Annex 1 for more details.

Table 4: GDP deflator

	Annual % change				Compound growth rate			% change on previous year					
								2011				2012	
	2008	2009	2010	2011	2001-2007	2008-2011	2001-2011	q1	q2	q3	q4	q1	q2
EU-27	0.2	-1.5	2.3	1.5	15.1	2.5	17.9	0.7	-0.1	0.2	0.3	1.0	0.9
EURO	2.0	1.0	0.8	1.2	16.1	5.1	22.0	0.4	0.3	0.3	0.2	0.3	0.4
BE	2.1	1.2	2.0	2.0	16.3	7.5	25.1	0.5	0.4	0.4	0.4	1.0	0.2
BG	8.4	4.3	2.8	5.0	48.6	22.0	81.3	3.0	0.8	0.4	-7.4	4.2	3.5
CZ	1.9	1.9	-1.7	-0.7	16.7	1.4	18.3	-0.8	0.1	0.6	0.8	0.0	0.0
DK	4.2	1.0	3.9	0.8	17.1	10.2	29.1	0.4	-0.4	-0.3	0.8	1.1	0.4
DE	0.8	1.2	0.9	0.8	7.4	3.8	11.4	0.2	0.3	0.2	0.2	0.4	0.4
EE	5.4	-1.4	0.7	2.9	56.1	7.7	68.1	0.3	1.4	0.5	1.1	0.4	1.3
IE	-3.2	-4.6	-2.2	0.2	25.7	-9.5	13.7	2.2	0.5	-0.2	0.8	1.3	:
EL	4.7	2.8	1.7	1.6	23.2	11.2	37.0	-0.6	:	:	:	:	:
ES	2.4	0.1	0.4	1.0	32.2	3.9	37.4	0.2	0.2	0.1	0.3	-0.1	0.0
FR	2.5	0.7	1.1	1.3	15.4	5.7	22.0	0.3	0.4	0.3	0.5	0.2	0.6
IT	2.5	2.1	0.4	1.3	18.9	6.4	26.5	0.8	0.3	0.2	0.1	0.5	0.1
CY	4.6	0.1	1.7	2.0	26.4	8.6	37.3	-0.7	1.7	0.1	0.6	-1.3	2.7
LV	13.0	-1.2	-1.3	5.9	72.4	16.7	101.2	2.1	1.5	1.8	0.9	-0.8	0.9
LT	9.8	-3.7	2.0	5.3	25.1	13.6	42.1	2.9	1.8	-0.3	1.4	-0.5	2.3
LU	4.4	0.1	4.9	4.7	27.5	14.8	46.4	0.2	0.6	1.4	0.8	0.1	:
HU	5.3	3.6	3.1	3.3	49.7	16.2	74.0	0.0	0.9	2.2	1.0	-0.9	1.1
MT	3.0	2.4	2.9	2.3	20.0	11.0	33.2	0.9	-0.3	1.3	-0.2	1.2	-0.2
NL	2.1	0.1	1.1	1.2	19.1	4.6	24.6	0.4	0.1	0.5	0.6	-0.4	0.3
AT	1.7	1.5	1.6	2.2	12.4	7.2	20.5	0.5	0.4	0.4	0.4	0.5	0.7
PL	3.1	3.7	1.4	3.2	19.7	11.9	34.0	1.2	0.3	1.0	0.8	0.5	0.6
PT	1.6	0.9	1.1	0.7	22.9	4.4	28.2	0.6	-0.8	0.7	-0.2	0.7	-1.4
RO	15.3	4.2	6.0	8.1	239.4	37.7	367.3	3.3	1.0	2.2	1.8	-1.5	2.3
SI	4.1	3.6	-1.1	1.0	37.9	7.7	48.6	1.2	-0.1	0.5	1.1	-0.3	0.6
SK	2.9	-1.2	0.5	1.6	29.5	3.8	34.4	0.3	0.8	0.2	0.4	0.0	0.3
FI	2.9	1.5	0.4	3.1	8.6	8.1	17.5	1.7	0.8	0.0	0.7	1.0	1.2
SE	3.1	2.1	0.8	1.0	12.2	7.2	20.2	:	:	:	:	:	:
UK	3.0	1.3	2.8	2.6	17.7	10.0	29.5	0.9	0.4	0.2	0.7	0.8	0.9

Source: DG EMPL calculations based on Eurostat, National Accounts, Price indices [namq_gdp_p].

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Table 5: Gross wages and salaries adjusted for HCPI changes

	Annual % change											Compound growth rate		
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2001-2007	2008-2011	2001-2011
BE	1.3	1.4	0.2	-0.2	-0.4	1.2	1.0	-1.1	0.5	-1.2	-0.2	4.6	-2.0	2.5
BG	7.6	1.0	3.1	3.9	7.4	-2.8	8.3	1.1	9.5	10.6	2.6	31.5	25.7	65.3
CZ	4.3	6.1	7.7	5.9	2.3	3.8	3.0	-1.4	-0.8	2.6	0.2	38.1	0.6	38.9
DK	1.0	0.8	1.2	2.7	1.5	1.2	1.7	0.3	1.0	-0.4	-1.1	10.4	-0.2	10.3
DE	0.0	0.0	0.1	-1.3	-1.6	-1.0	-0.9	-0.5	-0.2	1.2	0.9	-4.5	1.5	-3.1
EE	4.2	4.9	10.2	9.2	6.8	9.6	18.1	-1.3	-4.7	-1.1	-5.1	82.0	-11.7	60.7
IE	3.5	0.6	2.7	2.9	3.3	1.6	2.9	2.2	1.0	-1.6	:	18.8	:	:
EL	-0.4	7.0	2.8	2.0	-1.5	1.4	0.4	-0.7	3.7	-9.7	-5.4	12.1	-12.0	-1.4
ES	:	:	:	:	:	:	:	:	:	:	:	:	:	:
FR	1.3	1.7	0.3	1.3	1.2	1.5	1.0	-0.6	1.4	0.7	0.1	8.5	1.7	10.3
IT	0.7	-0.6	-0.8	1.1	1.0	0.5	0.0	-0.9	-0.7	0.4	-1.9	1.9	-3.1	-1.2
CY	2.2	2.0	4.1	-1.2	0.0	0.8	0.2	-1.1	5.0	-2.8	-1.5	8.3	-0.7	7.5
LV	4.4	0.4	9.3	9.1	20.4	16.6	26.8	2.1	-17.6	-6.0	13.2	122.6	-10.5	99.2
LT	6.0	5.9	10.7	9.1	8.1	12.6	7.0	2.6	-14.3	-0.2	-0.5	76.7	-12.7	54.2
HU	8.1	9.2	6.6	4.2	3.2	1.9	-1.8	0.4	-4.0	-1.2	-1.1	35.5	-5.9	27.6
MT	2.1	0.6	2.4	0.4	-1.4	3.5	1.3	0.7	1.8	-2.5	-1.7	9.3	-1.8	7.3
NL	-0.6	-0.8	0.5	0.8	-0.1	0.8	1.7	0.8	1.1	0.1	-1.2	2.3	0.8	3.1
AT	-0.9	0.6	0.2	-0.3	0.2	1.5	1.1	0.3	1.3	-0.6	-1.7	2.5	-0.8	1.7
PL	:	:	:	:	0.6	0.9	2.3	6.1	-0.9	1.9	0.0	:	7.1	:
PT	0.1	-0.5	-0.1	-0.1	1.1	-1.2	1.3	-0.2	3.7	:	:	0.5	:	:
RO	:	:	:	:	:	:	:	:	-8.1	2.5	-0.7	:	:	:
SI	3.3	0.1	1.7	3.5	3.5	2.8	2.5	1.9	0.7	2.3	-0.5	18.7	4.5	24.0
SK	-1.7	5.0	0.2	1.2	6.6	4.1	7.1	1.5	3.7	3.5	-2.2	24.4	6.5	32.5
FI	1.8	0.1	2.1	3.6	2.7	1.9	2.2	0.5	1.3	0.9	-0.1	15.2	2.6	18.2
SE	0.5	0.9	0.3	2.5	2.4	2.2	2.8	0.9	0.9	0.2	1.6	12.2	3.7	16.4
UK	4.2	1.3	1.9	2.0	0.6	2.0	3.3	-1.9	-0.5	-1.9	-2.2	16.2	-6.3	8.8

Source: DG EMPL calculations on the basis of Eurostat, National Accounts, [nama_nace10_c and nama_nace10_e], Price Indices [prc_hicp_aind].

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Bulgaria (+65.3%), Estonia (60.7%) and Lithuania (+54.2%).

2.5. Real effective exchange rates

Table 6 shows developments in the real effective exchange rate over the 2001-12 period. An increase (decrease) in the indicator refers to an appreciation (depreciation) of the real effective exchange rate (REER), i.e. a loss (gain) of international cost competitiveness [11].

In the run-up to the crisis most Member States saw the appreciation of their real effective exchange rate…

All other variables being equal, Member States that experienced a strong increase in their unit labour cost also experienced a strong appreciation of their REER.

The strongest appreciation of the real effective exchange rate was found in Romania (+50.2%), followed by Estonia (+48.8%) and the Czech Republic (+47.8%). In these Member States the strong appreciation over this period to a large extent reflected the ongoing catch-up associated with the restructuring of their economies.

Germany (-4.6%), Poland (-0.5%) and Sweden (-1.8%) were the only Member States to end the 2001-07 period with a compounded depreciation of their real effective exchange rate, i.e. an improvement in their cost competitiveness.

Among the euro area Member States, Slovakia (+41.2%), Ireland (+36.9%) and Malta (+24.9%) showed the strongest compound appreciation over the 2001-07 period. Appreciation within the 15% to 20% bracket was found in Spain (20.2%), Italy (+19.8%), and Cyprus (+18.4%), while increases within the 10% to 20% bracket were found in France (13.3%), the Netherlands (12.6%), Greece (12.6%) and Belgium (10.4%). Austria (+0.3%), Slovenia (+6.2%) and Finland (+8.5%) showed very modest appreciation.

Among the Baltic Member States, Estonia (48.8%) showed the strongest appreciation, followed by Latvia (+38.6%) and Lithuania (+26.9%). Most of the other Member states that acceded to the EU in 2004 or later and that have not joined the euro area in the meantime recorded strong appreciation: Hungary (+45.3%) and Bulgaria (+28.2%).

… but this trend was reversed in several Member States with the onset of the crisis…

In several Member States the real effective exchange rate depreciated over the 2008-11 period. The most notable development was the sharp depreciation recorded in the United Kingdom (-18.6%), Ireland (-12.0%) and Hungary (-9.9%). Other Member States that recorded a depreciation in their real effective exchange rate were Spain (-5.7%), Latvia (-5.5%), Lithuania (-6.7%) and Malta (-0.58).

Germany lost some of the momentum observed over the 2001-07 period, i.e. an appreciation of 0.7% over the 2008-10 period compared to a depreciation of 4.6% over the 2001-07 period.

… which is expected to continue in 2012.

Based on information available as of early 2012, it is expected that the real effective exchange rate will continue to depreciate through 2012 in most Member States, with Greece and Ireland registering the strongest depreciation.

The impact of real effective exchange rates on employment.

The consensus view is that developments in the REER affect the trade balance of a country, i.e. an appreciation (depreciation) leads to a deterioration (improvement) of the trade balance.

Chart 3 shows the correlation between the average real effective exchange rate and the accumulated trade balance divided by GDP for the 2001-11 period. The negative correlation is supportive of the hypothesis that an appreciation (i.e. a rise in the REER) leads to a deterioration of the trade balance.

Changes in the trade balances are associated with changes in exports and imports, both of which have a direct impact on aggregate demand, suggesting that an appreciation of the real effective exchange rate results in a drop in aggregate demand, all other factors being equal. An appreciation therefore leads indirectly to a decline in employment, as employment is conditioned by aggregate demand. Chart 4 shows a negative correlation between employment and the real effective exchange rate.

(11) See Annex 4 for an assessment of the scope and limitations of this indicator.

Table 6: Real effective exchange rate

	2008	2009	2010	2011	2012	2001-2007	2008-2011	2001-2011
EU-27	1.7	-3.5	-7.3	1.0	-3.6	38.4	-8.1	17.9
EURO	3.2	4.1	-7.3	0.2	-3.0	19.7	-0.1	10.9
BE	2.7	0.9	-2.0	1.8	-0.1	10.4	3.4	11.8
BG	8.7	10.3	2.9	2.7	0.8	28.2	26.7	67.1
CZ	11.5	-5.5	2.2	2.0	-2.1	47.8	10.0	66.2
DK	4.2	3.9	-4.2	-1.3	-2.8	20.6	2.4	18.2
DE	-0.1	3.2	-4.2	0.5	-0.3	-4.6	-0.7	-9.3
EE	9.4	0.0	-7.0	-0.4	-0.1	48.8	1.5	40.5
IE	8.0	-5.0	-9.8	-4.9	-6.3	36.9	-12.0	8.6
EL	4.2	4.5	-4.0	-3.1	-10.6	12.6	1.2	9.4
ES	3.0	-1.3	-4.7	-2.6	-4.7	20.2	-5.7	8.0
FR	1.4	0.2	-1.5	1.1	-1.2	13.3	1.2	12.9
IT	2.5	1.7	-3.0	0.4	-1.3	19.8	1.5	18.0
CY	-0.8	3.9	-3.2	1.8	-2.9	18.4	1.6	16.3
LV	15.7	-9.2	-11.3	1.5	-1.5	38.5	-5.5	16.1
LT	5.3	-1.9	-8.5	-1.2	-2.4	26.9	-6.7	8.3
HU	0.7	-9.7	-3.3	2.3	-3.9	45.3	-9.9	26.6
MT	2.2	1.3	-3.6	-0.6	-3.4	24.9	-0.8	19.5
NL	1.2	2.6	-2.7	-0.2	-0.8	12.6	0.8	10.4
AT	0.5	1.9	-2.2	0.2	0.2	0.3	0.4	-1.5
PL	12.7	-19.3	9.3	-2.2	-2.6	-0.5	-2.8	5.7
PT	1.2	0.4	-2.6	-1.1	-5.4	11.6	-2.2	6.2
RO	8.0	-12.9	6.5	1.4	-3.4	50.2	1.5	62.3
SI	2.3	6.3	-1.2	-0.4	-2.3	6.2	7.0	12.2
SK	9.0	9.2	-3.0	-1.5	-1.6	41.2	13.8	55.8
FI	4.5	6.5	-4.4	-0.2	-1.3	8.5	6.2	10.1
SE	-3.1	-8.1	6.0	3.5	1.0	-1.8	-2.3	1.7
UK	-13.0	-9.2	3.2	-0.1	3.8	5.5	-18.6	-11.4

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Source: DG ECFIN-AMECO; historical values and 2012 forecast.

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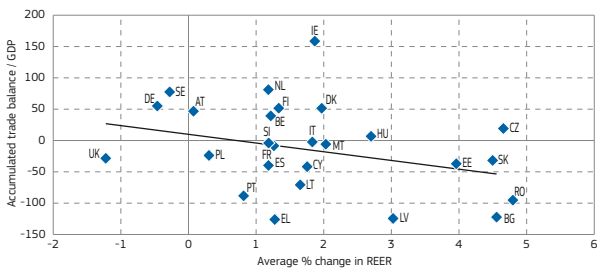
Notes: 1) Real effective exchange rates, based on unit labour costs (total economy). Performance relative to 35 industrial countries: double export weights. 2) A positive (negative) sign indicates an appreciation (depreciation) of the real effective exchange rate. 3) 2012 DG ECFIN forecast.

Chart 3: REER growth and cumulative trade balance (2001-11)



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Source: EMPL calculations based on DG ECFIN AMECO database (XUNRQ, UMGS, UVGD, UXGS).

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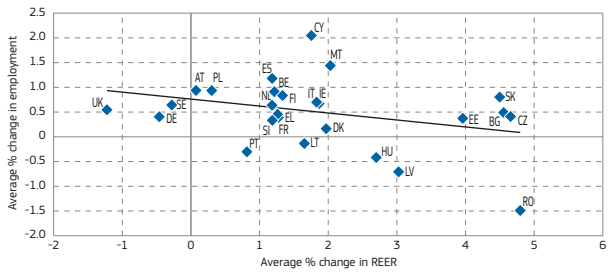
Notes: 1) A rise in REER indicates appreciation. 2) 2001-11 average of REER percentage change; cumulative trade balance (exports – imports) divided by GDP in market prices over the period 2001-11. 3) Coefficient of correlation is equal to -0.35.

Chart 4: REER and employment growth (2001-11 averages)



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Source: DG EMPL calculations based on Eurostat, National Accounts, Total employment (nama_nace06_e) and DG ECFIN AMECO database (XUNRQ).

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Notes: 1) Average annual percentage change over the 2001-11 period. 2) Coefficient of correlation is equal to -0.33.

3. Labour income share affecting demand and supply

3.1. Real unit labour cost

Changes in the real unit labour cost (RULC), which is equal to the nominal unit labour cost divided by the GDP deflator provide an indication of the evolution of [12]:

- the labour income share (or wage share) over time on the demand side;
- the real wage relative to labour productivity on the supply side.

Both dimensions have an important impact on employment and social cohesion as discussed in the following sub-section.

Table 7 shows data on the real unit labour cost for the 2001-12 period.

The real unit labour cost decreased notably during the run-up to the crisis…

Over the 2001-07 period the real unit labour cost showed a strong declining trend in most Member States, indicating that the labour income share was declining and that productivity was growing at a stronger pace than real labour costs.

Strong compound decreases in the real unit labour cost were found in Romania (-21.5%) and Poland (-16.3%), followed by Germany (-9.0%) and Luxembourg (-8.1%). Latvia (+8.0%) recorded the strongest increase, followed by the Czech Republic (+3.7%) and Ireland (+3.5%).

… but it recovered during the 2008-11 period…

During the 2008-11 period the trend reversed and most Member States recorded an increase in the real unit labour cost. Notable exceptions are the Baltic States, i.e. Estonia (-0.2%), Latvia (-10.9%) and Lithuania (-11.2%) as well as Hungary (-7.0%). In Greece (-1.7%), Spain (-0.5%), Malta (-1.2%) and Sweden (-2.5%) the decreases were fairly mild.

This temporary increase in the real unit labour cost reflects the fact that during an economic downturn, the nominal compensation per employee is less responsive to cyclical fluctuations than output or employment. The structural decline observed over a longer period is a reflection of various structural factors, including technological progress and globalisation [13].

… and stagnated in the beginning of 2012

Several Member States for which data were available at the time of writing showed a rise in their real unit labour cost in the beginning of 2012.

The United Kingdom showed the strongest increase, which is in line with the strong decrease in labour productivity and strong wage growth. The Czech Republic and Italy also recorded notable increases.

However, in Spain and Slovakia the real unit labour cost showed negative growth for the tenth consecutive quarter, while it fell for the fifth consecutive quarter in Latvia and the seventh consecutive quarter in Slovenia.

… the labour income share moved in the same direction

Chart 5 shows the adjusted labour income share (based on market prices) observed in 2001 and 2011 across the EU. Developments in the labour income share, based on market prices, correspond to the real unit cost discussed in the previous section. As a consequence, in Chart 5, the percentage differences between the 2001 and 2011 observations correspond with the compound growth rate over the 2001-11 period reported in Table 7.

In 2011 labour income shares above 60% were found in Slovenia (65.15%), the United Kingdom (63.59%) and Belgium (61.70%). The lowest labour income shares are below 50% and were found in Lithuania (+44.01%), Slovakia (+44.65%), Latvia (+47.22%), Poland (47.49%), Luxembourg (48.27%), and Hungary (49.36%).

(12) See Annex 1 for more details on this duality of the real unit labour cost.

(13) The wage share, which shows a long-term decline in Europe, was extensively discussed in European Commission (2007) and in the ILO (2011.a).

Table 7: Real unit labour cost

	Annual % change				Compound growth rate			% change on previous year					
								2011				2012	
	2008	2009	2010	2011	2001-2007	2008-2011	2001-2011	q1	q2	q3	q4	q1	q2
EU-27	1.1	3.1	-1.6	-0.5	-4.7	2.1	-2.8	-1.6	-0.7	-0.2	0.3	0.7	:
EURO	1.7	3.2	-1.7	-0.3	-4.5	2.9	-1.8	-1.3	-0.3	0.0	0.1	0.3	:
BE	2.2	2.6	-2.3	0.6	-2.5	3.1	0.4	-0.9	0.1	1.6	1.7	1.1	1.4
BG	3.7	8.1	2.7	-3.7	-8.8	10.9	1.2	:	:	:	:	:	:
CZ	1.5	0.5	1.0	0.9	3.7	4.0	7.8	2.1	2.8	1.5	0.8	2.6	2.2
DK	1.8	4.5	-4.6	-0.4	3.4	1.1	4.5	-2.3	-1.4	1.1	1.3	0.0	0.4
DE	1.5	4.4	-2.0	0.6	-9.0	4.5	-4.9	-0.9	0.8	0.7	1.3	1.4	1.3
EE	8.7	2.8	-6.8	-4.2	1.8	-0.2	1.6	-4.8	-3.8	-2.3	-0.5	0.9	:
IE	10.1	1.7	-4.6	:	3.5	:	:	-1.1	-4.3	-2.3	-5.9	-3.6	:
EL	2.2	4.3	-3.4	-4.5	-2.4	-1.7	-4.0	-5.6	:	:	:	:	:
ES	3.2	1.2	-2.4	-2.4	-6.1	-0.5	-6.6	-2.4	-2.6	-2.5	-2.2	-1.9	-2.5
FR	0.7	3.0	-0.4	0.3	-0.8	3.6	2.8	-0.5	0.3	0.6	0.6	0.7	0.1
IT	2.0	1.9	-0.9	-0.3	0.8	2.7	3.5	-1.0	-0.3	-0.1	-0.2	0.1	2.3
CY	-2.7	6.6	-2.9	0.0	-2.2	0.7	-1.5	0.4	-0.7	-0.1	0.4	0.5	:
LV	6.9	-6.7	-7.7	-3.2	8.0	-10.9	-3.8	1.1	-3.7	-1.2	-5.4	-3.9	-2.4
LT	0.6	2.4	-9.1	-5.2	1.7	-11.2	-9.8	-6.0	-6.8	-5.1	-2.7	2.7	1.7
LU	1.7	8.4	-3.0	-1.4	-8.1	5.4	-3.1	-2.2	-1.0	-2.7	0.4	0.8	:
HU	-0.9	-0.6	-6.1	0.5	-1.2	-7.0	-8.2	0.2	2.0	1.0	-1.3	1.4	0.8
MT	0.5	3.4	-4.1	-0.9	2.4	-1.2	1.2	-1.6	-1.6	-2.3	2.0	2.3	0.0
NL	0.9	5.2	-1.8	0.0	-3.5	4.2	0.6	-0.9	-0.5	0.5	0.5	1.1	0.5
AT	2.0	3.4	-1.6	-1.3	-6.1	2.4	-3.8	-2.7	-2.2	-0.5	0.6	1.2	1.6
PL	4.3	-1.4	-0.1	-1.4	-16.3	1.3	-15.2	-3.4	-2.1	-1.7	-2.9	-1.0	:
PT	1.9	2.2	-2.6	-1.4	-3.3	0.0	-3.3	-1.8	-2.0	-0.8	-1.0	-2.6	:
RO	6.6	-1.2	1.8	-5.9	-21.5	0.9	-20.8	:	:	:	:	:	:
SI	2.1	4.7	1.5	-1.6	-4.6	6.8	1.8	-1.6	-1.4	-2.2	-2.4	-0.8	-1.9
SK	1.5	8.2	-1.8	-2.2	-6.3	5.5	-1.2	-1.3	-2.6	-1.6	-3.4	-2.1	-0.8
FI	3.7	7.4	-2.0	-1.3	-0.1	7.7	7.7	-2.1	-1.1	-1.9	0.1	0.8	1.7
SE	-0.1	2.3	-2.9	-1.7	-2.9	-2.5	-5.2	:	:	:	:	:	:
UK	0.2	3.9	-1.6	-1.0	-0.9	1.4	0.5	-2.4	-1.8	-0.5	0.7	2.5	3.7

Source: DG EMPL calculations based on Eurostat, National Accounts, Unit labour Cost, [nama_aux_ulc and namq_aux_ulc].

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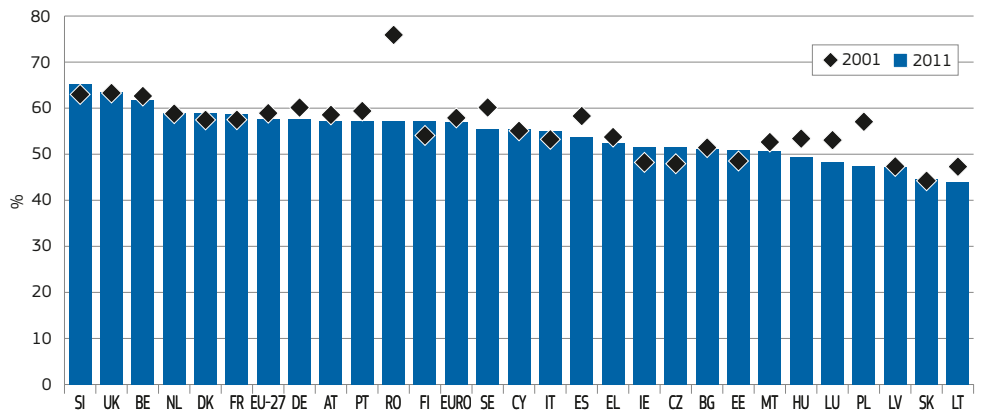
Chart 5: Adjusted labour income share based on market prices



Source: DG ECFIN AMECO database (ALCDO).

Note: Adjusted wage share: total economy: as percentage of GDP at current market prices (Compensation per employee as percentage of GDP at market prices per person employed).

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3.2. Household earnings

The previous sections referred to primary income distribution. For households, this refers to net earnings received after paying taxes and social security contributions which have a direct impact on their standard of living.

Chart 6 shows the net earnings of a single person without children across the EU in 2010. Earnings in the national currency are corrected for price differences across Member States, i.e. the purchasing power standard.

Household income is highest in Luxembourg, about 5.7 times the household income recorded in Bulgaria, which has the lowest level in the EU.

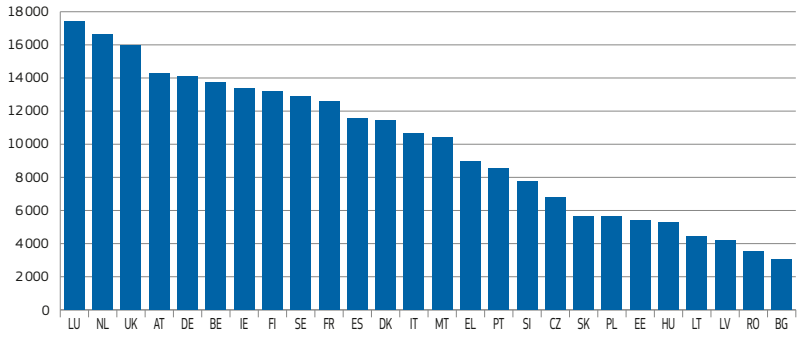
Apart from Cyprus and Malta, Slovenia recorded the highest net earnings of the Member States that joined the EU in 2004 or later, i.e. just over half the earnings of the Member States at the top of the ranking but 2.5 times the earnings recorded for Bulgaria.

Table 8 shows the development in net real earnings of a single person without children over time within the Member States, i.e. the nominal net earnings deflated by the harmonized consumer price index.

Among the Member States for which data are available, households in Slovenia showed the strongest increase in real purchasing power over the 2001-11 period, i.e. an increase of about 65%. In Ireland real net household income for persons without children decreased by 1.7% over the entire 2001-11 period, reflecting a -3.1% decrease over the 2001-07 period not offset by the 1.4% increase during the 2008-11 period.

Greece recorded a 39.1% increase in household income for single person without children over the 2001-07 period, which was counterbalanced by a 17.7% decrease during the 2008-11 period. Estonia (-8.3%), Hungary (-3.9%) and Belgium (-0.3%) also saw decreases in household income during the 2008-11 period.

Chart 6: Net earnings (single person without children, 50% of average wage, in purchasing power standard) – 2010



Source: Eurostat [earn_nt_net].

Notes: 1) Single person without children, 50% of AW.
2) The purchasing power standard, abbreviated as PPS, is an artificial currency unit. Theoretically, one PPS can buy the same amount of goods and services in each country.

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Table 8: Real net earnings growth (single parent without children)

					Compound growth rate		
	2008	2009	2010	2011	2001-2007	2008-2011	2001-2011
BE	-0.1	2.3	-1.5	-0.9	11.6	-0.3	11.3
BG	3.1	10.4	1.1	:	29.2	:	:
CZ	6.0	4.1	0.3	-2.2	35.5	8.3	46.7
DK	0.8	2.0	2.4	-1.1	11.4	4.1	15.9
DE	0.2	0.1	2.8	0.0	2.9	3.1	6.1
EE	2.6	-6.2	-2.8	-1.9	82.2	-8.3	67.1
IE	1.3	-1.9	2.5	-0.4	-3.1	1.4	-1.7
EL	-3.2	9.7	5.6	-26.7	39.1	-17.7	14.4
ES	4.1	3.3	-0.6	-2.1	1.9	4.7	6.7
FR	-0.6	1.4	-0.4	-0.4	11.4	0.0	11.4
IT	-0.4	0.9	0.3	-1.1	5.7	-0.4	5.3
CY	:	:	:	:	32.9	:	:
LV	9.6	-5.2	-2.3	:	85.4	:	:
LT	7.0	-8.3	-2.8	:	66.8	:	:
LU	0.0	4.0	-0.7	-3.8	5.8	-0.8	4.9
HU	1.5	-0.4	-2.1	-3.0	42.4	-3.9	36.8
MT	3.2	0.6	2.1	:	5.8	:	:
NL	-0.1	2.1	0.6	-0.5	24.9	2.1	27.5
AT	-1.3	4.4	-0.5	-2.3	5.9	0.1	6.0
PL	4.0	0.1	0.7	2.5	18.0	7.3	26.5
PT	1.2	3.8	-0.1	-2.6	20.6	2.2	23.3
RO	17.1	-1.6	4.0	:	73.4	:	:
SI	8.3	1.2	5.0	-1.1	45.3	13.8	65.3
SK	5.1	5.1	1.8	-3.4	14.7	8.6	24.6
FI	1.5	2.7	1.9	0.3	26.0	6.5	34.1
SE	2.6	2.4	0.8	0.5	24.9	6.3	32.8
UK	-2.0	-1.3	-1.0	-2.6	16.7	-6.7	8.9

Source: DG EMPL calculations based on Eurostat, [earn_nt_net] and Price Indices [prc_hicp_aind].

Note: Net nominal earnings adjusted for changes in HICP.

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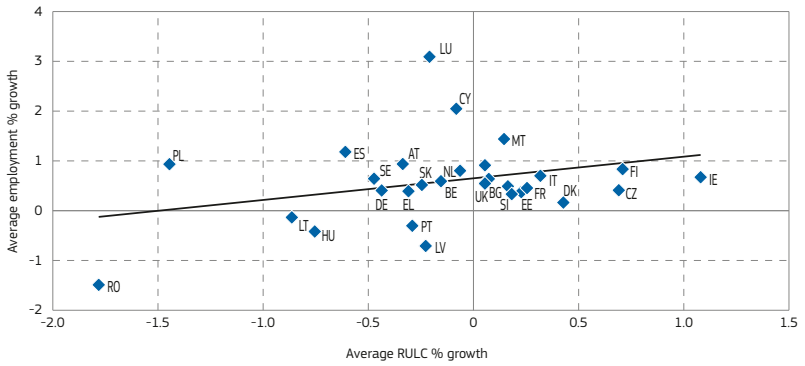
3.3. Impact of wages on both demand and supply side of employment

As discussed above, various points must be taken into account when assessing the impact on employment of changes in wages.

First, due consideration must be given to the specific economic environment that characterises the Member State under investigation. Changes in wages can be expected to result in different outcomes for employment under different economic situations. Box 3 provides an illustrative scenario to sharpen awareness on this problem.

Chart 7: RULC and employment growth (2001-11 averages)



Source: DG EMPL calculations based on Eurostat, National Accounts, Unit Labour Cost [nama_aux_ulc] and Price Indices [prc_hicp_aind].

Notes: 1) RULC= real unit labour cost (i.e. adjusted labour income share or real wage relative to labour productivity). 2) Coefficient of correlation is equal to 0.30.

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Second, in a multi-country context, spill-over effects may limit the scope for wage adjustment. For instance, if several countries in the same monetary union are hit by the same shock and try to restore their competitiveness by moderating their wages, the policy may lead to a deflationary wage spiral across the countries affected.

Third, wages play a role on the demand as well as the supply side of the economy. The dual role played by wages on both the supply and demand side of the economy is highlighted by the dual role that the real unit labour cost plays in the economy.

On the supply side, the real unit labour cost captures the discrepancy between real wages and productivity (see Annex 1). Under the classical paradigm, firms are willing to hire workers until their marginal product equals their marginal costs, that is, when labour costs equal productivity levels. In other words, an increase (decrease) in the real unit cost results in a decrease (increase) in labour demand, all other factors being equal.

On the demand side, the real unit labour cost measures the labour income share (Annex 1). When the labour income share increases (which also implies a decrease in the capital income share), consumer demand can be expected to rise and investment to fall, all other factors being equal. The latter two effects point in opposite directions with respect to their impact on aggregate demand so that a judgement cannot be made a priori as to which effect will dominate.

Nevertheless, in practice, one could argue that the net outcome will depend on the specific characteristics of the economy which are applicable at the time of the impact assessment. For instance, if investment prospects are low because demand is low, an increase in the labour income share should stimulate household demand which in turn will stimulate investment, generating a virtuous circle of mutually reinforcing outcomes yielding a rise in aggregate demand and employment, all other factors being equal. Of course, if household spending is also constrained due to a lack of confidence or high indebtedness despite a rise in the labour income share, then this increase will not be effective in stimulating aggregate demand.

Ultimately, the determination of the net impact of changes in the real unit labour cost on employment is an empirical matter. A first look at the data in Chart 7 shows a positive correlation between the average growth in the real unit labour cost and employment over the 2001-11 period, suggesting that developments in the demand side of real unit labour cost dominated supply side effects over this period [14]. It would be beyond the scope of this chapter to investigate this issue in greater depth.

(14) Technical note: Strictly speaking, such positive correlation may also arise from the supply side. In Annex 4 it is shown that assuming a CES production function, the relationship between labour demand (L) and the real unit labour (RULC) cost can be written as:
$\ln(L) = \ln(Y) - - (1/\rho)\,[\ln(RULC) - - \ln(\delta)]$
with ρ the substitution parameter, with $-1 < \rho < +\text{infinity}$.
For instance if labour and capital are perfect substitutes so that $-1 < \rho < 0$ then the correlation between labour and RULC becomes positive.

Box 3: Employment outcomes conditioned by economic environment: illustrative scenario

Normally if wages are cut under a wage-led regime while the economy is slightly above its potential for sustainable growth, aggregate demand will fall, and economic activity will converge to its sustainable potential [1].

In a severe economic downturn characterised by a sharp output gap, with nominal interest rates close to their lower bound, limits to the adjustment process must be taken into account when wages are cut if one seeks to assess the total impact on aggregate demand and thus on employment [2].

Indeed, under these circumstances, a cut in wages to restore balance with productivity, for example, will impose downward pressure on expected prices, since prices are determined by the unit labour cost, i.e. nominal labour costs relative to productivity. This will then increase the real interest rate, (equal to the nominal interest rate minus the expected inflation rate), since when nominal interest rates are close to zero there is no room for the monetary authorities to cut nominal interest rates [3].

As a result of this increase in real interest rates, all interest-sensitive expenditures, including those on capital goods and durable consumption goods, will decline further, thereby reinforcing the downward pressure on domestic demand and upward pressure on the real interest rate through deflationary pressures caused by the increasing gap between potential output and actual demand.

In addition, deflationary pressures will also increase the real value of existing nominal debt, and assuming that the marginal propensity of debtors to spend is greater than the marginal propensity of creditors to spend, the downward trend in aggregate demand will be reinforced.

If the country operates under a flexible exchange rate regime, an increase in the real interest rate will lead to an appreciation of the exchange rate, thereby negatively affecting net exports. If the country is part of a monetary union, the exchange rate of the union will be affected to the extent that this member's real interest rate affects the real interest rates of the monetary union as a whole. As a consequence, the net exports of all Member States (whether or not they have cut wages) will be affected by the impact on the exchange rate of wages cut in one Member State. If all Member States of the monetary union cut wages then the impact on demand for the union as a whole will be of the same nature as described in the case of the country under a flexible exchange rate regime. However, at the level of the Member States no competitiveness gains will be made vis-à-vis the other Member States in the monetary union.

Subsequently, the lower total output level may then provide an incentive to invest less in capital goods, strengthening the vicious spiral of decreasing consumption and decreasing investment. These downward pressures will then be reinforced further as falling demand widens the output gap which in turn induces demand-push deflationary pressure.

All in all, it is to be expected that in times of a severe economic downturn under a wage-led regime, a wage cut will induce a drop in output which is stronger than the drop in 'normal times' since nominal interest rates are hitting their lower bound, resulting in reduced employment.

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(1) Under a wage-led regime the positive effects arising from the increase in disposable income of households dominate the negative effects arising from the deterioration in competitiveness. Under a profit-led regime, the competitiveness effect dominates the disposable income effect. It is an empirical matter to investigate for each specific Member States and the euro area as a whole whether it falls under a wage-led or profit-led regime. Nevertheless, it is important here to point to the asymmetry that may occur under a profit-led regime in the time of a severe downturn.

(2) Such scenarios are discussed in more detail in, for instance, Eggerston (2009), Eggerston (2010), and Eggerston and Krugman (2011).

(3) In the case where a risk premium is discounted in the nominal interest rate, as it is the case for some Member States, then the lower bound is equal to the level of the risk premium.

4. Personal wage/ income distribution

4.1. Wage distribution and income inequality

Factor income distribution affects personal income distribution along several channels, including the following:

- the distribution of income between capital and labour arising from production, i.e. the labour income share;
- the distribution of the total wage bill among the different types of workers along various dimensions ranging from personal characteristics to firm-specific characteristics.

A standard measure of income inequality is the Gini coefficient. Table 9 shows the evolution of income inequality over time within Member States and across Member States. A higher Gini coefficient indicates greater income inequality.

Comparing the Gini coefficients from 2005 and 2010 (the last year for which an observation is available for all Member States) it follows that at the EU level as a whole, the degree of income inequality remained more or less stable. However, there are some notable differences in the developments within Member States.

The Gini coefficient is highest in Lithuania (36.9) and Latvia (36.1) and lowest in Slovenia (23.8). Bulgaria recorded the strongest increase, up from 25 in 2005 to 33.2 in 2010, followed by Germany where the coefficient increased from 26.1 to 29.3. The strongest decreases were found in Poland and Portugal, down from 35.6 and 38.1 to 31.1 and 33.7 respectively.

It would be beyond the scope of this chapter to analyse these outcomes in full detail. Nevertheless, it may be useful to have a closer look at the relationship between this coefficient and the labour income share discussed above.

A selected set of drivers of personal income inequality

Chart 8 shows a negative correlation between the Gini coefficient and the labour income share, suggesting that a rise in the labour income share leads to a decrease in income inequality. To understand this outcome, two transmission mechanisms must be recognized. First, if one assumes that capital income is primarily earned by individuals at the top of the income distribution, then it is to be expected that inequality will be reduced when the labour income share is increased (i.e. when the capital income share decreases).

Table 9: Gini coefficient

	1995	2000	2005	2006	2007	2008	2009	2010	2011
EU-27	:	:	30.6	30.2	30.6	30.8	30.4	30.5	:
EURO	:	:	29.2	29.1	29.9	30.2	30.1	30.2	:
BE	29	30	28	27.8	26.3	27.5	26.4	26.6	26.3
BG	:	25	25	31.2	35.3	35.9	33.4	33.2	:
CZ	:	:	26	25.3	25.3	24.7	25.1	24.9	25.2
DK	20	:	23.9	23.7	25.2	25.1	26.9	26.9	27.8
DE	29	25	26.1	26.8	30.4	30.2	29.1	29.3	29.0
EE	:	36	34.1	33.1	33.4	30.9	31.4	31.3	31.9
IE	33	30	31.9	31.9	31.3	29.9	28.8	33.2	:
EL	35	33	33.2	34.3	34.3	33.4	33.1	32.9	:
ES	34	32	31.8	31.2	31.3	31.3	32.3	33.9	34.0
FR	29	28	27.7	27.3	26.6	29.8	29.9	29.8	:
IT	33	29	32.8	32.1	32.2	31	31.5	31.2	:
CY	:	:	28.7	28.8	29.8	28.3	29.1	29.1	:
LV	:	34	36.1	39.2	35.4	37.7	37.4	36.1	35.2
LT	:	31	36.3	35	33.8	34	35.5	36.9	32.9
LU	29	26	26.5	27.8	27.4	27.7	29.2	27.9	27.2
HU	:	26	27.6	33.3	25.6	25.2	24.7	24.1	26.9
MT	:	30	26.9	27	26.3	27.9	27.2	28.4	27.4
NL	29	29	26.9	26.4	27.6	27.6	27.2	25.5	25.8
AT	27	24	26.2	25.3	26.2	26.2	25.7	26.1	26.3
PL	:	30	35.6	33.3	32.2	32	31.4	31.1	31.1
PT	37	36	38.1	37.7	36.8	35.8	35.4	33.7	34.2
RO	:	29	31	33	37.8	36	34.9	33.3	33.2
SI	:	22	23.8	23.7	23.2	23.4	22.7	23.8	23.8
SK	:	:	26.2	28.1	24.5	23.7	24.8	25.9	:
FI	:	24	26	25.9	26.2	26.3	25.9	25.4	25.8
SE	:	:	23.4	24	23.4	24	24.8	24.1	24.4
UK	32	32	34.6	32.5	32.6	33.9	32.4	33	:

Source: Eurostat, SILC [ilc_di12].

Notes: 1) The Gini coefficient is an indicator with a value between 0 and 100. Lower values indicate higher equality. In other words a value equal to 0 indicates that everyone receives the same income, a value equal to 100 indicates that one individual receives all income.
2) PL 2011 provisional.

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Second, however, such an outcome implicitly assumes that increases in the labour income share are equally distributed among the different deciles of wage earners – or at least that the redistribution of the labour income share among wage earners does not dominate the changes induced by the overall increase in the labour income share.

Chart 9 shows a positive correlation between the Gini coefficient and a measure of wage dispersion, i.e. the second upper decile of the wage distribution relative to the second lower decile observed in 2007. This positive correlation is in line with expectations, i.e. stronger wage dispersion will generate stronger income inequality, all other factors being equal.

Drivers of wage dispersion cover a range of variables. The next subsections describe the impact of individual characteristics (i.e. gender), geographical characteristics and labour market institutions (i.e. minimum wages).

4.2. Gender pay gap

Table 10 shows the spread in hourly earnings along the gender dimension, based on the latest release of the 2010 Structure of Earnings Survey covering the sectors of industry, construction and services (but excluding public administration, defence, and compulsory social security).

Generally speaking, the hourly earnings of men are higher than those of women and the earnings of older persons are higher than those of younger persons in all Member States. Furthermore, the pay gap between men and women increases with age.

The strongest gender pay gap (i.e. the difference between the earnings of men and women as a percentage of the average earnings of men) is found in Estonia (+27.2%), followed by Austria (23.9%). The lowest gap is found in Slovenia (+0.9%), followed by Poland (4.4%). The gender pay gap in the EU stood at 16.4% in 2010, and though a slight decrease has been observed since the beginning of the crisis (from 17.7% in 2006), it remains high[15].

Closing the gender pay gap is one of the five main priorities in the Women's Charter and also in the Strategy for Equality between Women and Men 2010-2015, which proposes a series of actions to tackle its root causes[16].

The causes of the gender pay gap derives from direct discrimination, but also segregation in the labour market and the undervaluing of women's work, the lack of transparency in pay policies and the greater difficulties experienced by women in balancing work and private life (resulting in career interruptions, etc.). These difficulties and inequalities accrue through the life cycle.

Chart 8: Labour income share and Gini coefficient (2005-10 averages)

Source: DG EMPL calculations based on Eurostat [ilc_di12 and namq_aux_ulc].

Note: Gini coefficient scaled 0 to 100; 2005-10 period average; coefficient of correlation: -0.12.

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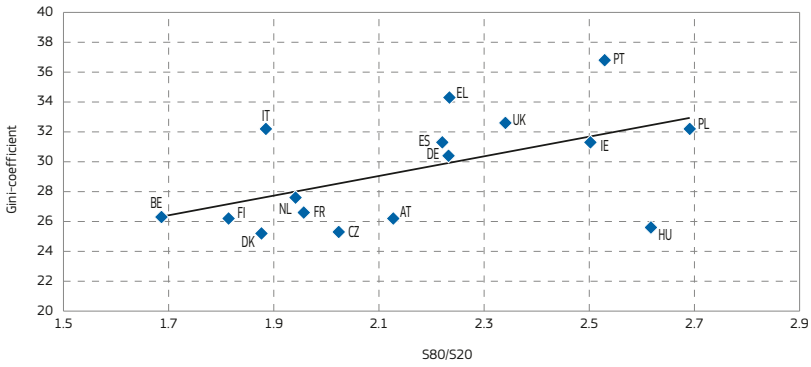
Chart 9: Wage distribution and Gini coefficient in 2007



Source: DG EMPL calculations based on Eurostat, [ilc_di12 and namq_aux_ulc] and OECD.

Notes: 1) S80/S20 = gross earnings 8th decile divided by gross earnings 2nd decile. Observations for 2007.
2) Gini coefficient scaled 0 to 100.
3) Coefficient of correlation +0.53.

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(15) See http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Gender_pay_gap_statistics.

(16) The gender pay gap has been a Commission priority for several years. It was already present in the Roadmap for Equality between Women and Men 2006-2010 as a sub-priority to 'Achieving Equal Economic Independence for Women and Men'. Tackling the gender pay gap has gained more political relevance over recent years: it became one of the main priorities in the Women's Charter and also in the Strategy for Equality between Women and Men 2010-2015.

Table 10: **Earnings along age and gender dimension – hourly earnings, 2010 (€)**

	Men						Women					
	Total	Less than 30 years	From 30 to 39 years	From 40 to 49 years	From 50 to 59 years	60 years or over	Total	Less than 30 years	From 30 to 39 years	From 40 to 49 years	From 50 to 59 years	60 years or over
BE	19.8	14.4	18.6	21.2	23.4	25.3	17.8	14.2	17.3	18.9	20.2	19.5
BG	2.2	1.9	2.4	2.4	2.2	1.9	1.9	1.8	2.0	1.9	1.9	1.8
CZ	5.8	4.6	6.3	6.4	5.7	5.8	4.6	4.3	4.7	4.6	4.6	4.9
DK	29.6	20.2	29.2	32.6	32.0	31.9	24.7	18.6	24.3	26.1	26.1	26.1
DE	18.8	11.0	18.6	21.5	22.0	21.1	14.6	10.3	15.5	15.8	16.0	15.8
EE	5.7	5.1	6.8	6.2	5.3	4.7	4.2	4.0	4.6	4.4	3.9	3.6
IE	27.7	:	25.0	31.1	33.3	29.6	23.8	:	23.0	26.9	26.7	22.2
ES	12.4	9.1	11.6	13.0	14.5	17.7	10.4	8.5	10.3	10.8	11.6	12.5
FR	17.5	11.8	16.6	18.7	20.1	25.2	14.8	11.8	14.5	15.5	15.9	19.0
IT	14.8	10.0	12.8	15.2	17.8	22.6	14.0	9.6	12.3	14.4	16.9	20.3
CY	13.3	8.0	12.5	15.7	17.5	14.5	11.0	7.6	11.7	12.1	13.0	9.2
LV	4.1	3.8	4.8	4.1	3.8	4.0	3.5	3.4	3.9	3.5	3.3	3.3
LT	3.7	3.3	4.0	3.7	3.6	3.8	3.2	3.2	3.3	3.2	3.2	3.4
LU	22.6	15.4	21.6	25.4	26.8	32.9	20.7	15.9	21.4	22.6	22.9	21.0
HU	5.0	3.9	5.2	5.3	5.0	6.2	4.1	3.9	4.4	4.1	4.1	4.8
MT	8.7	7.1	9.6	9.3	8.8	8.5	8.1	7.2	8.9	8.5	8.3	8.7
NL	18.6	11.2	18.8	21.7	22.6	21.0	15.2	11.0	16.9	17.1	17.0	16.3
AT	16.4	11.0	16.5	18.8	19.8	21.9	12.5	9.9	13.1	13.7	13.6	13.2
PL	5.2	4.0	5.7	5.7	5.2	6.2	5.0	3.9	5.2	5.4	5.0	6.2
PT	8.2	5.3	7.7	9.4	10.4	10.8	7.2	5.0	6.8	7.8	9.2	8.0
RO	2.8	2.3	2.8	2.9	3.0	3.7	2.6	2.3	2.6	2.5	2.7	3.1
SI	9.1	6.8	9.0	9.7	9.8	15.6	9.1	7.4	9.0	9.1	10.0	16.3
SK	5.2	4.3	5.8	5.5	5.1	5.1	4.2	4.0	4.4	4.2	4.2	4.8
FI	20.4	15.2	20.2	22.0	21.9	22.5	16.2	13.6	16.4	17.2	16.7	16.3
SE	18.1	:	17.9	19.8	19.4	:	15.3	:	15.4	16.2	15.9	:
UK	18.7	11.9	19.9	22.2	21.5	17.7	14.7	11.0	18.0	15.4	15.1	13.0

Source: Eurostat, SES 2010 [earn_ses10_13].

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4.3. Wage polarization

Making use of EU-LFS data, Hurley and Storrie (2011) analyse employment changes along the following dimensions: sector, worker characteristics and employment status, with a view toward assessing developments in wage polarisation. Key findings of direct relevance to this chapter are as follows:

- the recession strengthened the wage polarization trends observed in the past. Prior to the crisis, polarization was driven by the growth of service jobs at the extremes of the wage distribution. During the current recession, however, it was the massive job loss in manufacturing and construction – and the ensuing collapse of the middle-ranking jobs – that was the dominant driver of increased wage polarisation;
- job growth in the top wage quintile persisted strongly throughout the recession mainly due to an increase in knowledge-intensive services (KIS), including public services (mainly education and health) and in private services (business services);
- there are strong indications that, in the long term, employment creation in the services sector will be characterised mainly by employment growth at the top and bottom, implying that the service sector cannot be relied upon to fill the gap created by the decline in manufacturing. This trend toward further segregation thus intensifies the risk of limiting the career mobility possibilities for those in lower-end employment and exacerbating problems of job-skills mismatches and over-qualification.

4.4. Regional wage dispersion and labour cost trends

Regional income differences (which have an important impact on personal inequality at the level of the countries as a

whole) are to a large extent determined by the regional concentration of factor income differentials.

This section highlights some of the main developments in labour factor income across regions within Member States.

4.4.1. Regional nominal compensation per employee

Chart A.5.1 of Annex 5 shows the regional dispersion of nominal compensation per employee within a select group of Member States.

The national averages of the variables discussed in this section have been discussed in the previous sections.

Table 11 summarizes this chart by showing the upper end and lower bounds of the regional distribution of nominal compensation per employee (measured in euro) in 2001 and 2009.

The sharpest spread is found in the United Kingdom, with the London region listing compensation per employee at about 70 % above the national average, while Northern Ireland records a level about 20 % below the national average. At the other end of the scale are Greece whose upper bound is about 1 % above the national average and lower bound is about 3.5 % below the national average, and Ireland with an upper end 3 % above national average and lower bound almost 10 % below the national average.

Chart A.5.2 of Annex 5 shows the compound growth in nominal compensation per employee for a select group of Member States over the period from 2001 until 2009 (the last year for which observations are available).

Table 12 summarizes the data by showing the upper and lower bound of the regional distribution within a Member State for which sufficient data are available, measured as the ppt. difference between the regional compound growth rate and the national compound growth rate.

By far the strongest divergence was found in Hungary, followed by France (including the Overseas Departments) and Romania.

Table 11: Regional compensation per employee (in €1 000)

		2001	2009
BE	Brussels Hoofdstedelijk Gewest / Région de Bruxelles-Capitale	46 685	57 546
	Belgium	39 087	47 779
	Région wallonne	35 584	43 487
BG	Yugozapadna i yuzhna tsentralna Bulgaria	2 636	5 283
	Bulgaria	2 489	4 846
	Severna i yugoiztochna Bulgaria	2 329	4 282
CZ	Praha	10 532	20 540
	Czech Republic	7 121	13 896
	Severozápad	6 179	11 683
DK	Hovedstaden	40 839	54 161
	Denmark	36 973	48 521
	Nordjylland	34 149	44 645
DE	Hamburg	36 794	40 422
	Germany	31 761	34 181
	Mecklenburg-Vorpommern	24 762	27 078
EE	Estonia	5 696	13 439
IE	Southern and Eastern	33 608	48 231
	Ireland	32 577	46 806
	Border, Midland and Western	29 087	42 269
EL	Attiki	18 734	27 463
	Greece	18 107	27 207
	Nisia Aigaiou, Kriti	17 706	26 237
ES	Comunidad de Madrid	26 647	34 725
	Spain	23 431	31 121
	Canarias (ES)	22 473	28 146
FR	Île de France	46 688	52 649
	France	34 300	41 152
	Ouest (FR)	29 626	35 789
IT	Nord-Ovest	30 258	33 970
	Italy	28 490	32 393
	Sud	25 334	29 509
CY	Cyprus	18 361	24 603
LV	Latvia	4 515	9 989
LT	Lithuania	4 795	7 494
HU	Közép-Magyarország	11 243	13 147
	Hungary	8 076	11 862
	Alföld és Észak	6 211	10 822
MT	Malta	15 187	18 054
NL	West-Nederland	40 150	52 082
	Netherlands	38 814	50 258
	Noord-Nederland	37 240	47 959
AT	Ostösterreich	34 926	41 943
	Austria	32 987	39 657
	Südösterreich	30 998	37 438
PL	Region Centralny	10 580	11 140
	Poland	8 533	9 388
	Region Wschodni	7 202	7 348
PT	Lisboa	19 204	24 355
	Portugal	15 591	20 027
	Norte	13 483	17 386
RO	Macroregiunea trei	4 013	9 621
	Romania	3 245	7 680
	Macroregiunea doi	2 890	6 448
SI	Zahodna Slovenija	17 544	25 067
	Slovenia	15 632	23 157
	Vzhodna Slovenija	13 698	20 969
SK	Bratislavský kraj	6 940	18 477
	Slovakia	5 120	13 250
	Východné Slovensko	4 761	11 702
FI	Åland	32 745	48 481
	Finland	32 405	41 444
	Manner-Suomi	32 384	41 396
SE	Östra Sverige	37 831	30 787
	Sweden	34 756	29 270
	Norra Sverige	32 057	27 686
UK	London	62 760	60 739
	United Kingdom	37 736	35 370
	Northern Ireland (UK)	33 811	28 379

Source: DG EMPL calculations on the basis of Eurostat, Compensation of employees by NUTS 2 regions (NACE Rev. 2) [nama_r_e2remr2].

Note: For each Member State the first line shows the region with the highest average compensation per employee, the second line shows the country average, the third line shows the region with the lowest average compensation per employee.

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In Austria, Belgium and Denmark the spreads in the growth of compound nominal compensation per employee across regions were fairly limited.

4.4.2. Regional productivity growth

Chart A.5.3 of Annex 5 shows regional productivity growth per employed person for a select group of Member States over the 2001-07, 2008-09, and 2001-09 periods.

Within most of the Member States for which data are available, the growth in productivity in particular regions all points in the same direction, with all regions either showing gains or all showing losses in productivity. Exceptions to this rule include the Noord-Holland region in the Netherlands which showed a gain in productivity growth over the 2008-09 period, while the other regions of the Netherlands show a decrease and the Pólnocny region in Poland which shows a fall in productivity while the other regions record an increase in the 2008-09 period.

Where sufficient data are available, Table 13 presents a summary showing the spread in the compound productivity growth rates among the different regions within the Member States.

Among the Member States for which the full 2001-09 data range is available, the strongest spread in compound regional productivity growth is found in Portugal, followed by the Czech Republic and Germany. Belgium records the lowest spread among its regions.

Among the Member States for which only the 2001-07 data range is available, Slovakia recorded the strongest dispersion among its regions, followed by Finland. The Netherlands showed the lowest dispersion.

Table 12: Compensation per employee (in national currency) – Compound growth rate (ppt. difference from national average)

		Lower end				Upper end			
		2001-2007	2008-2009	2001-2009		2001-2007	2008-2009	2001-2009	Spread
HU	Közép-Magyarország	-3.6	-19.7	-37.8	Alföld és Észak	0.6	19.7	35.5	73.4
FR	Île de France	-6.3	0.3	-6.1	Départements d'outre-mer (FR)	56.4	-3.0	53.3	59.5
RO	Macroregiunea doi	-21.2	-1.9	-36.0	Macroregiunea patru	2.5	3.2	18.3	54.2
PL	Region Wschodni	-12.1	-4.8	-18.5	Region Pólnocno-Zachodni	3.7	4.1	8.9	27.4
UK	Northern Ireland (UK)	-12.8	-1.0	-14.6	South East (UK)	9.7	0.0	10.1	24.7
CZ	Severozápad	-10.1	-0.4	-11.0	Jihovýchod	4.4	4.0	11.2	22.1
FI	Manner-Suomi	0.1	-0.2	-0.1	Åland	-6.0	21.5	19.2	19.3
BG	Severna i yugoiztochna Bulgaria	-10.5	1.1	-11.6	Yugozapadna i yuzhna tsentralna Bulgaria	6.6	-1.7	5.4	16.9
EL	Attiki	-2.2	-1.7	-4.7	Kentriki Ellada	0.3	6.0	8.8	13.6
SI	Zahodna Slovenija	-4.9	0.0	-5.3	Vzhodna Slovenija	4.6	-0.3	4.5	9.8
PT	Lisboa	-1.8	-1.4	-3.6	Região Autónoma da Madeira (PT)	1.4	3.5	6.0	9.6
ES	Canarias (ES)	-3.2	-3.2	-7.4	Centro (ES)	4.2	-2.2	1.9	9.2
DE	Berlin	-4.2	0.6	-3.7	Thüringen	2.5	1.3	4.0	7.7
SE	Östra Sverige	-1.1	-1.8	-3.1	Norra Sverige	1.5	1.5	3.2	6.2
DK	Nordjylland	0.2	-1.7	-2.0	Hovedstaden	0.1	1.0	1.4	3.4
BE	Région wallonne	-1.5	0.9	-0.5	Brussels Hoofdstedelijk Gewest/ Région de Bruxelles-Capitale	0.8	0.3	1.2	1.7
AT	Ostösterreich	-0.6	0.3	-0.3	Südösterreich	2.0	-1.0	1.0	1.3

Source: DG EMPL calculations on basis of Eurostat [nama_r_e2remr2].

Notes: 1) Compound growth in region minus the compound 'average' national growth rate.
2) The spread is the difference between the upper and lower bounds of the 2001-09 compound growth rates in the regions.

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Table 13: Productivity per employed person – Compound growth rate (ppt. difference from national average)

		Lower end					Upper end			
		2001-2007	2008-2009	2001-2009			2001-2007	2008-2009	2001-2009	Spread
PT	Algarve	-8.2	-3.4	-11.5		Região Autónoma da Madeira (PT)	7.1	2.9	10.4	22.0
CZ	Moravskoslezsko	-5.9	-4.1	-11.0		Strední Cechy	8.2	1.2	9.7	20.7
DE	Hamburg	-6.3	0.1	-5.9		Sachsen	9.8	2.0	11.6	17.5
DK	Sjælland	-1.1	-4.5	-5.7		Nordjylland	2.3	4.0	6.5	12.2
ES	Comunidad de Madrid	-0.6	-3.9	-4.5		Centro (ES)	4.4	1.9	6.6	11.1
UK	East Midlands (UK)	-1.1	-2.5	-3.8		North West (UK)	3.4	1.9	5.6	9.4
SE	Norra Sverige	-6.6	1.8	-4.3		Östra Sverige	3.7	-0.1	3.4	7.7
BE	Région wallonne	-1.9	0.6	-1.1		Région de Bruxelles-Capitale / Brussels Hoofdstedelijk Gewest	3.8	1.0	4.8	6.0
SK	Bratislavský kraj	-7.7	:	:		Západné Slovensko	7.5	:	:	15.2
FI	Åland	-14.2	:	:		Manner-Suomi	0.1	:	:	14.4
FR	Méditerranée	-5.3	:	:		Départements d'outre-mer (FR)	6.6	:	:	11.9
IE	Border, Midland and Western	-7.4	:	:		Southern and Eastern	2.0	:	:	9.4
SI	Zahodna Slovenija	-7.1	:	:		Vzhodna Slovenija	0.0	:	:	7.1
PL	Region Pólnocny	-3.9	:	:		Region Pólnocno-Zachodni	2.9	:	:	6.8
NL	Zuid-Nederland	-1.9	:	:		Noord-Nederland	4.2	:	:	6.2

Source: DG EMPL calculations on basis of Eurostat [nama_r_e2remr2].

Notes: 1) Compound growth in a region minus the compound 'average' national growth rate.
2) The spread is the difference between the upper and lower bounds of the 2001-09 compound growth rates in the regions.
For Member states for which only the 2001-07 data range is available, 2001-07 compound growth rates are compared.

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4.4.3. Regional nominal unit labour cost growth

Chart A.5.4 of Annex 5 shows the growth in regional nominal unit labour costs for a select group of Member States over the 2001-07, 2008-09, and 2001-09 periods.

Table 14 summarizes the data by comparing the spread in compound growth of nominal unit labour costs within the Member States. Among the Member States for which the available data cover the 2001-09 time span, the regions within the Czech Republic show the most extreme differences, followed by Portugal and the United Kingdom.

Among the Member States for which the available data cover only the 2001-07 period, France (including the Overseas Departments) recorded the strongest divergence among its regions in the 2001-07 period.

Table 14: Nominal unit labour cost (in local currency) – Compound growth rate (ppt. difference with national average)

		Lower end				Upper end			
		2001-2007	2008-2009	2001-2009		2001-2007	2008-2009	2001-2009	Spread
CZ	Strední Cechy	-14.2	-3.7	-18.9	Praha	5.5	4.3	11.2	30.2
PT	Região Autónoma da Madeira (PT)	-9.3	0.5	-9.2	Algarve	9.2	3.3	13.9	23.1
UK	North West (UK)	-9.9	-0.2	-11.0	South East (UK)	10.1	-0.5	10.4	21.3
DK	Nordjylland	-2.4	-6.0	-10.0	Sjælland	2.4	3.3	6.8	16.8
DE	Sachsen	-6.4	-0.3	-7.2	Hamburg	7.3	1.2	9.2	16.4
SE	Östra Sverige	-4.4	-1.1	-4.8	Norra Sverige	7.7	-1.1	5.2	10.0
ES	Centro (ES)	-1.1	-4.0	-6.0	Sur (ES)	2.8	0.6	3.7	9.7
BE	Région wallonne	-3.3	-0.8	-4.4	Vlaams Gewest	0.9	0.3	1.3	5.7
FR	Île de France	-3.5	:	:	Départements d'outre-mer (FR)	45.3	:	:	48.8
SK	Západné Slovensko	-9.2	:	:	Stredné Slovensko	6.1	:	:	15.3
IE	Southern and Eastern	-1.8	:	:	Border, Midland and Western	7.8	:	:	9.6
FI	Manner-Suomi	0.0	:	:	Åland	9.2	:	:	9.2
NL	Noord-Nederland	-4.6	:	:	Zuid-Nederland	2.3	:	:	6.9
PL	Region Wschodni	-4.7	:	:	Region Poludniowo-Zachodni	1.6	:	:	6.2
SI	Slovenia	0.0	:	:	Vzhodna Slovenija	3.7	:	:	3.7

Source: DG EMPL calculations on the basis of Eurostat [nama_r_e2remr2].

Notes: 1) Compound growth in a region minus the compound 'average' national growth rate.
2) The spread is the difference between the upper and lower bounds of the 2001-09 compound growth rates in the regions.
For Member states for which only the 2001-07 data range is available, the 2001-07 compound growth rates are compared.

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4.5. Minimum wages: a demand stabilizer

The policy relevance of minimum wages for the realisation of the Europe 2020 targets with respect to employment and social cohesion can hardly be underestimated. Minimum wages can have an important impact on personal income distribution, but they also risk destroying jobs particularly for the low skilled.

Twenty Member States have a national statutory minimum wage, including Belgium, Bulgaria, Czech Republic, Estonia, France, Greece, Ireland, Hungary, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, and the United Kingdom. (See Table 20 in Chapter 1 of this report.)

There are no national statutory minimum wages in Austria, Cyprus, Denmark, Finland, Germany, Italy or Sweden. However, in many of these countries, the social partners in collective bargaining agreements define sector-specific minimum wages, which can be extended by the government to all companies and workers in given sectors (e.g., Germany), or which are de facto minimum wages due to extremely high collective bargaining coverage (e.g., Austria).

Recent developments in minimum wages are described in Chapter 1 of this report. The following sub-sections will focus on the developments in minimum wages over a longer period.

The minimum wage as a percentage of average wages will be used to assess the impact of minimum wages on employment and income distribution. The minimum wage in relation to standard purchasing power will be used to assess developments in minimum wages purchasing power.

4.5.1. Minimum wages: recent developments

Table 15 shows the minimum wage as a percentage of the mean value of the average wage for the period from 2008 until 2010 (i.e. the sample size for which data are available). Over this short time span, the minimum wage represented a fairly stable percentage of the average wage in the Member States that joined the EU before 2004. One notable exception is Greece where the minimum wage was about 50 % of the average wage in 2008, 2009 and 2011, but fell temporarily to 40 % in 2010.

The strongest increase in the minimum wage (as a percentage of the average) was found in Slovenia where it increased from 41.0 % in 2008 to 50.0 % in 2011. The strongest decrease was found in Bulgaria where the minimum wage decreased from 39.5 % of the average wage in 2008 to 33.7 % in 2011.

All in all, in 2011, minimum wages as a percentage of the average wage were highest in Greece and Slovenia at 50 %, while they were lowest in the Czech Republic (32.5 %) and Bulgaria (33.7 %).

Table 15: Monthly minimum wage as a percentage of the mean value of average monthly earnings (%)

	2008	2009	2010	2011
BE	:	:	44.7	:
BG	39.5	38.3	35.8	33.7
CZ	35.2	34	33.3	32.5
DK	:	:	:	:
DE	:	:	:	:
EE	34.9	36.2	35.6	33.8
IE	38.0	41.5	41.8	41.9
EL	48.4	50.7	40.4	50.1
ES	35.2	35.1	35.3	34.6
FR	47.3	47.9	47.4	:
IT	:	:	:	:
CY	:	:	:	:
LV	36.2	40.9	42.2	45.1
LT	39.6	40.5	42	41.1
LU	:	45.4	45.9	46.7
HU	38.5	38.6	38.8	39.1
MT	48.8	45.2	46.2	47.4
NL	44.2	44.1	44.6	:
AT	:	:	:	:
PL	35.7	39.7	40.4	38.3
PT	44.6	43.2	42.8	42.6
RO	30.1	33.3	32.3	35.8
SI	41.0	41.1	47.5	50.0
SK	34.7	36.5	36.6	36.6
FI	:	:	:	:
SE	:	:	:	:
UK	38.1	38.4	38.2	38.5

Source: Eurostat, NACE Rev. 2 (from 2008 onwards) [earn_mw_avgr2].

Note: Average monthly wage refers to NACE sections B-S.

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Box 4: Minimum wages and employment

Briefly summarised, minimum wages affect employment through a range of different channels, including the following:

1. Substitution among heterogeneous labour inputs

If one assumes the existence of different skill groups and the fact that the minimum wage only applies to the lowest-skilled employees, then the impact on employment is less clear-cut.

If firms are able to substitute skilled labour for unskilled labour, the demand for unskilled labour declines and the demand for high-skilled labour increases through the so-called substitution effect.

However to understand the full impact of the demand for different skill types, it must be borne in mind that an increase in the minimum wage increases the price of outputs, leading to a decline in demand for the product, and as a consequence, labour demand also declines through the so-called output effect.

For the low-skilled the substitution effect and the output effect both unambiguously reduce labour demand.

However, it is an empirical matter to determine whether in the case of higher skilled workers the substitution effect will supersede the output effect, i.e. whether employment of these workers will increase or decrease.

2. Monopsony in the labour market

Under perfect competition, market equilibrium is attained at the point where demand meets supply and the wage is equal to the marginal product. Under monopsony the firm is free to set wages and the equilibrium is attained when wages are lower than marginal productivity yielding maximum profit for the monopsonist.

Imposing a minimum wage, the marginal cost to the firm becomes fixed at the point where new workers are attracted only by providing higher wages, yielding employment which is greater than the level which is reached without a minimum wage. Nevertheless, if the minimum wage is greater than the competitive free-market wage, involuntary unemployment will exist.

Monopsony may arise, for example, when a firm is the sole provider of employment and employees are immobile.

3. Stimulus of aggregate demand during a severe economic downturn

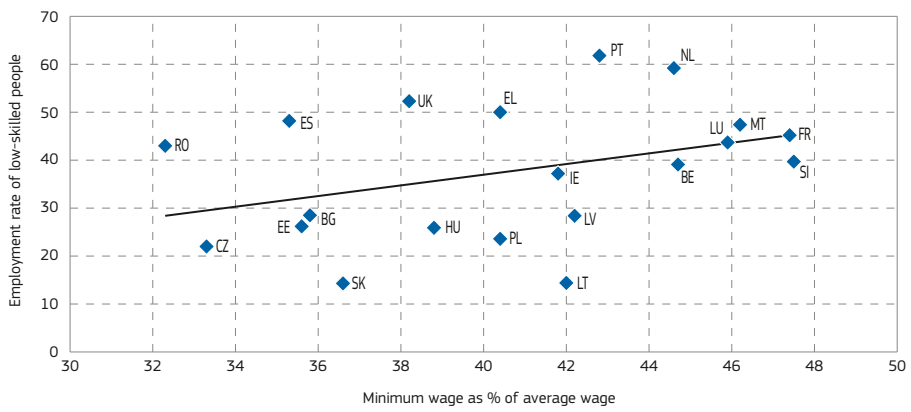
During a severe economic downturn, minimum wages:

- buoy prices, thereby reducing the risk of deflation during economic downturns;
- help to sustain aggregate demand;
- help to boost wage equality during a recession by maintaining an adequate standard of living for the most vulnerable workers.

These transmission mechanisms point in different directions and require a more rigorous examination to assess their net outcome.

Chart 10 shows a positive correlation between the minimum wage and the employment rate of the low skilled for the year 2010. The evidence suggests that the last two transmission mechanisms dominated the first in 2010. Nevertheless, this positive correlation could also be interpreted as meaning that in times of severe economic crisis, minimum wages are lowered when employment rates are falling.

Chart 10: Minimum wage (as % of average wage) and employment rate of low-skilled workers – 2010



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Source: DG EMPL calculations on the basis of Eurostat, minimum wage (earn_mw_avgr2) and employment rate [lfsa_ergaed].

4.5.2. The employment dimension

Minimum wages have an impact on the earnings of workers and their employment opportunities (see, for instance, Her et al. (2009)).

Box 4 highlights three transmission mechanisms that may affect the impact of minimum wages on employment in the case of imperfect labour markets.

4.5.3. The social cohesion dimension

The minimum wage as a percentage of the average wage is an appropriate version of the minimum wage indicator to assess the impact of minimum wages on the labour income share and wage distribution between different groups of workers, both of which are important drivers of social cohesion via their impact on income distribution.

Minimum wages affect the distribution of total factor income

The impact of minimum wages on the labour income share is not unambiguous. On the one hand, it raises the wage of the low-wage earners, on the other hand it carries the risk (under the classical paradigm) of reducing the demand for low-skilled workers – all other factors being equal. Both effects point in opposite directions.

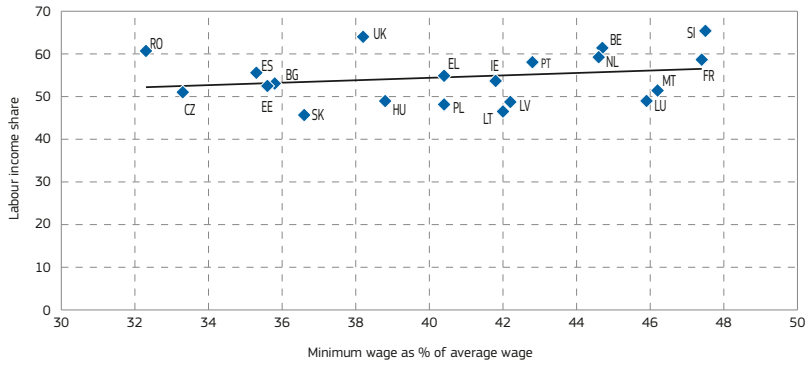
Chart 11 shows a moderate positive correlation between the minimum wage as a percentage of the average wage and the labour income share across the Member States for the year 2010. This indicates that minimum wages supported the labour income share in 2010.

Minimum wages affect wage distribution

Focusing on the distribution of wages between workers, Chart 12 shows a negative correlation between the minimum wage (as a percentage of the average wage) and the spread between the average earnings and the earnings of workers in the lowest pay decile in 2007, indicating that increases in minimum wages may narrow the gap between the low- and average-paid workers – all other factors being equal[17].

(17) It would be beyond the scope of this chapter to investigate how these effects of minimum wages on relative wages affect productivity (including via investment in human capital and effort) and employment.

Chart 11: Labour income share and minimum wage (as % of average wage) - 2010



Source: DG EMPL calculations on the basis of Eurostat, minimum wage as a percentage of average wage (earn_mw_avgr2) and DG ECFIN AMECO database, adjusted wage share (ALCDO).

Note: Coefficient of correlation is equal to 0.19.

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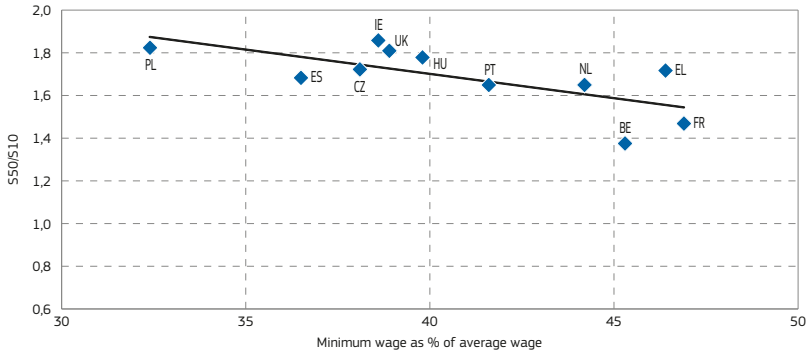
Chart 12: Minimum wage and S50-S10 pay differential – 2007



Source: DG EMPL calculations based on Eurostat (earn_mw_avgr2) and OECD.

Notes: 1) S50/S10 = gross earnings 5th decile divided by gross earnings 1st decile. Observations for 2007. 2) Coefficient of correlation is equal to -0.69.

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Minimum wages narrow the gender pay gap

As women are more likely than men to be employed in sectors with low wages, such as cleaning, minimum wages may also have an impact on the gender pay gap (which was briefly discussed in section 4.2).

Chart 13.a shows a negative correlation between the gender pay gap and the minimum wage in 2010. In other words, Member States with a high-level minimum wage relative to average earnings are more likely to enjoy a narrow gap between average earnings of men and women in employment.

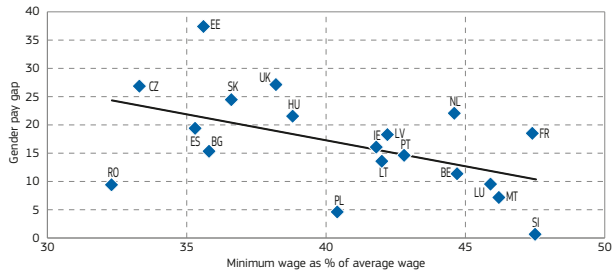
Chart 13.b shows a similar outcome by relating the minimum wage to the risk of women (relative to men) being employed in a low-paid job in 2008. This chart shows that in all Member States women have a higher likelihood of being in low-paid jobs than men, but that this probability decreases with the rise of minimum wages.

Minimum wages affect income distribution

The previous analysis shows that minimum wages have the potential to temper wage dispersion, causing a reduction in income inequality. Nevertheless, classical economic theory also suggests that a rise in the minimum wage will lead to an increase in unemployment, particularly for those at the lower end of the wage distribution. As unemployment benefits are lower than the minimum wage, one could expect an increase in income inequality, partly offsetting the positive effect described above.

Chart 14 shows a negative correlation between the minimum wage as a percentage of the average wage and the Gini coefficient (using 2010 data), indicating that on balance the former effect dominated the latter effect in 2010.

Chart 13a: Minimum wage and gender pay gap - 2010



Source: DG EMPL calculations based on Eurostat [earn_mw_avgr2] and earn_ses10_13.

Note: Coefficient of correlation -0.50.

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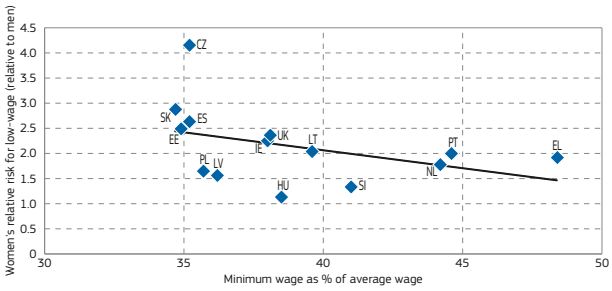
Chart 13b: Minimum wage and women's incidence of low-wage employment - 2008



Source: DG EMPL calculations based on Eurostat [earn_mw_avgr2] and calculations by the European Network of Experts on Gender Equality.

Note: Coefficient of correlation is equal to -0.41.

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Minimum wage in purchasing power standard remained fairly stable

The minimum wage measured in terms of purchasing power standard (PPS) is the most appropriate indicator to assess the impact of minimum wages on poverty.

Table 16 shows developments in national monthly minimum wages in the European Union measured in purchasing power standard, i.e. exchange rates adjusted for differences in the prices of goods and services across Member States.

Luxembourg shows the highest minimum wage by far over the entire period for which data are available, followed by the Netherlands, Belgium, France and Ireland.

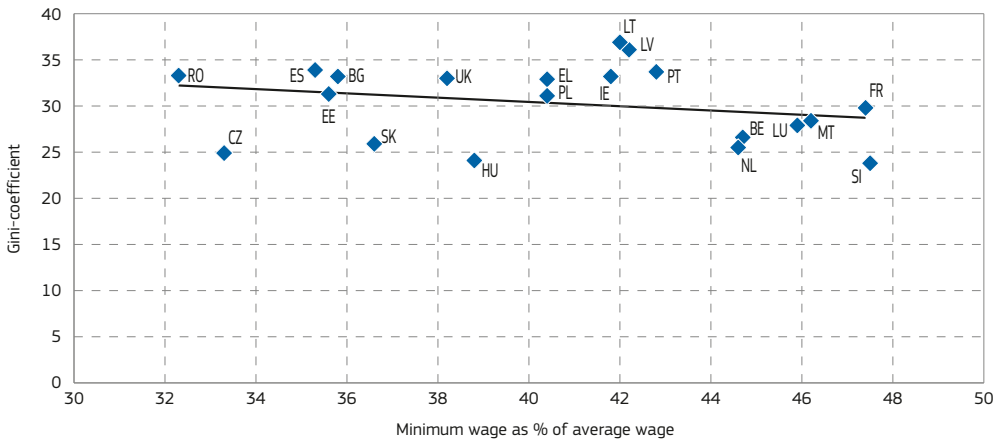
With the exception of Malta and Slovenia, the Member States that joined the EU in 2004 or later show lower minimum wages (measured in PPS), with the lowest minimum wages recorded in Romania and Bulgaria.

In terms of purchasing power, the minimum wage at the top (i.e. Luxembourg) is more than five times the minimum wage at the bottom.

Eleven Member States have a minimum wage (in terms of PPS) that is less than half the minimum wage of Luxembourg, among them Greece and Portugal.

All in all, minimum wages in purchasing power standard remained fairly stable over the 2001-11 period, despite the high inflation rates in some of the Member States that joined the EU in 2004 or later.

Chart 14: Minimum wage (as % of average wage) and Gini coefficient - 2010



Source: DG EMPL calculations based on Eurostat, Monthly minimum wage as a percentage of average wage [earn_mw_avgr2] and Gini coefficient, SILC [ilc_di12].

Note: Gini coefficient scaled 0 to 100.

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Table 16: **Minimum wage in purchasing power standard - First half of year**

	2001S1	2002S1	2003S1	2004S1	2005S1	2006S1	2007S1	2008S1	2009S1	2010S1	2011S1	2012S1
BE	1083.0	1122.9	1091.1	1110.8	1136.7	1145.6	1171.8	1186.9	1235.4	1245.5	1265.5	1290.8
BG	99.0	125.6	138.6	146.2	177.3	182.3	201.9	227.8	239.2	241.6	240.8	270.9
CZ	293.4	324.2	356.7	379.0	414.8	435.4	461.7	415.1	414.0	420.7	424.4	424.4
DK	:	:	:	:	:	:	:	:	:	:	:	:
DE	:	:	:	:	:	:	:	:	:	:	:	:
EE	167.4	194.3	222.4	251.3	265.8	279.8	313.6	362.7	363.3	371.7	352.3	367.4
IE	791.1	805.4	848.4	851.9	957.9	1038.3	1130.6	1127.4	1154.0	1227.0	1252.3	1252.3
EL	660.1	712.5	705.8	719.6	756.2	796.8	813.4	865.8	861.3	907.1	907.0	921.5
ES	592.1	609.4	595.4	590.3	656.6	687.5	716.9	736.4	744.5	761.3	768.5	768.5
FR	1040.4	1088.8	1048.9	1104.5	1188.1	1121.9	1160.7	1156.1	1175.7	1212.7	1232.7	1262.9
IT	:	:	:	:	:	:	:	:	:	:	:	:
CY	:	:	:	:	:	:	:	:	:	:	:	:
LV	151.2	181.2	200.8	214.2	201.5	212.8	257.4	303.5	335.4	351.6	381.9	381.9
LT	221.7	229.4	237.9	243.4	263.9	277.7	289.6	351.3	343.9	355.9	353.2	353.2
LU	1215.0	1263.0	1325.0	1361.0	1313.8	1349.9	1368.1	1340.1	1358.1	1396.0	1441.7	1477.8
HU	294.2	358.1	338.2	339.5	362.6	390.0	390.6	395.3	402.1	410.9	434.5	518.1
MT	717.0	729.9	750.1	744.8	768.1	781.1	797.5	797.8	810.1	846.4	852.9	872.1
NL	1120.6	1172.4	1158.4	1191.1	1207.9	1223.0	1275.1	1282.6	1281.2	1308.3	1319.0	1339.6
AT	:	:	:	:	:	:	:	:	:	:	:	:
PL	319.3	322.0	334.0	341.8	345.4	369.5	400.7	463.0	506.4	532.8	559.9	606.0
PT	461.9	470.1	483.3	487.3	513.7	529.6	548.6	565.7	588.7	628.5	647.0	647.0
RO	92.1	104.2	153.3	159.5	157.2	162.4	183.4	215.2	245.7	242.2	264.5	276.4
SI	523.6	562.7	580.9	617.2	644.9	667.2	661.4	650.5	688.4	706.4	895.8	913.7
SK	233.9	257.4	264.7	276.6	304.0	319.3	355.9	371.0	401.3	429.4	437.6	451.4
FI	:	:	:	:	:	:	:	:	:	:	:	:
SE	:	:	:	:	:	:	:	:	:	:	:	:
UK	839.5	916.5	927.0	1008.8	1065.6	1102.1	1132.3	1111.2	1101.7	1111.6	1108.4	1137.8

Source: Eurostat, Monthly minimum wages - bi-annual data [earn_mw_cur].

Note: The purchasing power standard, abbreviated as PPS, is an artificial currency unit. Theoretically, one PPS can buy the same amount of goods and services in each country.

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4.6. Who earns minimum wages in Europe?

In a 2012 report by Rycx and Kampelmann based on large, representative surveys containing micro-data for a set of European countries conducted by the European Union Survey on Income and Living Conditions (EU-SILC) and the German Socio-economic panel (GSOEP), it is stated that:

> 'Compared to the rest of the population, the empirical results show that this group is characterised by a lower average age; on average more female employment; lower levels of educational attainment than workers with higher wages; a considerably higher share of employees with temporary work contracts; and a higher share of part-time employment than the subpopulation with higher wages.
>
> Even more important in terms of the affected individuals' wellbeing is the finding that in all countries in the sample minimum wage earners live in bigger households that dispose of significantly lower income and that are at a higher risk of living in poverty.'

5. Sectoral wage distribution affects macro-economic outcomes

Sectoral employment composition also has an important impact on achievement of the Europe 2020 targets since the 'average' national compensation per employee and the productivity level are the weighted averages of their corresponding values at the sectoral level.

Box 5 provides an illustrative scenario underlining the importance of sectoral employment composition.

Several factors determine the composition of a country's sectoral output including sectoral wages in relation to sectoral prices and productivity, output demand, access to international markets etc. It would be beyond the scope of the current chapter to provide a rigorous analysis of the determinants of sectoral employment composition. Nevertheless, certain insights can be gained by glancing at the data.

First, wage dispersion will be explored in six sectors: agriculture, industry, construction, basic services, finance and business support, and public services. (See Annex 2 for more details on this classification.)

Second, developments in sectoral productivity will be studied and related to nominal compensation per employee, yielding the sectoral nominal unit labour cost. The policy relevance of nominal unit labour cost developments are of particular relevance for the sectors that supply goods and services subject to international competition, such as industry.

Box 5: The sectoral composition affects 'average' national productivity

Chart 15 illustrates the impact of changes in sectoral employment shares on average national productivity between 2000 and 2010 based on the sectoral productivity levels observed in 2010 (for which harmonised sectoral data are available, i.e. all EU Member States except Malta, Cyprus and United Kingdom). Sectors considered are agriculture, industry, construction, basic services, finance and business support and public services [1]. In other words, average national productivity in 2010 has been re-calculated using the sectoral employment shares observed in 2000.

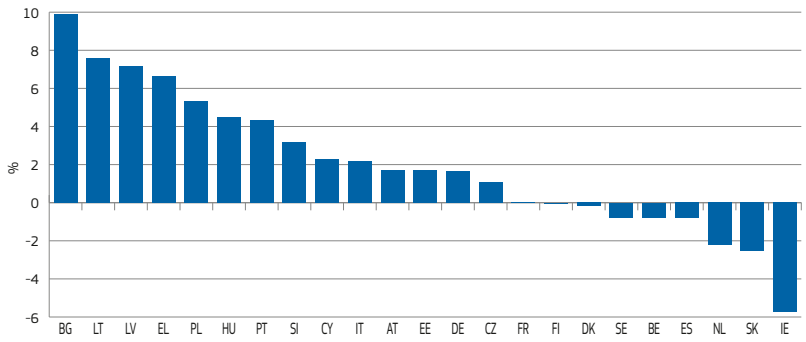
This exercise shows that most Member States shifted activity towards sectors with higher productivity, yielding a higher average national productivity level. This was particularly the case for Member States who joined the EU in 2004 or later since all (with the exception of Slovakia) would have had a lower average national productivity level (compared with the observed level in 2010) if they had maintained the same employment composition as observed in 2000, all other factors being equal.

For the other Member States – except for Germany, Greece, Italy, Austria and Portugal – Chart 16 indicates that the 'average' national productivity level would have been higher if the 2000 employment shares had prevailed in 2010, all other factors being equal. This means that in these Member States employment was reallocated from sectors with a relatively high productivity level to sectors with relatively low productivity levels, partly driven by divergent wage trends among sectors. [2]

A case in point of the latter development is Ireland. The sharp drop in the 'average' national productivity level in Ireland was caused by the reallocation of employment from sectors with relatively high productivity levels, such as industry and finance/ business support, to sectors with relative low productivity levels, such as the public service and agriculture sectors. In Ireland, this reallocation was to a large extent brought about by changes in the sectors' relative real compensation per employee, i.e., the nominal compensation per employee deflated by the sectoral price, particularly in the public service sector, where changes in output prices were not in line with nominal compensation per employee.

In the Member States that joined the EU in 2004 or later, the gains follow primarily from a reallocation from the agricultural sector to the service sector, including finance/ business support. This gain in productivity was made despite the notable decrease in the industrial sector's share of employment. Among the drivers of the changes in these Member States was the increased openness of their economies to international markets and, to a lesser extent, changes in real wages.

Chart 15: Sectoral composition effect on average national labour productivity, 2000-10



Source: DG EMPL calculations based on Eurostat; more details in Annex 2.

Note: Percentage difference between average national productivity level observed in 2010 and the average national productivity level calculated on the basis of 2000 employment shares, assuming predetermined sectoral productivity levels. A positive (negative) sign indicates that average national productivity observed in 2010 is higher (lower) than the productivity level that would have been reached if the sectoral employment shares observed in 2000 had been maintained in 2010, all other factors being equal. PL evaluated for 2004, instead of 2000. Data provisional for IE and EL.

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(1) It should be noted that these sectors can be grouped into three groups with respect to the order of magnitude of their productivity level (measured as gross value added in basic prices per person employed). At the lower end is agriculture, at the middle there is the group consisting of construction, basic services and public services, at the upper end there is the group consisting of industry and sector providing finance and business support. Within the last two groups the ordering may vary across the Member States.

(2) A more detailed assessment of the impact of sectoral wages on sectoral employment composition will be discussed in a forthcoming working paper in a recently launched series of analytical working papers. See also ECORYS and Cambridge Econometrics (2011), Applica and WIIW (2012), and Darvas (2012).

However, it should also be noted that nominal unit labour costs within sectors affect not only the international competitiveness of the sector, they also affect domestic demand since divergent developments in domestic sectoral nominal unit labour costs (for both tradable and non-tradable goods and services) result in divergent developments in output prices. Relative sectoral output prices are one of the factors that determine the demand for goods and services and influence the prices of downstream sectors.

Third, developments in sectoral real unit labour costs, i.e. nominal compensation per employee adjusted for productivity and prices will be explored. As discussed in the sections on 'average' national RULC, the sectoral real unit labour cost is subject to double interpretation, i.e. as a measure of labour income share (affecting the demand side) and as a measure of the discrepancy between real wages and productivity (affecting the supply side).

5.1. Sectoral compensation per employee

Tables 17 and 18 summarize the main developments in nominal compensation per employee relative to average national nominal compensation per employee in six main sectors.

The main empirical features over the 2001-11 period are summarized below.

The lowest nominal compensation per employee was found in the agricultural sector in all Member States (see Table 17). The largest gap between the average compensation per employee in the agricultural sector and the average national compensation per employee was found in Spain where agricultural wages were only 34% of the average over the 2001-07 period and just above 33% in the 2008-11 period. The smallest gap was found in Sweden at about 87% in the 2001-07 period but this fell to just below 85% during the 2008-11 period. The strongest increase in compensation per employee in the agricultural sector relative to the average compensation per employee was recorded in Latvia at +31.7 ppt. over the 2001-07 period compared with the national average, and at +28.3 ppt. over the 2008-11 period, with the sharpest fall in relative terms in Germany at -13.3 ppt. in the 2001-07 period and -0.9 ppt. in the 2008-11 period (see Table 18).

In most EU Member States the nominal compensation per employee in industry was above the national average compensation per employee: the highest relative compensation per employee in industry was in Germany at 29% above the average in the 2001-07 period and at 31% higher in the 2008-11 period; the lowest was found in Portugal at 82% of the average (see Table 17). The strongest increase in relative terms over the 2001-11 period was found in Slovakia where the increase was 20 ppt. greater than the rise in the 'average' national compensation per employee in the 2008-11 period, while the strongest decrease was observed in Latvia, down by almost 20 ppt. in the 2001-08 period, but up by 15.6 ppt. in the 2008-11 period (see Table 18).

Compensation per employee in the construction sector ranges from 23% above the national average in Ireland to 30% below the national average in Greece. Very large increases relative to average compensation per employee were recorded in Latvia, at 46.4 ppt. above the national average in the 2001-07 period, followed by a decrease of 6.7 ppt. in the 2008-11 period. The increases in Estonia were 27.1 ppt. and 8.1 ppt. respectively, and in Spain were 4.9 ppt. and 18.0 ppt., while the strongest decreases were recorded in Hungary at -16 ppt. and -0.7 ppt. respectively.

Except for Slovakia, nominal compensation per employee in the basic services sector is below the national average compensation per employee in all Member States. The highest relative compensation per employee in this sector was recorded in Slovakia at 100.3% the average in the 2001-07 period, but this fell to 86.9% in the 2008-11 period, and was lowest in Ireland which had respective rates of 73.3% and 74.8%.

Nominal compensation per employee in the finance and business support sector is, on average, higher than the national average compensation per employee in all Member States with the exception of Germany where average compensation per employee is higher in industry than in finance. The highest relative compensation per employee was recorded in Hungary at 61% above the average in the 2001-07 period and 52.8% above the average in the 2008-11 period and the lowest was in Germany at 97.5% and 95.6% respectively.

Compensation per employee in the public service sector is higher than the national average in most Member States, with the highest relative compensation per employee found in Portugal at 45.8% above the national average compensation per employee during the 2001-07 period and 41.3% during the 2008-11 period, while the lowest was found in Sweden at about 11% below the average.

Table 17: Relationship of nominal employee compensation within sectors to national average compensation (%)

	Agriculture		Industry		Construction		Basic services		Finance and business support		Public services	
	2001-2007	2008-2011	2001-2007	2008-2011	2001-2007	2008-2011	2001-2007	2008-2011	2001-2007	2008-2011	2001-2007	2008-2011
BE	40.0	41.6	118.6	119.4	89.1	89.9	89.3	91.6	107.0	101.6	96.9	98.6
BG	59.5	63.3	96.6	93.0	81.8	80.2	91.2	87.6	139.5	134.4	111.1	121.5
CZ	77.6	77.9	101.2	102.0	86.5	84.6	88.0	85.8	120.9	121.1	111.6	112.9
DK	59.7	58.0	108.6	110.1	112.6	108.4	88.0	84.8	111.0	110.6	100.2	103.5
DE	57.8	56.1	128.7	131.2	97.1	99.1	77.1	76.7	97.5	95.6	99.6	100.0
EE	66.1	74.2	91.0	86.2	98.1	106.7	97.6	92.8	163.8	158.2	97.3	100.5
IE	63.8	72.1	95.7	98.0	123.7	123.2	73.3	74.8	112.6	115.4	117.0	112.6
EL	54.7	55.4	103.3	106.5	69.7	69.7	83.8	82.6	137.4	126.2	115.9	116.4
ES	34.3	33.2	107.5	109.3	90.0	100.6	89.7	86.0	108.0	99.5	116.7	118.5
FR	54.4	57.3	109.6	111.3	100.8	100.6	88.7	88.8	116.5	115.8	96.5	96.1
IT	48.0	47.8	99.6	99.7	79.3	82.6	93.6	91.2	108.4	105.6	114.2	117.2
LV	49.1	70.2	93.5	90.4	91.0	110.1	89.6	89.8	142.0	125.9	118.7	111.2
LT	61.5	67.1	105.7	102.0	94.7	98.7	97.9	97.9	128.0	113.7	97.9	101.7
HU	61.7	64.0	89.7	91.8	74.2	67.8	91.8	91.0	161.0	152.8	112.2	109.0
NL	66.0	70.2	120.6	122.3	117.9	121.5	81.2	79.6	107.7	108.5	100.2	100.3
AT	55.2	52.1	114.3	117.8	100.7	96.0	78.8	78.6	110.0	108.5	108.6	108.3
PT	53.4	52.1	81.9	83.2	71.4	74.1	86.2	85.6	121.7	118.2	145.8	141.3
SI	78.6	74.6	92.5	94.9	81.0	80.2	94.0	94.2	110.9	108.2	120.1	116.8
SK	72.4	86.2	102.1	110.8	107.7	108.4	100.3	86.9	116.7	104.6	94.6	101.0
FI	65.5	62.3	116.9	110.2	107.1	110.8	86.1	87.3	113.9	114.4	94.6	97.1
SE	87.3	84.8	115.2	115.0	113.6	107.9	97.1	95.2	111.1	111.1	88.6	90.7

Source: DG EMPL calculations on the basis of Eurostat, National Accounts. See also Annex 2.

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Table 18: Rate of compound growth in nominal employee compensation within sectors in relation to national average compound growth (%)

	Agriculture		Industry		Construction		Basic services		Finance and business support		Public services	
	2001-2007	2008-2011	2001-2007	2008-2011	2001-2007	2008-2011	2001-2007	2008-2011	2001-2007	2008-2011	2001-2007	2008-2011
BE	8.8	-1.1	2.8	-0.2	-2.1	3.3	1.4	2.2	-2.3	-5.6	0.6	2.3
BG	-17.0	18.0	-14.9	6.1	-18.2	12.2	7.6	-4.6	27.9	-15.6	8.4	0.9
CZ	-4.9	-2.6	-0.5	1.0	-8.0	-4.8	-4.2	-1.2	2.0	1.3	6.8	0.6
DK	-2.9	-3.7	4.1	0.3	-4.2	-3.9	-2.0	-4.0	1.3	-0.1	-0.8	4.7
DE	-13.3	-0.9	5.8	-0.2	1.2	1.3	-1.1	-1.5	-3.6	0.0	-1.5	2.3
EE	14.2	2.2	-1.1	-3.9	27.1	8.1	-0.9	-6.6	18.3	-2.4	-18.6	7.0
IE	-1.9	14.2	-0.6	3.8	-2.5	1.3	-8.4	1.1	5.9	3.9	-1.0	-2.9
EL	66.3	-5.5	15.9	-4.9	-5.1	-2.9	-10.9	0.0	-3.6	0.6	-1.3	-0.7
ES	-1.8	-4.9	8.3	-2.9	4.9	18.0	-6.4	1.4	-15.8	-5.1	7.5	-4.2
FR	18.2	3.8	-0.1	2.3	-0.3	-0.4	-0.8	0.0	-0.2	-2.0	0.2	0.5
IT	-0.9	0.8	0.5	0.1	-0.1	5.4	-4.8	-0.5	-7.4	-2.7	7.4	0.2
LV	31.7	28.3	-19.7	15.6	46.4	-6.7	-5.6	14.1	-5.9	-15.8	8.4	-15.0
LT	39.5	11.7	-8.1	5.5	11.8	-0.8	9.5	-3.5	6.3	-20.7	-11.5	7.3
HU	-7.4	7.4	-3.2	2.0	-15.9	-0.7	-2.3	-1.2	-6.0	-3.9	7.3	-3.7
NL	-3.8	8.8	2.0	1.9	4.1	2.0	-2.5	-1.6	2.0	2.4	-0.3	-1.0
AT	-5.7	-3.7	3.4	2.5	-2.0	-3.3	0.5	-0.6	-1.7	-1.3	-2.2	0.8
PT	-5.9	:	3.6	:	8.2	:	-5.0	:	-4.8	:	-1.9	:
SI	-2.7	-4.7	4.9	3.0	2.7	-6.4	3.6	-3.2	-7.9	-2.3	-8.1	0.3
SK	5.3	33.7	0.8	19.8	-7.1	8.2	-1.7	-24.2	-10.2	-15.1	1.4	9.6
FI	-9.4	2.6	2.7	-5.9	-0.3	2.4	-3.5	3.7	-0.9	-0.5	1.8	1.7
SE	1.0	-3.9	2.2	-0.9	-2.4	-4.4	-2.8	-1.8	-0.6	-0.9	1.4	3.3

Source: DG EMPL calculations on the basis of Eurostat, National Accounts. See also Annex 2.

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5.2. Sectoral productivity

Table 19 shows the compound growth in sectoral productivity relative to 'average' national productivity growth. (See Box 6 for a discussion of the calculation of productivity at the sectoral level.)

During the 2001-07 period, labour productivity in industry grew at a stronger pace than 'average' national productivity in all Member States except Latvia, and most of the Member States that joined the EU in 2004 or later recorded strong growth. During the 2008-11 period productivity growth remained robust in comparison with productivity growth in other sectors. Notable exceptions were Greece, Italy and Finland where the productivity of industry decreased at a stronger pace than the national 'average': as shown in Table 2 above, compound 'average' national productivity growth in these Member States was negative over the 2008-11 period.

Labour productivity in the construction sector grew at a slower pace than 'average' national productivity in all Member States except Belgium and Lithuania during the 2001-07 period. Nevertheless, in several Member States, including Spain and Estonia, there was a strong reversal in productivity growth during the 2008-11 period, reflecting a greater decrease in employment rather than a decrease in gross value added for the sector. In Spain and Estonia, productivity in the construction sector grew at a rate 30 ppt. higher than the national 'average' from 2008 until 2011.

Labour productivity in the basic service sector behaved in a rather different way across Member States when compared with the national 'average' during the 2001-07 period. Most notable were the sharp decreases in Ireland (-22.4 ppt) and Slovakia (-27.1 ppt.). Labour productivity in basic services decreased in most Member States during the 2008-11 period in comparison with 'average' national productivity growth. Notable exceptions were Germany and Finland where productivity in this sector continued to grow at a robust pace in comparison with the 'average' national productivity level, up by 6.0 ppt. and 10.3 ppt. respectively.

Productivity in the finance/ business support sector grew at a slower pace than average national productivity during the 2001-07 period. A notable exception was Ireland where productivity increased at a rate 42 % higher than the national average. Some Member States recorded a notable recovery in the productivity of their finance/ business support sectors compared with the national average, e.g. Denmark which recorded compound growth at a rate 9.4 ppt. higher than the national average over the 2008-11 period.

Productivity in the public services sector progressed at a slower pace than the national average in all Member

Table 19: Compound growth in sectoral productivity relative to compound growth of national average

	Agriculture		Industry		Construction		Basic services		Finance and business support		Public services	
	2001-2007	2008-2011	2001-2007	2008-2011	2001-2007	2008-2011	2001-2007	2008-2011	2001-2007	2008-2011	2001-2007	2008-2011
BE	-1.6	36.3	9.8	6.3	9.3	-0.5	4.4	2.8	-3.8	-5.3	-10.2	-1.2
BG	-39.5	6.0	13.0	8.7	-29.2	5.3	2.7	-7.1	-15.9	-10.6	-8.6	-3.2
CZ	-12.7	-4.7	23.7	9.1	-16.4	-8.6	0.2	-9.7	-18.5	4.2	-25.1	-3.3
DK	-4.1	4.3	5.9	0.8	-14.7	-0.8	0.5	-7.8	-5.0	9.4	-1.4	1.5
DE	54.8	-13.8	14.6	1.3	-11.3	3.0	4.7	6.0	-13.4	-7.6	-11.0	3.6
EE	-6.6	12.7	16.2	6.7	-28.3	32.5	7.8	-17.5	9.4	-9.5	-31.6	0.7
IE	-20.4	15.9	24.5	31.5	-27.5	-10.5	-22.4	-17.5	42.7	-11.0	-48.2	-28.0
EL	-9.9	11.6	4.7	-1.3	-17.8	7.2	24.6	-5.7	-35.9	3.3	-14.4	2.3
ES	14.1	5.4	15.9	2.6	-5.7	32.6	-7.0	-2.5	-15.6	-8.8	3.9	-4.4
FR	5.4	21.1	16.7	0.0	-11.1	-13.4	-2.3	0.5	-4.6	0.1	-3.4	2.2
IT	4.9	5.6	4.2	-0.9	-5.0	-9.1	-4.1	-2.7	-10.2	-0.1	7.4	4.2
LV	7.5	16.3	-4.4	17.7	-24.0	-6.2	9.5	1.9	-16.3	-9.9	-22.2	-19.6
LT	11.8	24.1	8.4	14.3	0.4	7.1	-8.3	-6.6	-27.6	-23.6	-25.4	-4.0
HU	36.0	50.6	18.6	4.3	-31.6	-12.6	4.3	-14.6	-25.8	-13.4	-18.2	4.7
NL	8.6	11.6	15.5	4.6	-4.4	-6.6	8.2	-2.4	-5.7	3.9	-9.6	0.0
AT	9.9	13.8	14.4	5.6	-1.3	-14.7	-4.5	-3.5	-7.1	1.8	-12.2	-1.0
PT	-6.5	6.4	13.5	1.5	-11.8	-12.8	-11.4	2.5	3.4	-4.0	-7.9	-7.3
SI	5.2	8.0	18.1	8.8	-4.5	-26.5	2.8	-2.0	-26.9	-1.2	-17.3	-1.5
SK	72.6	-30.0	47.1	33.2	-23.5	-1.3	-27.1	-30.8	-28.8	-21.0	-19.9	-1.8
FI	8.6	15.7	33.3	-4.9	-14.4	6.7	-2.0	10.3	-19.8	-4.4	-20.3	2.9
SE	50.7	-12.1	25.6	8.0	-15.6	-14.2	5.2	-2.0	-12.4	-5.0	-15.7	4.8

Source: DG EMPL calculations on the basis of Eurostat, National Accounts. See also Annex 2.

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States during the 2001-07 period, with Ireland recording the strongest decrease by far (48.2 ppt. below the national average). Several Member states recorded compound growth in productivity in the public services sector higher than the compound growth at the national level during the 2008-11 period, including Sweden at +4.8 ppt., and Hungary at +4.7 ppt.

5.3. Sectoral nominal unit labour cost

Table 20 shows the compound growth rates in nominal unit labour costs (ULC) compared with the compound growth rates of the national average for the 2001-07 and 2008-11 periods.

The main characteristics of the compound growth rates in sectoral nominal unit labour costs [18] across Member States for the 2001-07 period are:

- strong decreases in industry relative to national average compound ULC growth in all Member States except Greece, where compound ULC growth in industry was 10.6 ppt. above the national average compound growth rate;
- strong increases in the construction sector in all Member States except Belgium and Austria;
- strong increases in the public services sector, with Ireland recording the strongest increase by far, up by 90 ppt.

No other common patterns across Member States were readily identified. It should be further noted that the magnitude of the compound growth was notably higher in the Member States that joined the EU in 2004 or later.

Developments in sectoral nominal ULCs over the 2008-11 period are characterised by:

- apart from France and Italy, continued strong decreases in industry in all Member states, including Greece;
- a sharp reversal in the ULC in construction in several Member States, with particularly strong decreases in Estonia, Greece, Spain and Lithuania;
- stronger increases in the ULC of basic services in most Member States;
- a modest reversal in the ULC of the public sector in a few Member States including decreases in Germany, Greece, France, Italy and Hungary;

Among the various sectors, it is particularly in the industrial, agricultural and certain of the private services sectors that changes in nominal ULCs have the greatest direct impact on international cost competitiveness. It would nevertheless be beyond the scope of this chapter to make a precise assessment of the above-described developments on the international cost competitiveness of the Member States' sectors) [19].

Box 6: Sectoral labour productivity

The following factors should be taken into account when using productivity data calculated as gross value added (GVA) at basic prices divided by the number of employed persons at the aggregate and sectoral levels.

First, the rule that productivity is calculated as GVA divided by the number of employed persons is an accounting rule: it does not constitute a behavioural relationship showing causality. I.e., it still states that causality runs either from (predetermined) productivity and GVA to an (endogenous) number of employed persons, from (predetermined) productivity and number of employed persons to (endogenous) GVA, or from (predetermined) GVA and number of employed persons to (endogenous) productivity.

Second, productivity by persons employed in the public services sector is difficult to measure because gross value added in this sector is often unpriced and public services are often consumed collectively [1], (see, for instance, Boyle (2006)).

Third, financial costs and depreciation are not considered in the calculation of gross value added or GDP. However, these costs may constitute the main costs faced in some parts of the real estate sector and telecommunications sector. As such, productivity (i.e. GVA per employed person) tends to be particularly high for these sectors [2]. In addition, gross value added in the real estate sector covers imputed rent for owner-occupied dwellings. This component of gross value added stems from the use by employed persons or households of stocks of dwellings, and as such it does not correspond with observed paid labour input in the real estate sector.

All in all, not taking into account the previous considerations can lead to overestimation of labour productivity in the real estate and telecommunications sector, and underestimation of labour productivity in the public services sector. This is of particular relevance if one seeks to compare total productivity levels across Member States. For instance, Member States whose employment levels in the public services sector are higher than in other Member States but with productivity levels in other sectors which are equivalent to other Member States will for 'statistical' reasons report a lower productivity level. But this bias will be less pronounced if developments in productivity levels within Member States are considered.

(1) To measure the flows of non-market services see, for instance: http://circa.europa.eu/irc/dsis/nfaccount/info/data/esa95/en/een00454.htm

(2) For further details, see: http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Real_estate_activity_statistics_-_NACE_Rev._2 and http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Real_estate_statistics_-_NACE_Rev._1.1#Expenditure_and_productivityhttp://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Real_estate_statistics_-_NACE_Rev._1.1#Expenditure_and_productivity

(18) Nominal unit labour is the sectoral nominal compensation per employee adjusted for productivity gains.

(19) See, for instance, ECORYS and Cambridge Econometrics (2011) and Darvas (2012).

Table 20: Sectoral nominal ULC compound growth relative to national average compound growth

	Agriculture		Industry		Construction		Basic services		Finance and business support		Public services	
	2001-2007	2008-2011	2001-2007	2008-2011	2001-2007	2008-2011	2001-2007	2008-2011	2001-2007	2008-2011	2001-2007	2008-2011
BE	10.6	-27.4	-6.4	-6.1	-10.4	3.8	-2.9	-0.6	1.5	-0.3	12.0	3.6
BG	37.2	11.3	-24.7	-2.5	15.5	6.6	4.8	2.7	52.1	-5.6	18.6	4.2
CZ	8.9	2.2	-19.6	-7.5	10.1	4.1	-4.3	9.4	25.2	-2.8	42.6	4.1
DK	1.2	-7.7	-1.6	-0.4	12.3	-3.2	-2.5	4.1	6.6	-8.6	0.6	3.1
DE	-44.0	14.9	-7.7	-1.4	14.1	-1.7	-5.6	-7.0	11.4	8.2	10.7	-1.3
EE	22.2	-9.3	-14.9	-10.0	77.3	-18.4	-8.0	13.2	8.1	7.8	19.0	6.3
IE	23.3	-1.5	-20.2	-21.1	34.5	13.1	18.0	22.5	-25.8	16.8	91.1	34.9
EL	84.5	-15.3	10.6	-3.7	15.5	-9.5	-28.5	6.0	50.4	-2.6	15.2	-2.9
ES	-13.9	-9.8	-6.5	-5.3	11.2	-11.0	0.6	4.0	-0.3	4.0	3.5	0.2
FR	12.2	-14.2	-14.3	2.3	12.2	14.9	1.6	-0.5	4.6	-2.1	3.8	-1.7
IT	-5.6	-4.5	-3.5	1.0	5.2	15.9	-0.6	2.2	3.1	-2.6	0.1	-3.8
LV	22.4	10.3	-16.0	-1.8	92.7	-0.6	-13.8	11.9	12.3	-6.5	39.2	5.6
LT	24.8	-10.0	-15.2	-7.7	11.4	-7.4	19.4	3.4	46.9	3.9	18.7	11.7
HU	-31.9	-28.7	-18.4	-2.2	23.0	13.6	-6.3	15.7	26.8	11.0	31.2	-8.0
NL	-11.5	-2.5	-11.7	-2.6	8.9	9.2	-10.0	0.9	8.2	-1.4	10.2	-1.0
AT	-14.2	-15.4	-9.7	-3.0	-0.7	13.4	5.2	3.0	5.8	-3.0	11.5	1.8
PT	0.7	:	-8.7	:	22.7	:	7.1	:	-7.9	:	6.5	:
SI	-7.5	-11.8	-11.1	-5.4	7.6	27.3	0.7	-1.1	25.9	-1.1	11.1	1.8
SK	-39.0	91.0	-31.5	-10.1	21.5	9.6	34.8	9.6	26.1	7.5	26.7	11.6
FI	-16.6	-11.3	-22.9	-1.0	16.6	-4.0	-1.4	-5.9	23.5	4.1	27.6	-1.2
SE	-33.0	9.4	-18.7	-8.3	15.6	11.5	-7.6	0.2	13.6	4.3	20.3	-1.4

Source: DG EMPL calculations on the basis of Eurostat, National Accounts. See also Annex 2.

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5.4. Sectoral prices

To gauge changes in the distribution of total factor income between labour and capital at the sectoral level, sectoral nominal unit labour costs must be deflated by sectoral output prices.

Table 21 summarizes the main developments in sectoral prices relative to average price movements in the Member States for the 2001 to 2011 period.

The main features of sectoral price developments over the 2001-07 period are that in all Member States except Bulgaria, average prices in the public service sector grew at a stronger pace than did the average national price level, and that prices in the agricultural sector grew at a slower pace than the average price in all Member States except Estonia and the Czech Republic. By far the largest increases in the public services sector were recorded in Ireland, with a compound growth of 129 ppt. above the compound growth in national average price, reflecting the strong price increases in public services, including health services and education, over the 2001-07 period. During the 2008-11 period some Member States, including Latvia, Lithuania and Hungary, showed compound growth rates in the prices of the public sector that were below the compound growth rate of the national average price level.

In the industrial sector prices rose less than average prices in most Member States, except in Bulgaria, Denmark, Greece, Spain, and the Netherlands where output prices in industry increased at a faster pace than the national average.

Prices in the construction sector rose in most Member States except Latvia and Lithuania at a faster pace than average prices in the 2001-07 period. However, output prices in the construction sector decreased sharply in the Baltic States, Ireland, Spain, Greece and Finland during the 2008-11 period.

5.5. Sectoral real unit labour cost

Table 22 shows developments in the sectoral real unit labour cost. The sectoral real unit labour cost is obtained by deflating the sectoral nominal unit cost by sectoral prices.

As discussed in the text above and in Annex 1, the real unit labour cost at the level of the economy as a whole can be associated with two transmission mechanisms, with one related to aggregate demand as a measure of the adjusted national labour income share, and the other related to aggregate supply as a measure of the wedge between average national real wages and average national labour productivity.

At the sectoral level, the two above-mentioned transmission mechanisms differ in their relevance to policy. Indeed, for any particular sector, an increase in real unit labour costs (i.e. the sectoral labour income share, which represents household income that will be spent on a variety of goods and services including those of the sector concerned) generates externalities. Among these are increased aggregate demand, the benefits of which will trickle down to all sectors of the economy, therefore, these sectors do not have an incentive to take these externalities into account in their decisions.

Table 21: Compound growth in sectoral prices relative to national average compound growth

	Agriculture		Industry		Construction		Basic services		Finance and business support		Public services	
	2001-2007	2008-2011	2001-2007	2008-2011	2001-2007	2008-2011	2001-2007	2008-2011	2001-2007	2008-2011	2001-2007	2008-2011
BE	-18.7	-23.2	-6.2	-0.5	0.8	4.7	11.3	1.2	-2.4	-0.1	12.1	9.3
BG	-14.6	:	0.5	:	31.6	:	-17.4	:	-9.1	:	-2.8	:
CZ	8.4	0.8	-14.8	-5.6	25.2	7.4	-9.7	1.3	18.8	5.3	37.1	10.5
DK	-43.1	28.6	7.1	-0.2	12.1	0.0	0.9	1.4	-4.6	0.1	6.5	3.8
DE	-42.2	27.4	-1.4	1.9	7.8	9.9	-5.4	-5.3	3.0	-0.9	3.6	0.5
EE	18.3	-6.1	-7.5	5.8	49.2	-31.3	-7.9	12.0	-12.1	-7.1	24.2	6.1
IE	-12.0	43.4	-4.2	-3.4	53.7	-55.2	37.8	18.4	-24.4	2.8	129.1	38.3
EL	-7.0	-22.9	2.6	13.8	4.1	-11.8	-17.3	-1.3	27.3	-3.6	14.7	3.7
ES	-8.5	-10.5	6.3	7.6	33.4	-0.2	11.6	8.2	-5.7	-0.7	9.7	3.5
FR	-7.5	-9.0	-14.2	-2.8	27.7	14.6	4.3	3.0	5.9	-2.1	11.2	4.1
IT	-13.4	-6.4	-1.1	-2.7	18.2	10.1	1.2	3.4	3.7	2.4	6.8	1.3
LV	-3.2	22.8	-11.1	4.0	-6.2	-15.1	-23.7	-2.5	10.1	-17.5	18.8	-10.3
LT	-5.7	-24.0	-16.0	-6.0	-7.0	-21.2	-8.2	-1.2	35.8	-15.7	5.1	-8.8
HU	-15.4	-10.3	-13.4	5.6	2.2	1.7	-2.6	1.8	9.8	0.7	14.6	-8.9
NL	-14.5	-19.0	4.5	5.3	15.5	7.0	-9.1	-1.9	1.1	-0.5	12.1	4.1
AT	-1.5	-6.3	-2.6	-3.4	6.8	9.8	6.8	4.9	1.6	-3.5	10.5	3.7
PT	-19.3	-13.0	-4.9	0.0	18.1	15.0	4.7	4.7	-1.6	-5.3	13.3	-1.3
SI	-4.0	2.7	-8.8	-2.8	10.0	11.6	3.5	1.4	4.7	0.2	5.0	8.2
SK	-15.5	34.9	-25.6	-7.8	19.7	6.4	14.1	18.5	30.0	3.9	15.8	15.8
FI	-3.0	-9.8	-18.7	-5.7	20.7	-8.2	0.5	-1.3	11.0	0.4	30.1	10.4
SE	-19.8	23.6	-13.1	-0.9	28.6	13.3	3.2	3.2	0.8	-1.3	22.2	3.9

Source: DG EMPL calculations on the basis of Eurostat, National Accounts. See also Annex 2.

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Table 22: Compound growth of sectoral real unit labour cost relative to compound growth of national average

	Agriculture		Industry		Construction		Basic services		Finance and business support		Public services	
	2001-2007	2008-2011	2001-2007	2008-2011	2001-2007	2008-2011	2001-2007	2008-2011	2001-2007	2008-2011	2001-2007	2008-2011
BE	35.9	-5.4	-0.2	-5.7	-11.1	-0.8	-12.7	-1.7	4.1	-0.2	-0.1	-5.2
BG	60.6	:	-25.1	:	-12.2	:	26.9	:	67.3	:	22.0	:
CZ	0.5	1.4	-5.7	-2.0	-12.0	-3.0	5.9	8.0	5.4	-7.7	4.0	-5.8
DK	77.7	-28.2	-8.2	-0.2	0.2	-3.1	-3.4	2.7	11.7	-8.7	-5.5	-0.6
DE	-3.2	-9.8	-6.4	-3.3	5.9	-10.5	-0.2	-1.8	8.2	9.2	6.9	-1.8
EE	3.3	-3.4	-8.0	-14.9	18.8	18.8	-0.1	1.1	22.9	16.1	-4.2	0.1
IE	40.1	-31.3	-16.7	-18.3	-12.5	152.3	-14.4	3.4	-1.9	13.6	-16.6	-2.5
EL	98.4	9.8	7.8	-15.4	10.9	2.6	-13.5	7.4	18.1	1.1	0.4	-6.4
ES	-5.9	0.7	-12.0	-12.0	-16.6	-10.8	-9.8	-3.9	5.7	4.7	-5.7	-3.2
FR	21.3	-5.8	-0.1	5.2	-12.1	0.3	-2.6	-3.4	-1.2	0.0	-6.6	-5.6
IT	9.0	1.9	-2.4	3.8	-11.1	5.3	-1.8	-1.1	-0.6	-4.8	-6.3	-5.0
LV	26.5	-10.2	-5.5	-5.6	105.5	17.1	13.0	14.8	2.0	13.4	17.2	17.8
LT	32.3	18.5	0.9	-1.9	19.7	17.5	30.0	4.6	8.2	23.2	13.0	22.5
HU	-19.6	-20.5	-5.7	-7.4	20.4	11.7	-3.8	13.7	15.4	10.2	14.5	0.9
NL	3.5	20.4	-15.5	-7.5	-5.7	2.0	-1.0	2.8	7.0	-1.0	-1.6	-4.9
AT	-12.9	-9.8	-7.2	0.4	-7.0	3.2	-1.4	-1.8	4.2	0.4	0.9	-1.9
PT	24.7	:	-4.0	:	3.9	:	2.4	:	-6.4	:	-6.0	:
SI	-3.6	-14.0	-2.5	-2.7	-2.3	14.0	-2.7	-2.5	20.3	-1.4	5.8	-5.9
SK	-27.8	41.5	-7.9	-2.5	1.6	3.0	18.1	-7.5	-3.0	3.5	9.4	-3.6
FI	-13.9	-1.7	-5.2	4.9	-3.4	4.7	-1.9	-4.7	11.3	3.7	-1.9	-10.6
SE	-16.4	-11.5	-6.4	-7.4	-10.1	-1.6	-10.5	-3.0	12.7	5.7	-1.6	-5.2

Source: DG EMPL calculations on the basis of Eurostat, National Accounts. See also Annex 2.

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This is in sharp contrast with increases in the national labour income share of the economy as a whole, particularly in closed economies without leakage to the rest of the world, in which case the economy as a whole benefits.

The following observations can be made about compound growth rates in sectoral real unit labour costs relative to the compound growth rate of the national average for the 2001-07 period:

- compound growth in industry was below the national average in all Member States except Greece and Lithuania;
- significantly different patterns were seen in the compound growth of agriculture across Member States, with very sharp increases in Greece and Denmark and notable decreases in Portugal;
- the compound growth rate in the finance/ business support sector increased in all Member states except Ireland, France, Italy, Portugal and Slovakia;
- the compound growth in real unit labour costs in the public services sector compared with the compound growth rate of the national average differed markedly across Member States with sharp increases relative to the national average in Bulgaria at +22 ppt. and Latvia at +17.2 ppt. and a sharp decrease in Ireland at -16.6 ppt.

Observations with regard to the real unit labour cost over the 2008-11 period:

- industry displayed a pattern similar to that observed in the 2001-07 period;
- in some Member States, particularly Ireland and Latvia, construction displayed reverse patterns in comparison with the 2001-07 period, rising in Member States where it had previously fallen and falling where it had previously risen;
- with the exception of the Baltic States and Hungary, the real unit labour cost of the public services sector returned a lower compound growth rate than the national average.

6. Main findings and conclusions

An analysis of various indicators has highlighted a number of developments that have marked the last decade and may be relevant in the pursuit of the Europe 2020 targets of reaching an employment rate of 75% of 20-64 year-olds by 2020 and of reducing the number of people in or at risk of poverty and social exclusion by at least 20 million by 2020:

- labour costs grew significantly during the run-up to the crisis in the Member States that joined the EU before 2004, but have decelerated markedly since the crisis, notably in Greece, Portugal and Ireland and since 2010 in Spain, i.e. Member States where growth in nominal compensation was well above productivity growth during the run-up to the crisis;
- labour costs grew significantly in new Member States before the crisis, but so too did growth in productivity – mainly reflecting the ongoing restructuring of their economies;
- productivity growth started to weaken significantly in all Member States by the end of 2011, resulting in negative productivity growth in several Member States in the first half of 2012, including Belgium, the Czech Republic, Germany, Italy, Hungary and the United Kingdom. (No data is available for Greece);
- nominal unit labour cost growth developed in an asymmetric manner across the Member States of the euro area over the 2001-07 period; it was negative in Germany, but positive and often substantially so in the other members, with compound growth rates between 5.7% in Austria and 31.6% in Ireland;
- nominal unit labour costs began to converge moderately with the onset of the crisis, as Greece, Portugal and Spain started to show a declining trend in nominal unit labour costs as a result of productivity increases, while in Germany costs continued to increase;
- in the run-up to the crisis most Member States (with the notable exception of Germany) showed an appreciation of their real effective exchange rate and a loss of international cost competitiveness, but this trend was reversed in several Member States with the onset of the crisis. Exchange rate movements overall had a limited impact on employment over the 2001-12 period;
- the adjusted labour income share or real unit labour cost decreased notably during the run-up to the crisis, but recovered in most Member States during the 2008-11 period. However, in Spain and Slovakia the real unit labour cost showed a negative growth rate for the 10th consecutive quarter in the second quarter of 2012;
- strong differences were seen among Member States and between time periods in the development of real wages, i.e. gross wage growth adjusted for consumer price inflation. The Baltic Member Sates experienced sharp increases over the 2001-07 period, but strong decreases over the 2008-11 period. Germany recorded a fall during the 2001-07 period, which was only partly offset during the 2008-11 period;
- the purchasing power of minimum wages remained fairly stable during the 2001-12 period. There is only weak evidence that minimum wages impact jobs negatively especially in a severe economic downturn as they support employment in several respects. First, they help to sustain aggregate demand; second, they boost wage equality by maintaining an adequate living standard for the most vulnerable workers; and third they buoy prices, thereby reducing the risk of deflation;
- the gender pay gap fell in some Member States but remained quite high in others, whereby minimum wages seem to have the potential to narrow the gender pay gap;
- strong wage dispersion still existed at the regional level in some Member States, and the spread increased in some countries after 2008;
- changes in sectoral real wages brought about a reallocation of

sectoral employment with notable effects on average national productivity and the nominal unit labour cost in some Member States.

The previous analysis highlighted the relevance of indicators related to the monitoring of wage developments in reaching the Europe 2020 targets of employment of 75% of 20-64 year-olds by 2020 and reduction by at least 20 million of those at risk of poverty and social exclusion by 2020.

The analysis tends to suggest that the interactions between the different channels through which wages affect employment and social cohesion call for attention to be paid to a broad socio-economic spectrum of indicators, including the nominal and real unit labour cost at the national and sectoral level as well as their respective optimal lower and upper bounds. Nevertheless, more research is needed to derive firm policy conclusions.

Annex 1: Basic definitions

This annex provides definitions for some of the basic concepts used in this chapter including the wage-related indicators. Annex 4 assesses the scope and limitations of these indicators.

A.1.1. Labour cost

Total labour costs encompasses employee compensation as well as the cost of vocational training, recruitment costs, expenditure on work clothes etc., from which any subsidies received may be deducted.

Employee compensation refers to total remuneration including gross wages and salaries (before deduction of taxes and employee social security contributions), employer social security contributions, bonuses and overtime payments paid in cash or in kind, by employers to employees in return for work performed during the accounting period. Compensation per employee is obtained by dividing total compensation of employees by the number of employees.

Wages and salaries are defined as total remuneration, in cash or in kind, paid to all persons counted on the payroll including home workers, in return for work performed during the accounting period regardless of whether it is paid on the basis of working time, output or piecework and whether or not it is paid regularly.

Monthly gross earnings in the reference month cover remuneration in cash paid before tax deductions and social security contributions owed by wage earners and retained by the employer, and are restricted to gross earnings disbursed in each pay period during the reference month.

Mean annual gross earnings also cover 'non-standard payments', i.e. payments not occurring in each pay period, such as 13th or 14th month payments, holiday bonuses, quarterly or annual company bonuses and annual payments in kind.

A.1.2. Labour productivity

Labour productivity is the ratio of the real value of output to the input of labour. Although it is considered appropriate to use the number of hours as the labour input indicator, it is most common to use the number of employed persons as the denominator since this data is easier to obtain. This may pose problems if the number of employees is not expressed in full-time equivalents and if part-time workers participate in the production process.

A.1.3. Nominal unit labour cost

Labour cost, compensation per employee, and wages and salaries are nominal concepts and are difficult to interpret in absolute terms, therefore nominal compensation per employee (or any other labour cost measure) is usually related to another variable.

The nominal compensation per employee deflated by a price index yields the real compensation per employee, while the nominal compensation per employee divided by labour productivity yields the (nominal) unit labour cost (ULC).

Alternative definitions of nominal unit labour cost

Other definitions of the unit labour costs include the following:

- OECD: Unit labour costs measure the average cost of labour per unit of output and are calculated as the ratio of total labour costs to real output. See: http://stats.oecd.org/glossary/detail.asp?ID=2809;
- ILO: Labour cost per unit of output (in short, unit labour cost) is defined as nominal labour compensation divided by real value added. See: http://www.ilo.org/wcmsp5/groups/public/---ed_emp/documents/publication/wcms_142286.pdf;
- US BLS: Unit labour costs can be computed by dividing employer labour costs (payments made directly to workers plus employer payments into funds for the benefit of workers) by real value added output. Unit labour costs can also be computed by dividing hourly labour costs by output per hour. See: http://www.bls.gov/fls/fls-faqs.htm#unitlaborcosts.

Interpreting the nominal unit labour cost

More formally, the unit labour cost (ULC) used in this note is defined as

ULC = (Compensation of employees at current prices / no. of employees) / (GDP in volume / no. of persons employed)

which can be rewritten as

= (Compensation of employees at current prices) / (GDP in volume) * (no. of persons employed/ no. of employees)

whereby the first term is equal to the ULC concept defined by the OECD and ILO and whereby the ratio (no. of persons employed/ no. of employees) is the so-called adjustment for the self-employed in the total wage bill, assuming that wages earned by the self-employed are similar to the wages earned by employees. In other words, the indicator used in this note provides a correction for the self-employed whose labour cost are not available in the national statistics.

A.1.4. Real unit labour cost

The real unit labour cost (RULC) is obtained by dividing the nominal unit labour cost (ULC) by the GDP deflator (PGDP).

Interpreting the real unit labour cost

The real unit labour cost can be interpreted in two ways. First, it is a measure of labour income share. Second, it is a measure of the discrepancy between real wages and productivity.

Some arithmetic to clarify this statement:

RULC = ULC / PGDP
= [(Compensation of employees at current prices / No. of employees) / (GDP in volume / No. of persons employed)] / PGDP)
= [(Compensation of employees at current prices) / (GDP in value)] * (No. of persons employed/ No. of employees)
= Adjusted labour income share

The first term, (Compensation of employees at current prices) / (GDP in value), captures the income share of the employees. The second term, (No. of persons employed/ No. of employees), adjusts the share to include the self-employed. This is done because, while data for the

compensation of employees is usually readily available for the EU Member States, the remuneration of the self-employed is not readily available in the statistics. However, data on the income of the self-employed must be estimated and a common practice is to assume that the wage rates of employees and the self-employed are the same and adjust the labour income share accordingly.

The real unit labour cost thus gives an indication of the changes in the wage share (or labour income share) over time.

By further rearranging the terms one obtains:

RULC = [(Compensation of employees at current prices / No. of employees) / PGDP] / (GDP in volume / No. of persons employed)

i.e. the real wage relative to productivity. In other words, the RULC also provides an indication as to the extent to which real wage growth keeps up with productivity growth.

A.1.5. The real effective exchange rate

The nominal unit labour cost indicator is also the basis for assessing the development of a country's international cost and price competitiveness, if it is compared with the nominal unit labour cost in other countries. Since relative costs/prices between countries are subject to monetary fluctuations, relative competitiveness is measured using the real effective exchange rate (REER) defined as:

REER = NEER * weighted average (ULC / ULCf)

where:

NEER = the nominal effective exchange, defined as the weighted average of bilateral exchange rates
ULC = the domestic unit labour cost
ULCf = the unit labour cost of trading partners.

A rise in the index means a loss of competitiveness.

The scoreboard for monitoring the sustainability of macro-economic developments endorses the REER based on the Harmonized Indices of Consumer Prices (HICP) deflator.

Annex 2: Data sources

Harmonised data have been used throughout this chapter. The main sources are the Eurostat databases and the DG ECFIN AMECO database.

Data on the 'distribution of gross earnings of full-time employees and the 'gender wage gap' are obtained from the Online OECD Employment database [20].

The notes to the tables and charts provide the exact references for the data used in the tables.

A.2.1. The sectoral data

Sectoral ('Branches') variables were retrieved from the Eurostat database: 'National Accounts detailed breakdowns' (by industry, by product, by consumption purpose) (nama_brk) along the following units:

- gross value added (at basic prices): Chain linked volumes, reference year 2005, national currency (including 'euro fixed' series for euro area countries);
- gross value added (at basic prices): Millions of national currency (including 'euro fixed' series for euro area countries);
- compensation of employees: Millions of national currency (including 'euro fixed' series for euro area countries);
- total employment – domestic concept: 1000 persons;
- employees – domestic concept: 1000 persons.

For the sectors

- A: Agriculture, forestry and fishing;
- B-E: Industry, including manufacturing;
- F: Construction;
- G-J: Wholesale and retail trade; repair of motor vehicles and motorcycles; transportation and storage; accommodation and food service activities; information and communication;
- K-N: Financial, real estate, renting and business activities;
- O-Q: Public administration and defence; compulsory social security; education; human health and social work activities.

Not covered are the sectors R-U Arts, entertainment and recreation; other service activities; activities of household and extra-territorial organizations and bodies.

A.2.2. Data transformation

Nominal compensation per employee is derived by dividing the nominal compensation of employees by the number of employees. The compensation of the self-employed is assumed to be equal to the compensation per employee.

The deflator for the nominal compensation per employee is derived by dividing gross value added (at basic prices) by gross value added (at basic prices), chain linked volumes, reference year 2005, national currency –neither adjusted seasonally or by working day– in case they are not readily available from the EUROSTAT database.

Sectoral labour productivity is derived by dividing gross value added (at basic prices), chain linked volumes, reference year 2005, by total employment. It should be noted that in national accounts, gross value added (GVA) is the difference between the value of goods and services produced and the cost of raw materials and other inputs used to produce them. As such,

GVA + taxes on products - subsidies on products = GDP

with GDP gross domestic product. In other words, GVA does not take into account indirect taxes and subsidies.

[20] Available at: http://www.oecd.org/els/employmentpoliciesanddata/onlineoecdemploymentdatabase.htm#deciles

Annex 3: Wages, productivity and employment in imperfect markets

Assuming, inter alia, perfect competition and perfect information, classic economic theory posits that workers are hired until their marginal product equals their marginal costs (i.e. wages). However, changing these assumptions may have some important implications for the interaction between wages, productivity and employment.

Efficiency-wage theory

Yellen (1984), and Shapiro and Stiglitz (1984) show that in the case of imperfect information, where the productivity, i.e. the effort, of workers cannot be observed directly, an interaction between wages and productivity exists that captures effects that go beyond the classical findings.

In such an environment, workers may be tempted to shirk, i.e. make less effort than expected in return for their paycheck. To give workers an incentive not to shirk, employers pay a wage above the free market wage which is reflective of productivity, so that when a worker is caught shirking she or he is fired and must return to the free market wage. If only one firm were to apply this rule, workers would only choose to work for the firm that paid wages above marginal productivity. As a consequence, all firms must raise their wage above the free market wage, so that real equilibrium wage remains above productivity. At the same time, however, there will be involuntary unemployment as some persons will be willing to work but unable to find a job at the prevailing wage.

Following similar lines of reasoning are other theories which state that wages above productivity lead to higher personal income (and to the extent that this is related to health, to better health and thus to higher productivity), and to lowering turnover costs, attracting higher quality employees, improving morale, and creating greater feelings of loyalty to the firm (see for instance Katz (1986)).

Implicit wage contracts

Assuming different attitudes toward risk, i.e. that workers are risk-averse with regard to their wage income and firms are risk neutral with regard to labour cost, firms may have an incentive to protect their workers' wages against risks associated with stochastic productivity shocks throughout the duration of the contract. As a consequence, risk-averse workers will be prepared to accept a non-stochastic wage lower than the expected value of a stochastic wage that moves in line with productivity. (See Newberry and Stiglitz (1987)).

As a consequence, a fall in productivity and thus a fall in labour demand which would lead in a classical model to a decline in wages, is now offset by firms laying off redundant workers while keeping the wage unchanged for the rest of the workforce. Arnott, Hosios and Stiglitz (1988) show that the overall employment effects of such an arrangements depend on assumptions regarding the mobility of workers and the way in which a reduction in labour demand is translated into a lower number of employees employed or a lower number of hours worked.

Labour turnover costs: insiders – outsiders

Labour turnover costs, i.e. costs related to the hiring, training and firing of employees affect the inflow and outflow of employees and give employed workers bargaining power. If outsiders are not considered competitive enough (either because they have been out of work for a long time or do not have the necessary skill levels), then naturally their role in pushing down the wages of insiders is diminished. As a consequence, insiders can negotiate wages that are above productivity, and employment will be lower and show stronger adjustment inertia in the sense that the current employment is to a large extent determined by the employment in the previous period. (Lindbeck and Snower (2002)).

The minimum wage

Minimum wages can be set above the productivity level. Employment effects depend first on the degree of substitution between workers for whom the minimum wage is binding and other workers, and second, on the structure of labour demand (perfect competition or monopsony).

Annex 4: Scope and limitations of wage indicators

This annex reflects on the scope and limitations of the nominal and real unit labour cost and the real effective exchange rate (based on unit labour costs).

A.4.1. Measuring the nominal unit labour cost

In practice, the change in marginal labour productivity is measured as the change in average labour productivity (i.e. the change in output per unit of labour input – where labour input is usually measured as the amount of labour, as opposed to the number of hours worked).

This approach to measuring the change in marginal labour productivity is based implicitly on several assumptions, including:

- a Cobb-Douglass production function with constant returns to scale
- perfect competition in the goods market, i.e. where producers are price takers;
- existence of markets for public goods and services;
- homogeneity of employees;
- homogeneity of employers;
- symmetric information about an employee's effort;
- same risk preference between employers and employees.

The following sub-sections will investigate the implications of changing these assumptions for the relationship between marginal labour productivity, average labour productivity and real wages.

The elasticity of substitution between labour and capital

The implicit assumption of the type of underlying production function has important implications for the interpretation of labour productivity and the unit labour cost indicator. Indeed, if one assumes that the cross-price substitution between capital and labour differ from zero, as is the case for the constant elasticity of substitution (CES) production function, then one can show that the change in marginal productivity will be larger, equal to or smaller than the

Box A1: Elasticity of substitution

The more general case

It can be shown that for the class of CES production functions, the marginal equilibrium condition for labour demand (in its most simple form, making abstraction of technical progress) reads as:

(1) Marginal labour productivity = δ (Y/L) ** (1+ρ) = real wage

with

δ: distribution parameter between 0 and 1,
Y: output
L: labour input
ρ: substitution parameter, with -1< ρ< +infinity
**: exponent operator

and with (Y/L) measuring the average labour productivity.

Note that σ = 1/(1+ ρ) is the elasticity of substitution between labour and capital, which is in the case when the Cobb-Douglass production function is equal to 1. See, for example, Layard and Walters (1978).

Equation (1) can be rewritten in terms of percentage growth rates, assuming constant parameters, as:

% change in marginal labour productivity = (1+ρ) % change in (Y/L)

In other words, marginal productivity increases at a higher or lower pace than average productivity depending on whether ρ is lower than or greater than 0, i.e. whether labour and capital are substitutes (<0) or complements (>0). The case of substitution is likely to occur when one considers the interaction between low-skilled labour and capital, while the case of complementarity is likely to occur when one considers the interaction between high-skilled labour and capital.

The limiting case of factor substitution

In the case of a Cobb-Douglas function the substitution parameter between labour and capital is equal to zero (i.e. ρ = 0), the marginal labour productivity is, on inserting ρ = 0 into equation (1):

marginal labour productivity = δ (Y/L)

i.e. the marginal labour productivity is proportional to the average labour productivity, with the degree of proportionality determined by a constant parameter of the production function.

In growth rates, taking into account that δ is constant, one obtains:

% change in marginal labour productivity = % change in (Y/L)

In other words, the change in marginal productivity is equal to the change in average productivity.

change in average productivity depending on the value of the elasticity of substitution between the production factors labour and capital.

Box A1 shows some arithmetic to clarify the point.

Imperfect competition in the goods market

Apart from assuming perfect competition in the labour market, the classical theory also assumes perfect competition in the product markets, i.e. that producers can sell an unlimited quantity of goods at a fixed market price. If competition in product markets is imperfect, changes in output (produced by a changed labour input) will change the market price of the output for a given demand for the product. In other words the real wage (i.e. the nominal wage deflated by the price of output) is changed, interfering with the direct link between productivity and wages.

Absence of markets for public good and services

The productivity of employees in the public sector is difficult to measure because the output of public services is often unpriced and because some public services are consumed collectively. See also Box 6 in the main text and Boyle (2006).

Employee heterogeneity

The composition of a heterogeneous labour force may also affect the average labour productivity and unit labour cost.

For example, if restructuring of a firm results in a reduction in low-productivity employees then the observed average productivity level of the firm will increase (Lehment (2000)).

Another example, if in a country economic activity is reallocated – for instance due to increased international competition – from sectors with high unit labour costs to lower unit labour costs, the unit labour cost of the economy as a whole will decrease.

Firm heterogeneity

Altomonte et al. (2011) analyse competitiveness at the level of the firm, explicitly recognizing the heterogeneity of firms. Heterogeneity may arise for many reasons, including firm size, etc. Given this heterogeneity, the performance of firms will differ.

The literature shows that whatever measure of competitiveness for firms is used (e.g. unit labour cost, productivity, etc.), the performance index of the firms is Pareto distributed (i.e. it is skewed to the left from the mean), and not normal (i.e. symmetric around the mean). Both distributions have the same average, but a noticeably different spread.

Given the skewed nature of the distribution of the firms, only a select group of firms will be able to compete, i.e. the firms in which performance exceeds the global 'cut-off' rate. The policy implication is that policies aimed at promoting the competitiveness of firms should not be aimed toward the 'average,' but rather toward the group of firms that meet the level of performance required to be competitive, a group well above the average. Even so, the measure of competitiveness is not the unit labour cost of the average firm, but the unit labour cost at the end of the distribution.

From a dynamic perspective it should be noted that as trade policy barriers or

transportation costs fall, exporters will have more opportunities to compete in other markets, while firms that previously produced only for the domestic market will now experience stronger competition from foreign exporters and their profitability will come under threat. As a consequence, high-productivity exporting firms will survive and expand while lower-productivity non-exporting firms will shrink or exit. This reallocation of economic activity across firms raises average national productivity. See, for instance, Melitz (2003).

A.4.2. Interpreting the nominal unit labour cost

Underlying the interpretation of the percentage change in nominal unit labour cost as domestic (cost-push) inflationary pressure is the equation

(2) $L W = \delta P Y$

where:

L = labour input
W = nominal wage
P = price level
Y = output

and where the distribution parameter δ is between 0 and 1.

Equation (2) is a first order condition for labour market equilibrium (assuming profit maximization with perfect goods and labour markets under a Cobb-Douglass production function with constant returns to scale). See, for instance, Layard and Walters (1978).

As such equation (2) does not indicate a line of causality between the variables!

Depending on the economic paradigm, this equilibrium condition can be interpreted in several ways, see Box A2.

A.4.3. Interpreting the real unit labour cost

Section 4 of Annex 1 showed the dual interpretation that can be given to the real unit labour cost. Depending on the paradigm, the real unit labour cost will be interpreted as real wages relative to productivity under the classical paradigm and labour income share under the Keynesian paradigm. In both cases the transmission mechanisms through which the RULC affects employment differ, see Box A3.

Box A2: The nominal unit labour cost

The Classical paradigm

Under the classical paradigm, equation (2) is rewritten as

$P = (1/\delta)\ W / (Y/L) = ULC$

i.e. there runs a causality from nominal wages (W) and labour productivity (Y/L) to prices (P). In other words, nominal wages and productivity are predetermined and prices adjust to maintain equilibrium.

Taking growth rates yields an equation for inflation, i.e. (approximately)

% change(P) = -% change(δ) + % change(W) – % change(Y/L) = % change(ULC)

In practice it is usually assumed that the parameter δ does not change, assuming no structural changes that affect the equilibrium labour income share, so that growth (δ)=0, i.e. inflation is determined by the average increase in nominal wages minus the average increase in labour productivity – with the emphasis on 'average.'

The Keynesian paradigm

Under the Keynesian paradigm, equation (2) can be rewritten as

$L = \delta\ Y/ (W/P)$

i.e. labour input (and thus not prices as in the case of the classical paradigm) adjust to maintain a balance between predetermined output Y and real wages (W/P).

Taking the growth rates, the previous equation yields an equation for labour input growth, i.e.

% change(L) = % change(δ) + % change(Y) – % change(W/P)

A further refinement would be to distinguish labour input as its component hours worked (H) and the number of employed people (N), i.e.

% change(H) = -% change(N) + % change(δ) + % change(Y) – % change(W/P)

assuming the number of employed persons is predetermined so that the number of hours worked adjust.

A.4.4. Interpreting the real effective exchange rate

This section of the annex reflects on the real effective exchange rate as an indicator to assess international cost competitiveness depending on a partial or general equilibrium approach to the issue.

Real effective exchange rates as drivers of external imbalances: a partial equilibrium approach

The limitations of the REER indicator are that the REER based on ULC does not reflect all costs, such as capital costs, R&D expenditure, or distribution costs. Neither does this indicator take into account 'pricing-to-market behaviour' whereby firms (partly) offset variations in the exchange rate by adjusting their profit margins, instead of instantly passing the movement in the exchange rate on to prices charged to foreign customers.

In other words, REER based on unit labour costs (or on HICP/CPI deflators – as is the case in the MIP scoreboard) provides a useful insight into the developments in international competitiveness in the short run, i.e. when, for instance, the capital stock is a predetermined variable. In the medium term, as capital stocks adjust, a broader definition is required to guide policy making.

Moreover, economic theory posits that in the long run, trade between countries is conducted on the basis of comparative advantages, not absolute advantages. As such, the real effective exchange rate affects the efficiency of the economy and in that sense the allocation of labour (across tradable and non-tradable sectors) and not its level, which is determined

Box A3: The real unit labour cost

The Classical paradigm

It can be shown that for the class of CES production functions the marginal equilibrium condition for labour demand reads (in its most simple form making abstraction of technical progress) [1]:

Marginal labour productivity = δ (Y/L) ** (1+ρ) = W/P = real wage

see equation (1) above.

Taking the natural logarithm to simplify further calculations, we find that

$\ln(\delta) + (1+\rho) * \ln(Y/L) = \ln(W/P)$

which yields – on rearranging terms - for a predetermined output level and real unit labour cost, an employment level determined as

$\ln(L) = \ln(Y) - (1/\rho)\,[\ln(RULC) - \ln(\delta)]$

with the real unit labour cost defined as RULC = (W/P) / (Y/L).

In other words, employment is determined by output and the (predetermined) real unit labour cost.

The Keynesian paradigm

The Keynesian paradigm starts from the demand side and recognizes that the RULC is a measure of labour income distribution, and that the capital income share is one minus the labour income share.

In other words, the real unit labour cost is a channel that operates via the demand side of the economy by affecting factor income distribution, which affects private consumption and investment.

Generally speaking, it is not possible a priori to identify in which direction the net outcome will evolve as this will depend on a variety of conditions – including the ones discussed in Box 1 of the main text. It would be beyond the scope of this chapter to explore this issue in more depth. See, for instance, Storm and Naastepad (2012) for an empirical analysis of demand regimes in OECD countries covering a period prior to the current crisis. See also ILO (2011.b).

(1) See, for example, Layard and Walters (1978).

by more structural labour market conditions, including mismatching, insufficient training, high reservation wages, employment protection legislation etc. See, for instance, Krugman (1993).

However, absolute advantages are (in the long run) important at the level of individual enterprises or sectors. But as only a small fraction of firms are involved in international trade, the interpretation of competitiveness in terms of the average ULC becomes less straightforward. This implies then that REER should focus on the competitiveness of the firms at the cutting edge of tradable sectors. See, for instance, Altomonte et al. (2011).

Finally, it also should be noted that measuring the real effective exchange rate as the relative nominal unit labour cost (denominated in local currency) adjusted for the nominal exchange rate is an accounting identity which could also be interpreted as a measure of the extent to which the nominal exchange rate deviates from its purchasing power value. Such deviations in nominal exchange rates are to a large extent indications of (non-linear) developments in money markets – rather than labour markets. See, for instance, Taylor (2005).

External imbalances and endogenous real effective exchange rates: a general equilibrium approach

Two additional important remarks must be made concerning the debate on international cost competitiveness.

First, international cost competitiveness indicators are often interpreted from the perspective that international trade constitutes a zero-sum game with some countries winning and others losing –such as for instance in the case of athletes in the Olympic arena. See, for instance, De Grauwe (2011).

When analysing international competitiveness at the level of countries it is important to recognize that running a current account deficit/surplus is part of an inter-temporal optimization process depending on the local population's calculation of current and future needs. A case in point is Japan which is characterized by high current account surpluses over recent decades, reflecting an ageing population that seeks to accumulate foreign assets to be used as the population becomes older (and less active). See, for instance, Lane (2011).

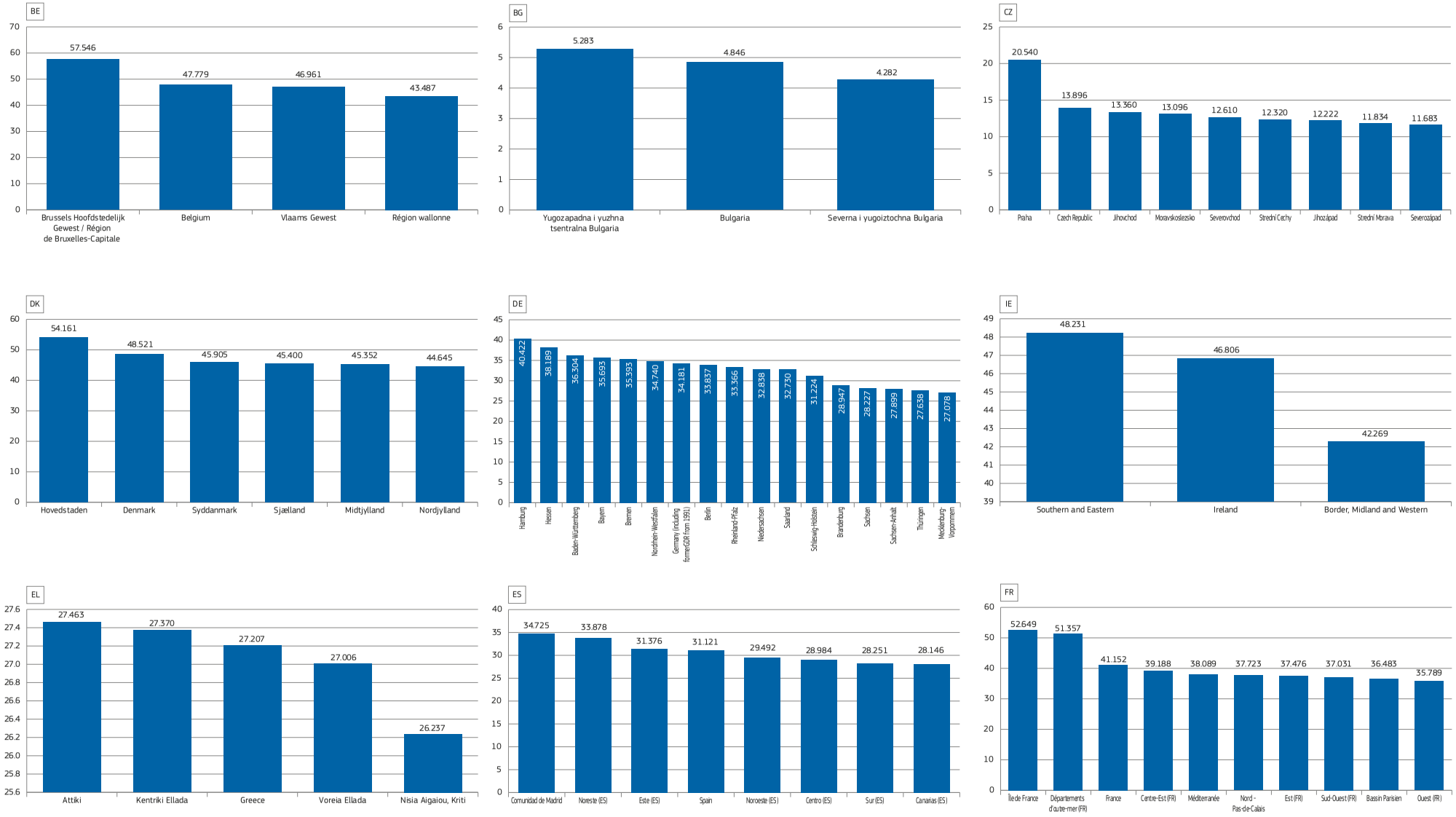
Taking such general equilibrium considerations into account, fluctuation in the real effective exchange rate is a transmission mechanism to establish the long-run reallocation of goods and services by a country.

Second, the causality between international competitiveness and external imbalances does not always run in one direction, i.e. a loss of competitiveness caused by wage developments can lead to external imbalances. The interaction between them can also run in the opposite direction, i.e. external imbalances (i.e. fuelled by cheap credit from abroad) can lead to excess domestic demand that raises wages.

For example, Gros (2010) argues that the loss of competitiveness in southern Europe was primarily due to booms in domestic demand, fuelled mainly by the easy availability of cheap credit for consumption (Greece) and construction (Spain, Ireland). This, and not 'a lack of structural reforms or unreasonable trade unions,' led to an excess demand for labour, particularly in protected sectors like services, and caused sharp increases in wage costs.

Annex 5: regional compensation, labour productivity and unit labour cost dispersion – Charts

Chart A.5.1: Regional compensation per annum – select group of Member States (in €): 2009



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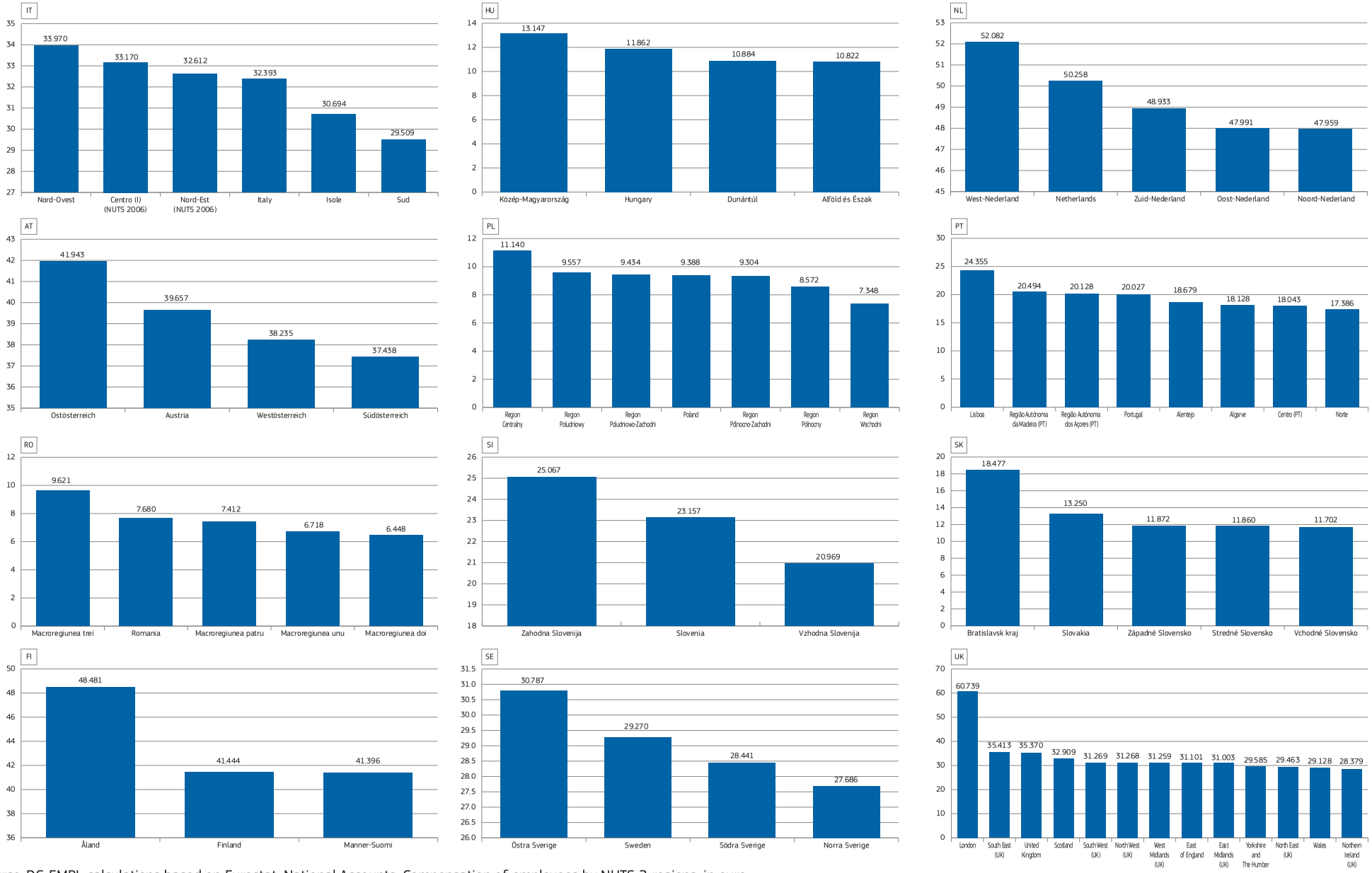

Source: DG EMPL calculations based on Eurostat, National Accounts, Compensation of employees by NUTS 2 regions, in euro, All NACE Activities, (NACE Rev. 2) [nama_r_e2remr2] and Employees, All NACE-Activities, [nama_r_e3em95r2].

Note: The non-euro area compensation per employee is measured in euro.

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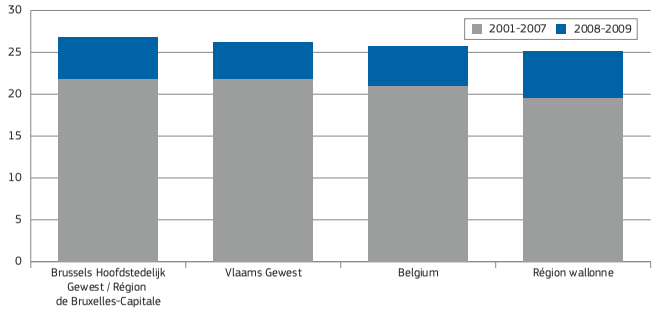
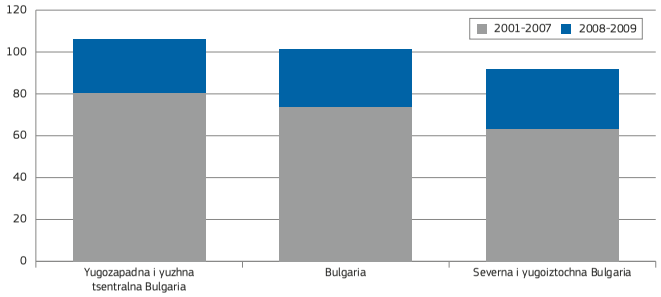
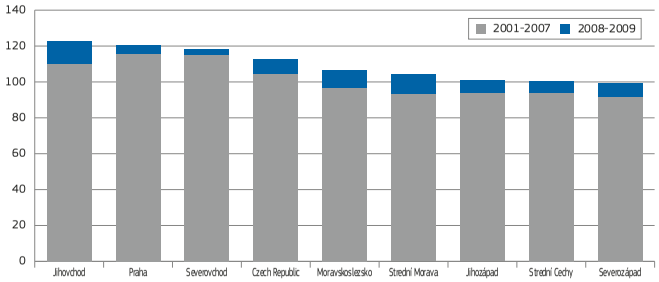
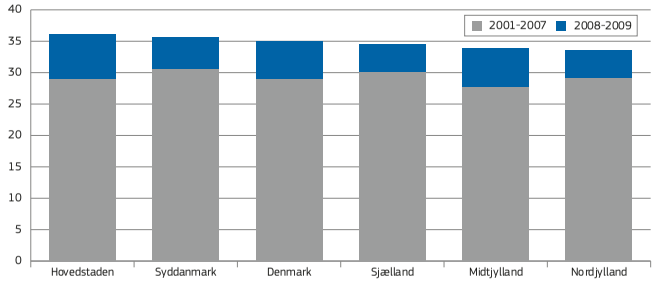
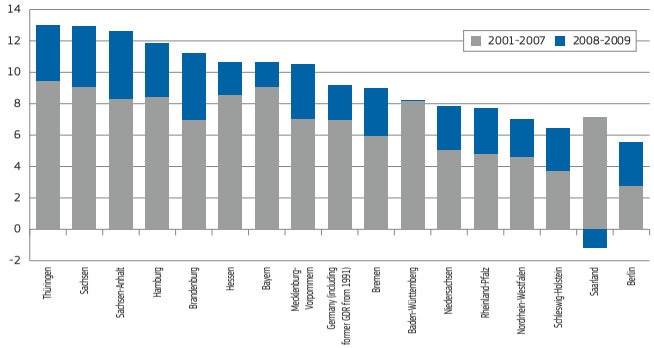
Table A.5.2: Regional compound growth in compensation per employee (in €)

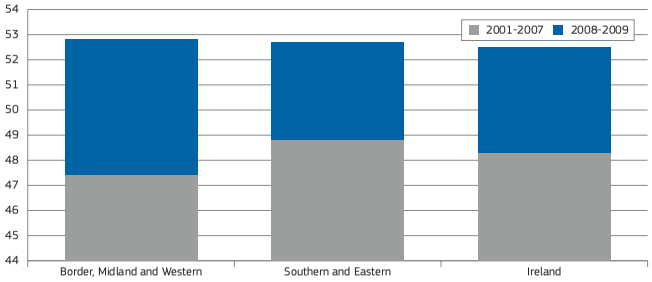


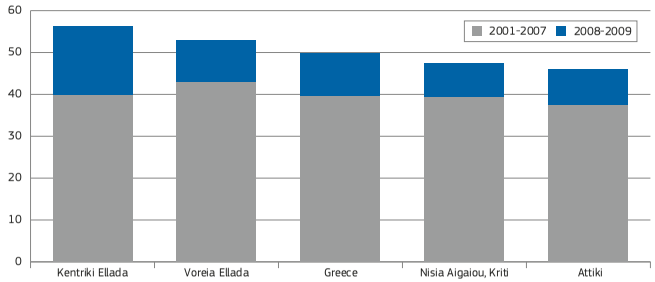


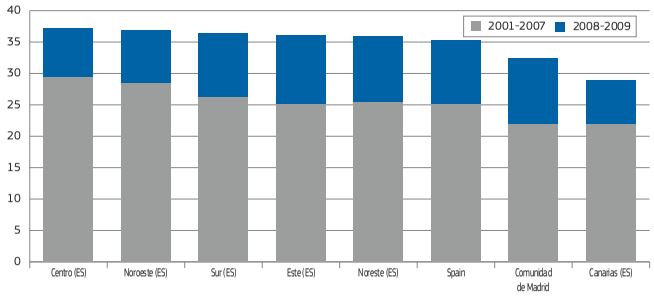


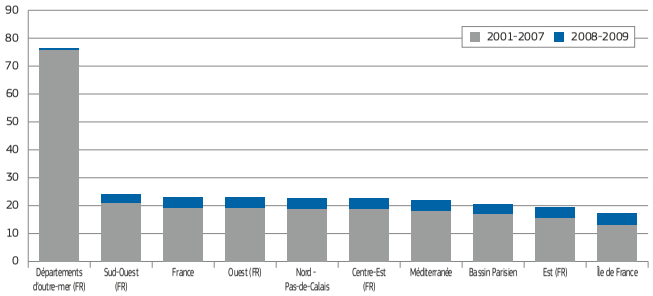












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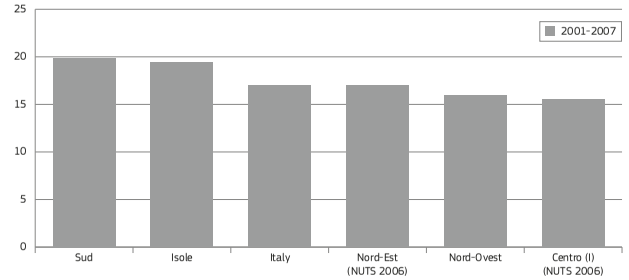

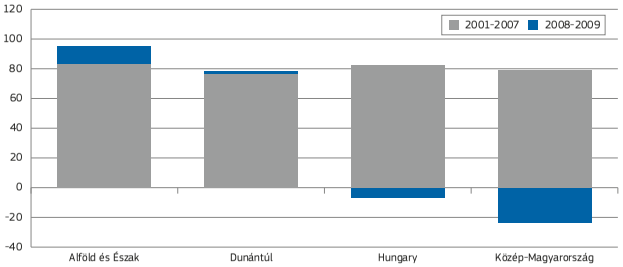

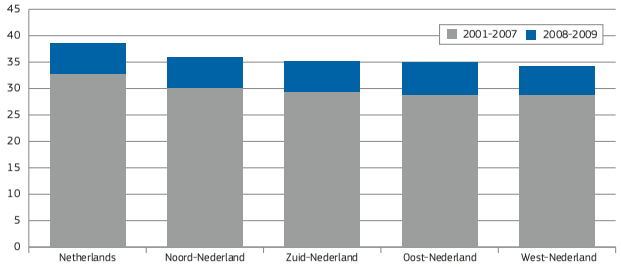

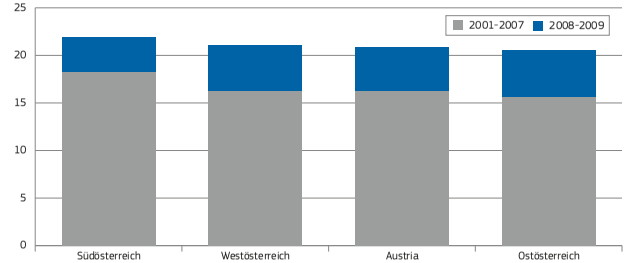

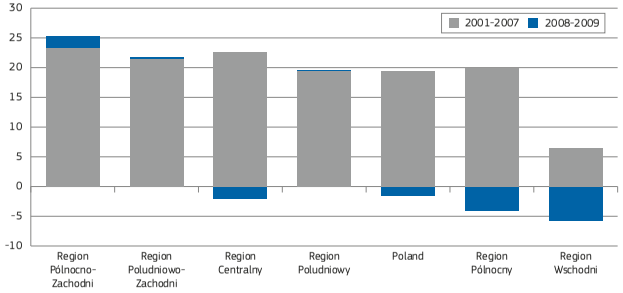

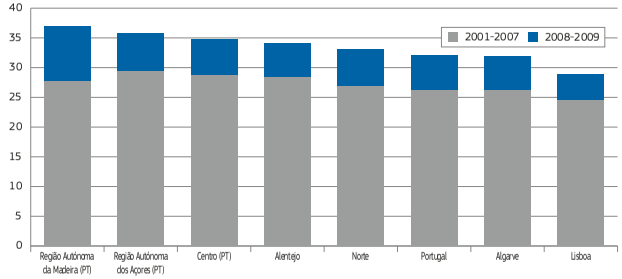

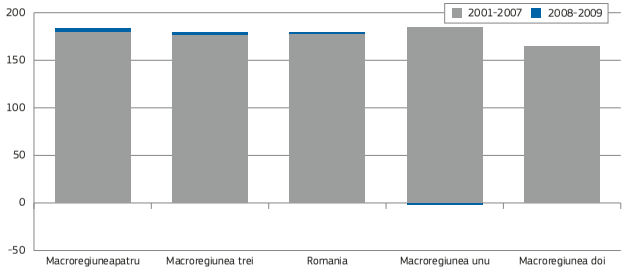

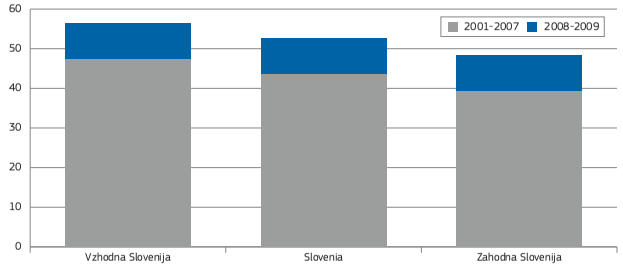

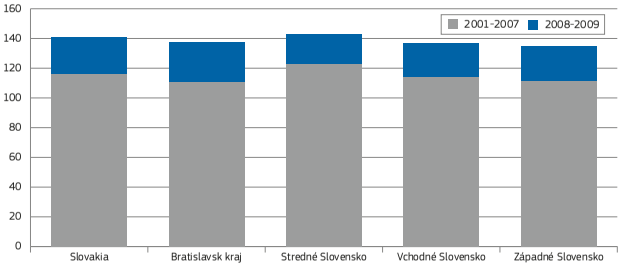

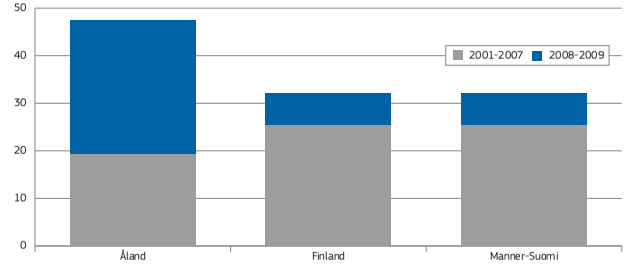

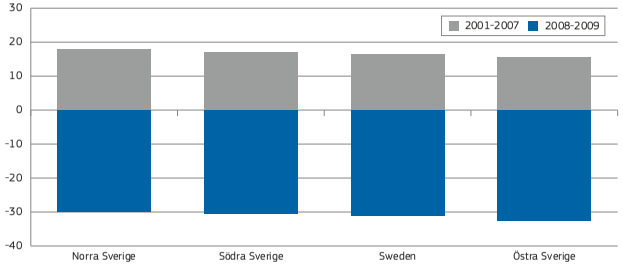

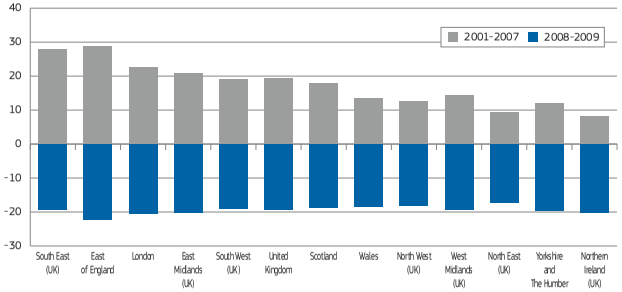

Source: DG EMPL calculations based on Eurostat, National Accounts, Compensation of employees by NUTS 2 regions, in euro, All NACE Activities, (NACE Rev. 2) [nama_r_e2remr2] and Employees, All NACE-Activities, [nama_r_e3em95r2].

Note: The non-euro area compensation per employee is measured in euro.

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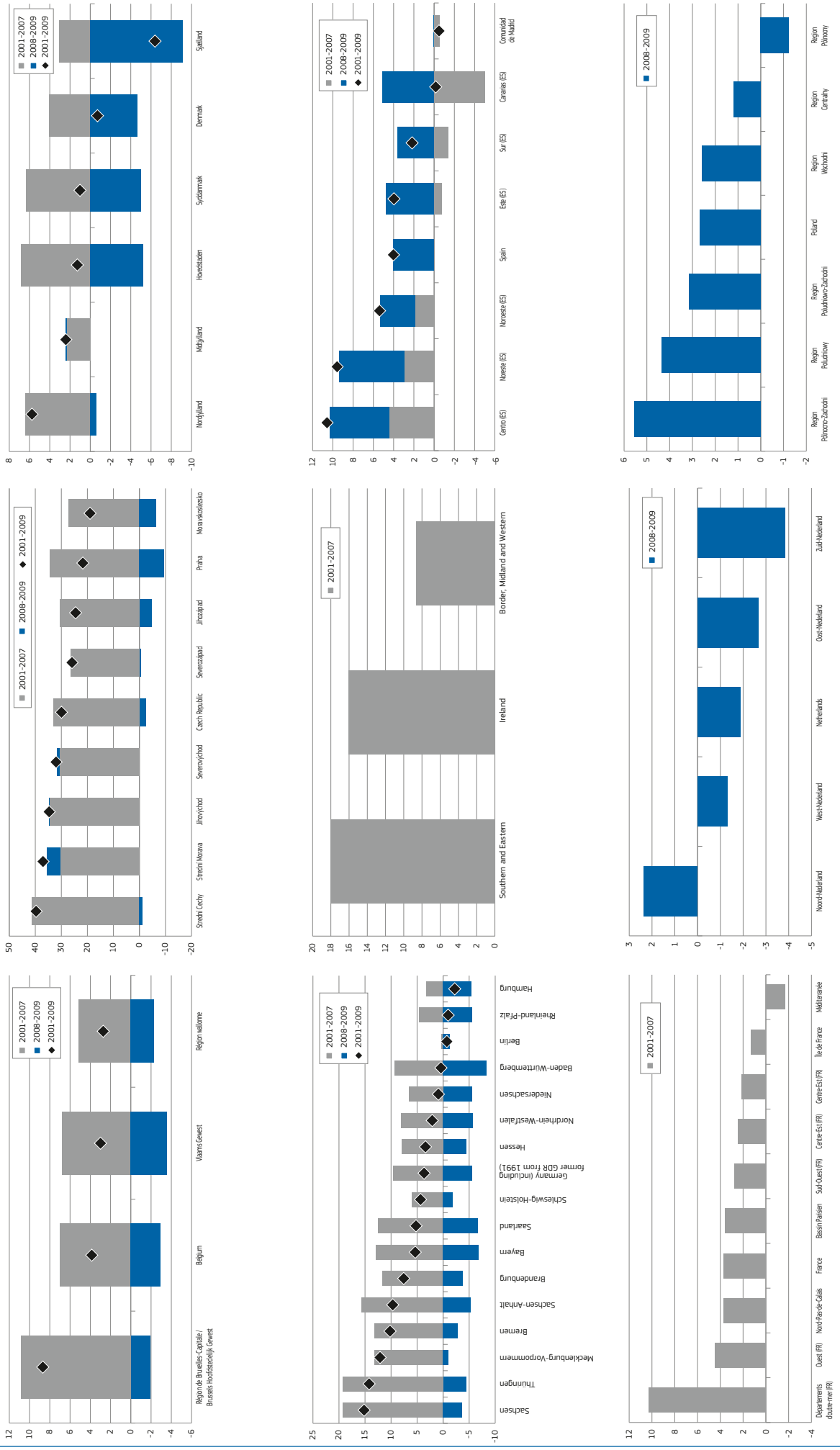
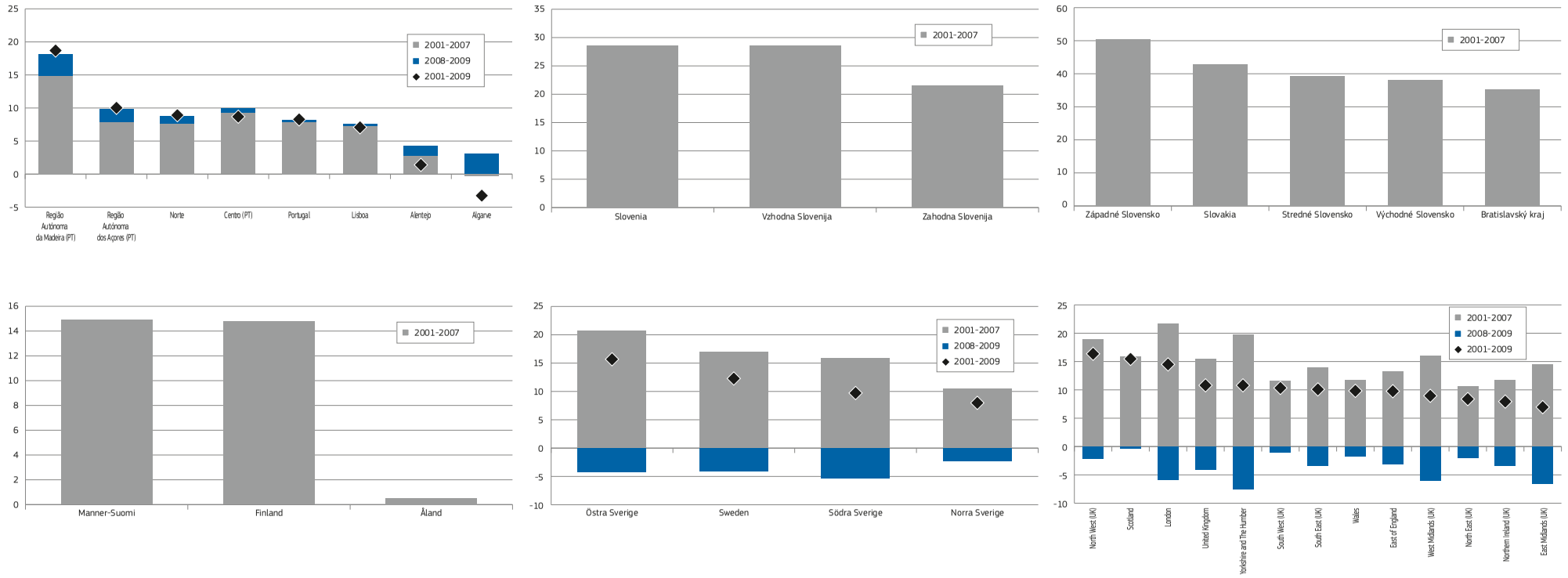
Chart A.5.3: Regional compound productivity growth





Source: DG EMPL calculations on the basis of Real growth rate of regional gross value added (GVA) at basic prices by NUTS 2 regions – percentage change on previous year [nama_r_e2grgdp] and Employment (in persons) by NUTS 3 regions (NACE Rev. 2) [nama_r_e3em95r2].

Note: Growth in productivity per employed person is calculated as growth in GVA minus growth in number of persons employed.

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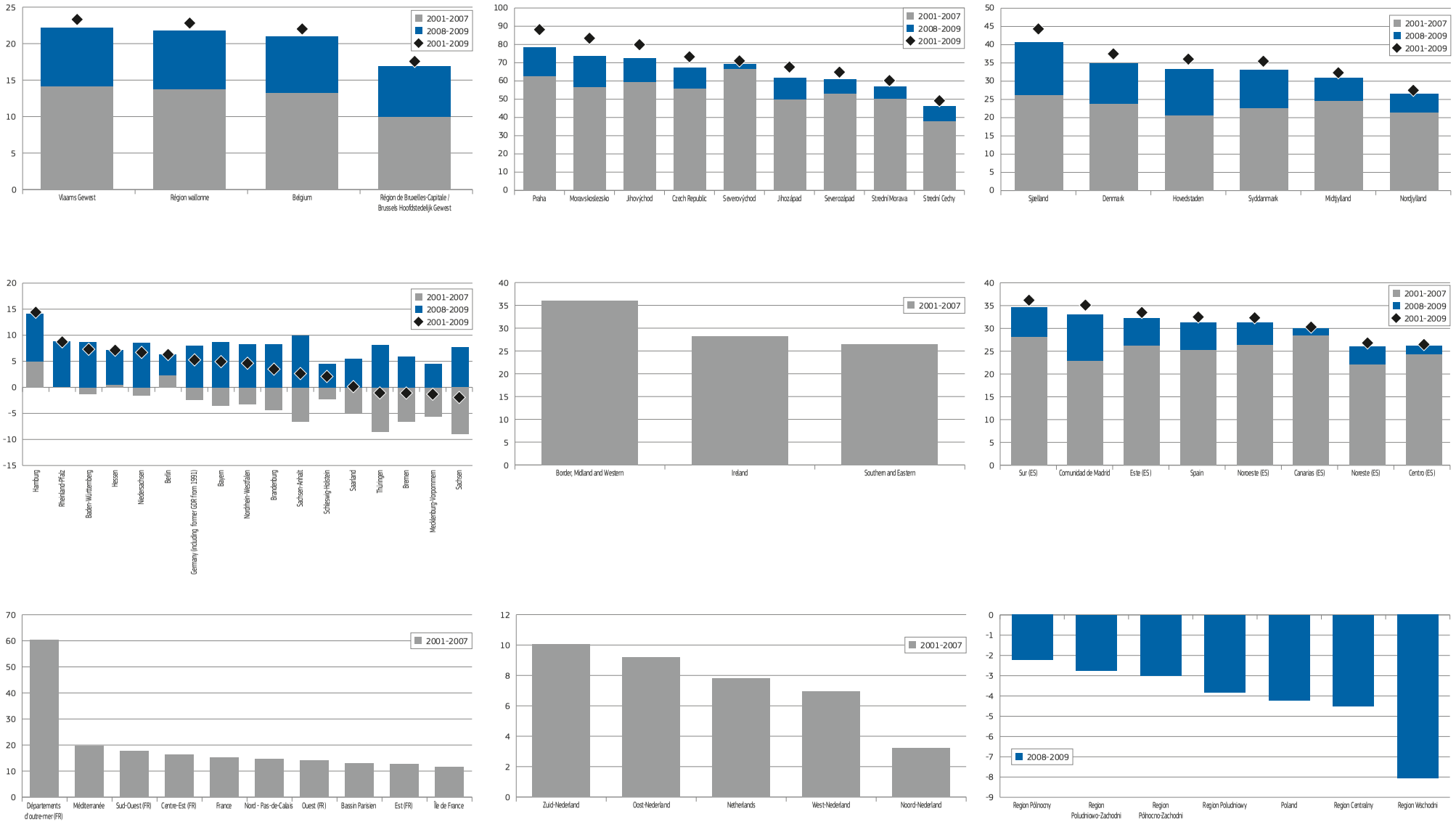
Chart A.5.4: Regional compound ULC growth in the regions of a select group of EU Member States – (in €)



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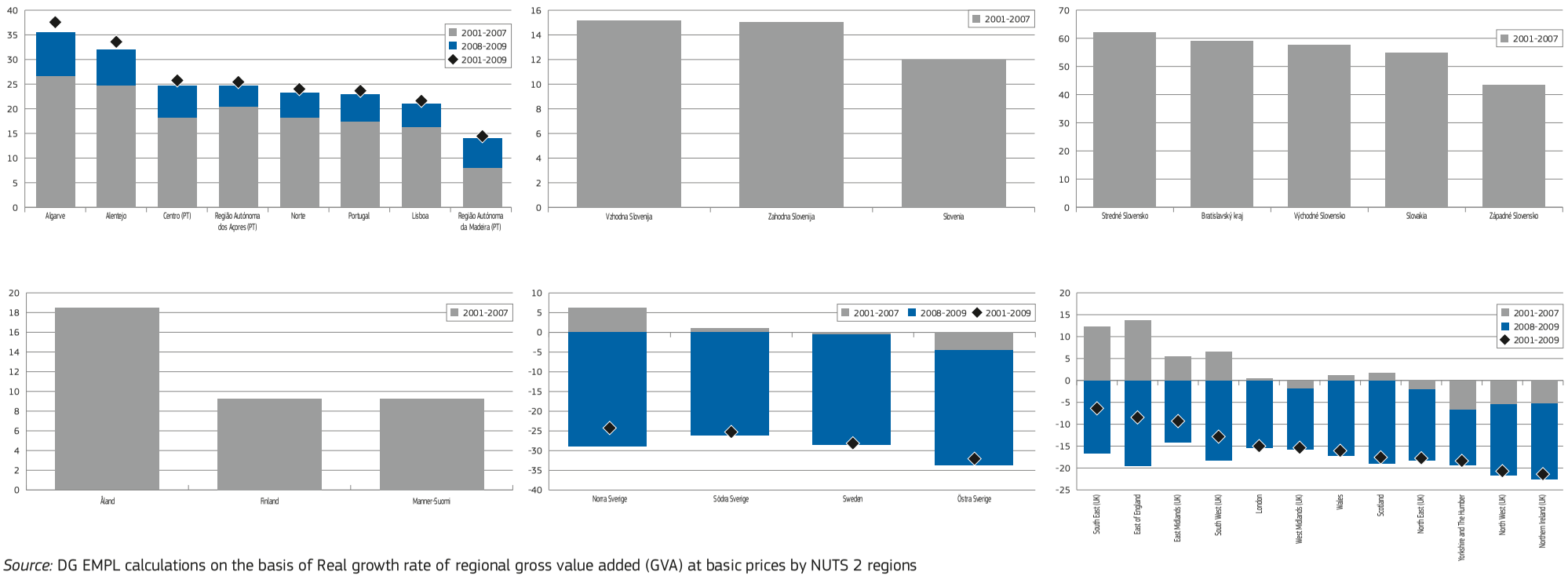

Source: DG EMPL calculations on the basis of Real growth rate of regional gross value added (GVA) at basic prices by NUTS 2 regions – percentage change in previous year [nama_r_e2grgdp] and Employment (in persons) by NUTS 3 regions (NACE Rev. 2) [nama_r_e3em95r2].

Notes: 1) Productivity per employed person is calculated as GVA divided by persons employed.

2) The non-euro area compensation per employee growth is measured in euro.

gif *excel file*

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