

Recent developments in the distribution of wages in Europe





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Acronyms used in the report

AMECO	Annual macroeconomic database of the European Commission
CEE	Central and Eastern European countries
CHER	Consortium of Household panels for European Socio-economic Research
ECHP	European Community Household Panel
EU LFS	EU Labour Force Survey
EU-SILC	EU Statistics on Income and Living Conditions
GDP	Gross domestic product
LIS	Luxembourg Income Survey
NACE	EU statistical classification of economic activities
NUTS	Nomenclature of Units for Territorial Statistics
OECD	Organisation for Economic Co-operation and Development
PPS	Purchasing power standards
PPP	Purchasing power parity
SES	Structure of Earnings Survey

Country codes EU28

AT	Austria	IE	Ireland
BE	Belgium	IT	Italy
BG	Bulgaria	LT	Lithuania
CY	Cyprus	LU	Luxembourg
CZ	Czech Republic	LV	Latvia
DE	Germany	MT	Malta
DK	Denmark	NL	Netherlands
EE	Estonia	PL	Poland
EL	Greece	PT	Portugal
ES	Spain	RO	Romania
FI	Finland	SE	Sweden
FR	France	SI	Slovenia
HR	Croatia	SK	Slovakia
HU	Hungary	UK	United Kingdom

Executive summary

Introduction

Across the globe, there is increasing concern about inequality. Empirical evidence suggests that income inequality has grown in many developed economies over the last three decades, although there is considerable diversity in the extent and timeframe of this trend. The Great Recession of 2008–2009 has intensified this growing interest in inequality, both due to the impact of the ongoing economic crisis on inequality levels and due to the general perception that the increase in inequality may be one of the factors triggering and protracting the crisis itself.

There is an increasingly large body of research on wages and particularly on income inequality in European countries. However, there are very few studies that take the EU perspective and, as far as the present study can discern, none of them focuses on wages. The report gives an overview of recent developments in the distribution of wages in Europe from 2004 to 2011 – the period before and after the onset of the Great Recession. The main focus is on the EU dimension, although the report analyses relevant trends and developments within countries in a comparative perspective as well. The findings are drawn from two key data sources: the EU Statistics on Income and Living Conditions (EU-SILC) – with yearly data for the period 2004–2011 – and the Structure of Earnings Survey (SES) – using data from its 2002, 2006 and 2010 survey waves.

Policy context

Evidence regarding the evolution of inequality in the EU as a whole is surprisingly limited, despite the growing interest in the phenomenon of inequality and the sound reasons for looking at inequality from a European perspective also. In many EU policy documents, there is the implicit assumption that economic integration should lead to some degree of convergence in terms of income and wages and therefore to a reduction of inequality at EU level – at least between countries. A truly European approach to inequality could strengthen the idea of a social Europe and enhance the complementarity of the two main types of policies currently used to fight inequalities: social policies (targeted at inequalities within countries) and regional policies (aimed at inequalities between countries).

Key findings

- According to the analysis, the level of wage inequality in the EU as a whole is below that of the US and the three most unequal countries in the EU – Latvia, Portugal and the UK – when wages are measured in terms of purchasing power parity (PPP). The Gini index for wages in the EU as a whole is 0.346 (for full-time equivalent wages measured in PPP), while the comparable measure for the US is around 0.4, and in the UK, the most unequal EU country, it is 0.404. The majority of EU countries have Gini values for full-time equivalent wages well below the overall EU figure.
- The Great Recession changed the trend of overall EU wage inequality, with wage inequality levels decreasing in the period 2004 and 2008 and subsequently increasing. This decrease before the crisis was due to a process of convergence in pay levels between countries which stopped in 2008 and was starting to reverse in 2011, the end of the period of analysis for this report. The main driver behind the increase in wage inequality after 2008 was within-country inequality, which in the earlier period had remained more or less stable in many countries.
- Convergence in national wage levels before 2008 was mostly driven by a rapid process of catch-up by eastern European Member States and a stagnation – or decrease – of wages in the two biggest countries (Germany and the UK). Average wage levels in southern European Member States converged in nominal terms only before 2008 (remaining stagnant in real terms), experiencing a drop in nominal and real terms later. From the onset of the crisis, average wage levels started to grow very marginally in Germany, while in eastern European Member States they regained growth after an initial significant drop.

- There was significant variation across Member States regarding inequality trends. The most common pattern was cyclical: wage inequality increased up to 2008 and decreased afterwards. In many eastern European Member States, wage inequality consistently decreased throughout the whole period of 2004–2011, whereas in some Member States (Austria, Belgium, Denmark and to a lesser extent Germany) it consistently increased. In France and the UK, wage inequality rose in the period before 2008 and continued to rise afterwards, particularly in the UK.
- In many cases, the observed trends of wage inequality contrast radically with developments in wider income inequality, which often moved in opposite directions. This phenomenon (occurring mostly in the southern European and Baltic Member States) was caused by the crisis having a significant impact on unemployment, which increased income inequality by drastically reducing the earnings of those who lost their jobs. At the same time, wage inequality fell as a result of some relatively low-paid segments of employment being eliminated. In such cases, the increase in unemployment had the effect of removing some inequality from the labour market, leading to a decrease in wage inequality but an increase in overall inequality levels.
- Inter-sector wage differentials account for a significant proportion of total wage inequality in most European countries: between 20% and 40% if sectors are measured at the two-digit NACE level and between 5% and 20% if measured at the one-digit level. The sector most affected by the crisis was the financial sector, which experienced a significant reduction in both its average wage levels and in its levels of internal wage inequality.
- Collective bargaining has been found to have a compressing effect on wages, whereby sectors with a higher coverage of bargaining have noticeably lower levels of wage inequality. At EU level, collective bargaining coverage is associated with higher average wages, although this is to some extent the result of country-level differences: countries with higher levels of collective bargaining also tend to have higher wage levels. This phenomenon does not always apply within countries.

Policy pointers

- The research points to the need for better and more frequently updated data on wages at the EU level, a requirement that will become more pressing as the EU continues to integrate economically. The two currently existing data sources used in this report are useful but not perfect: EU-SILC only measures wages indirectly and rather imprecisely, while the SES has a very limited coverage of the European working population and a very infrequent periodicity.
- The reversal of the process of convergence in wage levels that was taking place before 2008 may be a cause for concern regarding the cohesion of the EU project. Only in eastern European Member States was there a real process of convergence to the EU average and declining levels of wage inequality during the period. No convergence in real wages has been achieved in southern European Member States, where increasing inequality levels were reversed during the crisis due to compositional effects that shifted inequality outside the labour market against a background of growing unemployment.

Introduction

Across the world, there is increasing concern about inequality. The evidence that income inequality has grown significantly in many developed economies over the last three decades is overwhelming. Academic books on inequality trends make the bestseller lists (Piketty, 2013), echoing public and policy debates on this issue at national and international levels (OECD, 2011). The Great Recession of 2008–2009 has played a significant role in this growing interest in inequality, both because of the effect of the still unresolved economic crisis on it, intensifying previous trends, and a more or less generalised perception that the secular increase in inequality may be one of the factors behind the crisis itself.

In Europe, there is a considerable amount of evidence of increasing inequality in many countries (OECD, 2008 and 2011). Nonetheless, evidence regarding the evolution of inequality in the EU as a whole is surprisingly limited: in fact, more is known about the evolution of inequality at a global scale (thanks to researchers such as Branco Milanovic – see Milanovic, 2005) than within the EU. In recent decades, EU countries have engaged in a massive process of market integration and (to a more limited extent) policy coordination. In this context, it seems quite natural to wonder about the impact of this in terms of inequality, not only at national level but also, crucially, at EU level. In many EU policy documents, there seems to be the implicit assumption that economic integration should lead to some degree of convergence in terms of income and wages, and therefore to a reduction of inequality at EU level, at least in its between-country component. But the evidence for this is relatively limited. There is even less information on the impact of the Great Recession on inequality at EU level.

This is not to say that there is no evidence at all of income inequality at EU level. As this report shows, some studies have focused on this, adjusting income to differences in price levels in one way or another. These studies have shown that income inequality at EU level is comparable to inequality in the US, and much higher than that found in any EU Member State. But there has been no study of wage inequality from a European perspective – an aspect of inequality that is particularly interesting in the context of the Great Recession. It is known that the impact of the Great Recession has varied significantly across countries in terms of employment and overall wage levels; for instance, in some countries unemployment has risen significantly but wages have remained more or less stable, while in other countries, wages have decreased significantly and unemployment has remained stable. However, the impact on overall wage inequality at EU level is not known. Moreover, no exhaustive, cross-country comparative analysis has been conducted on developments across Member States over this period.

Wage inequality is of particular interest from an EU perspective. Because of the deep (although uneven) market integration within the EU, wage levels should be strongly interrelated across different countries: a European perspective is necessary to understand country-specific trends. A European perspective is also essential for evaluating the wider social and economic impact of EU integration, a key dimension of which is wage inequality. It would be wrong to assume that economic integration must necessarily lead to convergence in this respect. For instance, regional specialisation could plausibly lead to divergence rather than convergence in pay levels (if some regions specialise in high-value added and others in low-value added activities). As another example, initial differences in endowments and institutional settings could lock different countries into increasingly diverging trajectories. EU integration can also contribute to the increase of wage inequality within countries, if countries engage in race-to-the-bottom processes of wage–cost competition.

Taking an EU perspective, this report evaluates recent trends in wage inequality in Europe. It focuses on the effect of the crisis (comparing the periods before and after 2008) on the evolution of wage inequality within and between EU countries. The first chapter of this report presents a review of the relevant literature on income and wage inequality, discussing the limited existing evidence. The second chapter presents the approach and methodology taken in this analysis of recent data on EU wage inequality.

The following four chapters present the main findings of the analysis: Chapter 3 outlines EU developments and the evolution of wage distribution across countries; Chapter 4 takes a closer look at wage differentials between countries; Chapter 5 presents a comparative analysis of the evolution of inequality within EU Member States; while Chapter 6 reviews the sectorial dimension of recent trends in wage distribution in Europe and the link to trade and productivity. Finally, Chapter 7 summarises the findings and highlights some potential policy implications of the analysis.

Review of the literature 1

Income inequality

Most studies on inequality focus on household income rather than individual wages – and are typically national-level studies. This chapter presents the main findings and common themes of this body of literature, sometimes addressing different components of income, in order to briefly review what is known about income inequality.

Different empirical analyses have confirmed a trend towards greater income dispersion across most developed countries from the 1970s, although the timing and magnitude of these changes vary by study (Jenkins and Micklewright, 2007). The OECD, which has conducted two recent important studies mapping inequality in the largest world economies, reports growing inequality between the mid-1980s and the mid-2000s in most OECD countries:

There has been an increase in income inequality that has gone on since at least the mid-1980s and probably since the mid-1970s. The widening has affected most (but not all) countries... But the increase in inequality – though widespread and significant – has not been as spectacular as most people probably think it has been.

OECD, 2008

According to a more recent study, income inequality increased in most OECD countries over the two decades prior to the global economic crisis, as measured both by Gini coefficients and by the gap in the real disposable household income between the richest and the poorest 10% (OECD 2011). In most countries, this growth in inequality is associated with a large increase in the share of income going to those at the very top of the distribution (Atkinson, Piketty and Saez, 2011).

While these results suggest that income inequality has been on the rise since the 1970s, important differences exist between countries regarding patterns in income inequality and the timing of those patterns. From the mid-1980s to the late 2000s, income inequality measured by the Gini index increased in 17 of the 22 OECD countries covered. There seems to be a certain convergence towards higher levels of inequality among OECD countries, experienced in different waves. Inequality increases first began in Anglo-Saxon countries at the end of the 1970s and beginning of the early 1980s, generalised by the end of the 1980s and even reached traditionally low-inequality countries during the 2000s (OECD, 2011). The most generalised widening in the distribution took place from the mid-1980s to the mid-1990s, while the patterns seem to be more diverse from the mid-1990s to the mid-2000s (OECD, 2008).

This picture of growing income inequality across most countries during the 1980s and 1990s, followed by a more complex evolution in the 2000s, is also presented in the Growing Inequalities Impacts project (otherwise known as the Gini project; see Nolan et al, 2014). According to this research, southern European countries (Greece, Portugal and Spain) registered declining inequality trends in the 1980s and 2000s and growing inequality in the 1990s. Eastern European countries experienced increasing inequality from the 1990s onwards. Nordic countries, starting from the lowest levels of inequality, saw growing inequality during the 2000s, particularly Sweden. Finally, inequality rose notably in Anglo-Saxon countries during the 1980s (Ballarino et al, 2012).

The diverging trends at country level observed in the 2000s are also captured in two recent reports from the European Commission. The first reports increased income inequality in the EU as a whole, while highlighting differing country-specific trends. Between 1997 and 2009, levels of inequality across EU15 Member States seem to have converged, with the biggest decreases in inequality taking place in those countries with higher inequality levels, and vice versa. Between 2005 and 2009, inequality – as measured by the Gini index – increased in 10 of the EU27 Member States, decreased in 15 of them and remained quite constant in the two remaining countries (European Commission, 2011).

The second European Commission study used data from the EU Statistics on Income and Living Conditions (EU-SILC) data to compute the income quintile ratio (the ratio between the income of the top and bottom quintiles of the population) during the period 2006 to 2011, which it used as a measure of income inequality. It also shows variation across countries. Out of 27 countries, nine registered a reduction in income inequality during the period (Belgium, Hungary, Ireland, Latvia, Lithuania, Luxembourg, Poland, Portugal and Slovakia), seven experienced little change (Austria, the Czech Republic, Cyprus, Finland, Malta, the Netherlands and the UK); six experienced an increase in income inequality (Bulgaria, Denmark, Germany, France, Romania and Spain); and in five, inequality dropped notably at some point during the period before moving back to the initial level (Estonia, Greece, Italy, Slovenia and Sweden) (European Commission 2013).

Many recent studies have argued that wages represent the main factor behind recent changes in income inequality (see, for instance, OECD, 2011). Although income from capital and self-employment are less equally distributed, the fact that they account for a relatively small share of overall income for most families led to capital being considered of secondary importance in this respect. However, this is quickly changing, largely because of the work of Piketty and associate researchers in different countries: using tax records rather than income surveys, they have argued that capital income has played a very significant role in the recent trend of increasing inequality, and is likely to play an even more important role in the future (Piketty, 2014; for a discussion of Piketty's arguments, see Moretti (2015)). This link between capital income and inequality is very important to consider against a background of declining labour shares across developed countries, a finding consistently reported in a different but related field of research (Guscina, 2006).

Other drivers of increasing income inequality mentioned in the literature are demographic factors and changes in the tax and benefit systems (see Nolan et al, 2014). Demographic trends and family structure play a role in inequality trends, because while wage inequality is typically measured among workers, income inequality is measured among households (even when individuals are used as the unit of analysis, households are the reference unit whereby all the income of the different members is pooled and then assigned to each of them). For instance, in many European countries, an increasing number of older people are receiving a pension that is lower than pre-retirement labour earnings. Also, in many countries there has been a decline in the average household size, due to an increase in single parent families and people living alone. This also contributes to inequality, as smaller households tend to be associated with higher inequality, since the household income is pooled among fewer members who have fewer opportunities to benefit from economies of scale.

Another factor highlighted by the research literature is that of taxes and transfers, which are generally found to be less effective than they were in the past in terms of reducing wage and capital inequalities generated by markets. Across OECD countries, the tax and benefit systems reduce income inequality by around 25% to 33% on average; in-kind benefits (education, health, and housing) reduce income inequality less than taxes and cash transfers (OECD, 2011). These public policies generally have a greater impact on reducing inequality at the bottom level of income distribution than the top; since from the mid-1990s onwards they became less redistributive, they contributed to growing income inequality levels. In many OECD countries, income tax rates were lowered and regressive changes took place in tax burdens and benefit entitlements (OECD, 2008, 2011).

Wage inequality

It is reasonable to expect that the trends described above regarding income inequality also apply to wages, or household earnings when using the household as a unit of analysis. After all, wages and salaries represent the largest proportion of household income (Brandolini and Smeeding, 2009); according to the OECD, wages and salaries account for 75% of household incomes in the case of working age adults (OECD, 2011). But what is really known about trends in wage inequality?

The literature on wage distribution offers a wide range of empirical results, covering different periods, groups and countries. Due to the wide variety of methodologies used in each case, it is not easy to compare the findings (Atkinson and Brandolini, 2009). But, as noted regarding overall income trends, many studies refer to an upward trend in wage inequality although not in all countries and periods.

A very recent report (2014) from the European Parliament looking at the inequality of labour earnings reports an increase in inequality between 2006 and 2011 in around two-thirds of EU Member States. Nevertheless, the increase is quite moderate when wages are measured as hourly earnings, implying that changes in the number of hours worked represent a primary reason behind the increase in wage inequality (European Parliament, 2014). According to this study, the only countries in which inequality (measured by the Gini index) fell between 2006 and 2011 are Estonia, Greece, Hungary, Italy, Luxembourg, Poland, Portugal, Romania and Slovakia.

The landmark OECD report reviewed in the previous section (OECD, 2011) also considers wage inequality, mostly by using the ratio between the wages of the top and bottom 10% wage earners (full-time or equivalent). In doing so, it provides a relatively comprehensive picture of the evolution of wage inequality in the period 1980–2008 across 23 OECD countries. The results show a general increase in wage dispersion over the past three decades in most European OECD countries, especially the UK and some Central and Eastern European (CEE) countries such as Hungary and Poland. By contrast, wage inequality narrowed in France and Spain, whereas no clear trend was apparent in Belgium, Finland or Ireland (OECD, 2011).

According to this OECD study, the trend towards wage inequality seemed stronger during the late 1990s and 2000s, and although it affected both ends of the distribution it was particularly acute at the top half:

The widening of the wage distribution has resulted from both high growing earnings shares at the top and declines shares at the bottom. But top earners experienced particularly sharp rises. The distance between the highest 10% earners and those in the middle has been growing faster than the distance between the middle and the lowest wage earners. Thus, in most countries wage disparities grew more in the upper half of the distribution than in the bottom half.

(OECD, 2011)

This study has been criticised for using different measures of wages for different countries – hourly, weekly, monthly and annual – and for focusing excessively on decile ratios, an approach that overlooks the even more stark growth in the gap in earnings between the top 1% and the rest of the working population (Rosnick and Baker, 2012; Piketty, 2014).

The research literature identifies several drivers of this widening distribution of wages in advanced economies. One of the main contributing factors is differences in working hours and wage rates of workers in non-standard employment such as part-time workers or temporary employees. If a measure of annual earnings is considered, the bottom of the distribution will typically be occupied by those working fewer hours, either due to a shorter working week for part-time workers or due to fewer weeks worked during the year for temporary employees (Burniaux, 1997).

Wage dispersion among full-time male workers has been growing (OECD, 2008). One of the most frequently discussed explanatory factors identified in the literature is skills-biased technical change: new information technologies increase the relative productivity of high-skilled workers (compared to low-skilled workers), thus increasing their demand and putting an upward pressure on their wages compared to others (Violante, 2008). This is why the role of education in reducing wage inequalities has often been emphasised: increasing the supply of highly educated workers would lower the pay differentials between different skill groups, thus reducing wage inequality (Crivellaro, 2014).

The effect of technological change on inequality may be reinforced by other factors. Trade specialisation and off-shoring, both phenomena facilitated by information and communication technologies, may result in a depressed demand for low-skilled workers in European countries, leading to more wage inequality (Blau and Kahn, 2009; European Parliament, 2014). Increasing economic integration also affects wage inequality through migration, although the effect will depend on the skills of migrants (Kahanec and Zimmermann, 2009): if immigrants are mostly high-skilled, they will most likely contribute to a reduction in wage inequality by reducing the average wage level of high-skilled workers; if they are low-skilled or face difficulties in getting their skills recognised in their receiving countries, they will expand the supply of low-skilled workers and therefore contribute to wage inequality.

Labour market institutions also play an important role. The weakening of European industrial relations systems, translated into a declining coverage of collective pay bargaining agreements in several countries, has been highlighted as a factor behind widening wage distributions (European Commission, 2013). Trade unions and centralised wage-setting mechanisms have a compressing effect on the wage structure (Blau and Kahn, 2009; Visser and Checchi, 2009). A very recent econometric study of EU countries found that minimum wage levels have a significant compressing effect on wage inequality (especially at the bottom of the distribution), as well as on union density and collective bargaining coverage (European Parliament, 2014).

Inequality at EU level

As previously mentioned, inequality is typically studied at country level. But with increasing levels of European integration, it seems necessary to complement national perspectives with an EU-wide one. As early as 1989 (published in 1995), Atkinson argued:

If the Community continues to assess poverty purely in national terms, taking 50 per cent of national average income, then the impact of growth on poverty in the Community will depend solely on what happens within each country. However, a central question concerns the possibility of moving to a Community-wide poverty line, with the same standard applied in all countries. In that case, the effect of growth on the extent of low income is affected by the relative growth rates of different member countries.

(Atkinson, 1995, cited in Brandolini, 2007)

Despite this early insight, studies with an EU-level perspective on inequality remain very scarce 25 years later. Even European institutions seldom take this perspective when discussing inequality and income distribution: either the data are national or the EU values are simply a weighted average of national levels (which leads to misleading estimations of EU-level disparities, as argued by Dauderstädt and Keltek, 2011). Table 1 below summarises the characteristics and findings of the few known studies that have taken such an EU-wide approach. All of them refer to income inequality, rather than wage inequality.

Table 1: Summary of empirical studies estimating inequality for the EU

Reference	Coverage	Data source	Target variable	Main findings	Numerical results
Bonesmo and Fredriksen (2012)	22 EU Member States, 2008	OECD income distribution and poverty database	Disposable income, assigned to individuals using OECD scale	Within-country inequality accounts for 85% of total EU inequality. Inequality in the EU has increased over time, both due to enlargements and to growing inequalities in countries for which data can be compared over time.	Gini:0.323 p90/p10: 4.86 p75/p25: 2.13
Dauderstädt and Kelttek (2011)	EU27 and EU25, 2005–2008	EU-SILC	Household disposable income, assigned to individuals using OECD scale	Inequality in the EU decreased during 2005–2008. Inequality is lower when measured in PPS than when using exchange rates. When measured in euro, inequality in the EU27 is higher than in other large economies such as India, the US, China or Russia; with PPS, it is still higher than in India.	P80/P20 (PPS):6.21 (2005) and 5.67 (2008) for EU25; 7.23 (2007) and 6.79 (2008) for EU27
Brandolini (2007)	21 EU countries (EU15+6 NMS), 2000	ECHP for the EU15 and LIS for the rest	Household disposable income	Inequality is higher when: income is measured in euros instead of PPS measures; inequality is measured for the EU as a whole instead of the population-weighted average of national values. Inequality is lower in the EU than in the US. The 2004 EU enlargement increased inequalities within the EU: inequality is higher in EU25 than in EU15 or euro area.	Gini (PPP): EU25 0.33; EU15 0.29; Euro area 0.29; US 0.37. P80/P20 (PPP):EU25 2.8; EU15 2.3; euro area 2.3;US 2.9
Boix (2004)	Several EU aggregates, early 2000s	World Bank Household Survey Database	Individual disposable income or expenditure, obtained at household level.	Inequality in the EU27 is higher than in the US (0.394). In all other EU specifications, it is lower. Inequality increased in the EU following each of the successive enlargements, especially when the eastern European countries joined.	Gini: 0.342 (EU15), 0.38 (EU-25), 0.399 (EU-27)
Papathodorou and Pavlopoulos (2003)	13 EU countries, 1999	CHER	Net household income, assigned to individuals using modified OECD scale	Inequality between countries accounts for a small part of overall EU inequality (8%). The remaining 92% is due to within-country inequality.	Theil: 0.176 (between-country component: 0.015, 7.8%)
Beblo and Knaus (2000)	Euro area (11 countries), 1995	ECHP and LIS for Finland	Household disposable income, assigned to individuals using modified OECD scale	Inequality between countries accounts for 8% of overall EU inequality. Government intervention reduces inequality and intensifies differences between countries.	Theil: 0.185
Atkinson (1996)	12 EU countries, Norway and Switzerland, 1985–1990.	LIS	Household disposable income, assigned to individuals using modified OECD scale	The Europe-wide distribution is less unequal than that of the US.	Bottom decile gets 2.9% of the income (1.9% in the US); bottom 50% gets 29.5% of the income (26.2% in the US); bottom 90% gets 77.2% of the income (76.3% in the US).

Note: Databases presented as acronyms are European Community Household Panel (ECHP); Luxembourg Income Survey (LIS); and Consortium of Household panels for European Socio-economic Research (CHER).

Although few in number, the existence of these studies shows that inequality and income distribution can be studied at EU level. Among them, two empirical findings are particularly relevant to the present report, and will be returned to at a later point in relation to the data presented here. The first is that once purchasing power differences are taken into account by using purchasing power standards (PPS), most of the studies reviewed find that EU-level income inequality is comparable to that of the US or other large economies (although some studies yield slightly higher or lower values).

The second is that although between-country differences are relevant, they account for a relatively small share of the overall EU-level inequality (within-country inequality represents around 90% of the total according to the studies reviewed).

Literature on the most recent trends in wage inequality

Aside from the factors discussed above, inequality is affected by the business cycle and macroeconomic development in general. Taking a long-term perspective, the Kuznets curve describes the evolution of inequality in industrialising economies as an inverse U-pattern, with inequality initially increasing until a certain income level is reached, with democratisation and welfare state development leading to a redistribution of the gains from industrialisation (Kuznets, 1955). However, different researchers have contested the generality of this hypothesis beyond the cases that Kuznets himself studied: when more complete panel data are used, the results do not hold (Palma, 2011). Moreover, as already shown, inequality seems to have been growing in many countries over the last 30 years, something that also contradicts the Kuznets hypothesis. The more recent hypotheses of Piketty, which have already been touched upon, contrast starkly with those of Kuznets: according to Piketty, inequality is bound to continue growing because the rate of capital returns tends to be higher than economic growth, a process that can only be overturned via state intervention. Piketty proposes a global system of progressive taxation to address this (Piketty, 2014).

Taking a more short-term perspective, there seems to be some consensus in the literature that income inequality tends to be counter-cyclical, increasing in periods of economic crisis and decreasing during economic expansion. This effect is mostly mediated by unemployment and inflation, although it is country-specific and strongly depends on institutional factors such as existing tax and transfer systems (Maestri and Roventini, 2012). This effect is clearer in terms of net income and total labour earnings than it is in terms of hourly wages.

Against this background, it is useful to consider the empirical evidence regarding the impact of the Great Recession on inequality. Although the evidence is limited, some European studies look at very recent trends in income inequality. But the evidence is somewhat contradictory. According to some studies, inequality did not increase or even declined modestly in certain countries during the initial years of the economic crisis, when mainly capital was hit (European Commission, 2011; Jenkins et al, 2011; Foster-McGregor et al, 2014). Other studies identified increases in inequality as a result of the crisis. A recent OECD study, using a pooled sample of 16 countries, found income inequality (as measured by the Gini index) moved upwards during the beginning of the crisis, between 2007 and 2010. Households at the bottom of the income distribution (those at the bottom 10%) benefited less from rising incomes or were more affected by income losses than households at the top 10% of the income distribution (OECD, 2013).

Only one study looked at the evolution of EU-level inequalities since the crisis (Dauderstädt and Kelttek, 2014). It found an increase in income inequality after 2009, which contrasted with a previous process of EU-wide convergence following the 2005 enlargement.

Defining wage measurements

Chapter 3 of this report uses European datasets to analyse recent changes in the distribution of wages in Europe. The focus is on the period 2004–2011, covering the period immediately before and after the onset of the economic crisis (around 2008), in order to be able to evaluate its impact on wages.¹ The target measure is the gross hourly (or full-time equivalent) wages received by individual workers in PPS-adjusted euro, although other measures of labour earnings are occasionally considered in order to provide a better picture. It is important to discuss in some detail the main features of the target measure used here as it has important implications for the analysis. Its main features are summarised below.

- By focusing on wages, the sample is restricted to employees and does not include other forms of labour earnings such as those from self-employment.
- By using hourly (or full-time equivalent) wage, the variation in wages resulting from differences in working hours and employment intensity is eliminated. In other words, this report considers wage inequality by different jobs, rather than inequality in workers' earnings.
- For similar reasons (to focus on wages and not labour earnings), gross rather than net wages are used. The gross measure of wages is before taxation, but after social security contributions (in other words, they are not included in the measure), so that it is not a direct measure of labour costs.
- This measure refers strictly to individual workers, and does not take into account the pooling of earnings that typically takes place in households and which obviously affects disposable income.
- Finally, as this report takes a pan-European, comparative approach, PPS-adjusted euro are used as a unit of measurement of wages in different countries. The purchasing parity scales used here are those provided by Eurostat.

This target measure is departed from when a different or wider focus is needed. In particular, consideration is made of how results change when using monthly or annual wages rather than hourly wages, thereby evaluating the impact of working hours and employment intensity on wage inequality. This also applies to the use of euro that are not PPS-adjusted for measuring wages. The latter point is particularly important in terms of taking a truly pan-European perspective. After all, it could be argued that the existence of a common currency and free movement of labour and capital in the majority of European countries justifies the analysis of the distribution of wages in euro without any adjustment. For this reason, the discussion will include analysis of how results change when wages are measured that way.

Data sources and variables used

Surely one of the reasons for the scarcity of EU-level studies on wage inequality is the fact that, up until relatively recently, there was a limited availability of data at the individual level. There are now two large-scale European surveys that cover wages and that can be used for this purpose. But in addition to the fact that they have only been carried out for a few years and therefore do not allow for long-term or even medium-term analysis, they also present some formidable methodological problems that can be reasonably managed but never truly solved. Basically, neither of the two existing sources can be used to analyse recent trends in the distribution of wages as required here. This means that both sources must be used in parallel in order to ensure the robustness of the results presented. Their use also requires particular caution and transparency in any methodological decisions made, which is the aim of this chapter. Finally, the findings presented here must be interpreted as approximations only.

¹ This is the period for which EU-SILC data were available at the time of preparing this report.

European Survey on Income and Living Conditions (EU-SILC)

The main source for this report is the European Survey on Income and Living Conditions (EU-SILC). The EU-SILC is a cross-sectional and longitudinal database on income, poverty, social exclusion and living conditions in the EU, coordinated by Eurostat, with data drawn from different sources at the national level. One of the advantages of this dataset is the fact that it is representative of all private households and their current members residing in the territory of the countries at the time of data collection. It also has a reasonably large sample and has the advantage of incorporating both a longitudinal perspective and a household perspective, as well as containing rich information on individuals. A clear advantage of EU-SILC, for the purposes of this report, is that it provides information on a yearly basis from the years 2005 to 2012 (referring to income earned in the previous year).

Nevertheless, there are important problems with EU-SILC for the purposes of this report, summarised below.

- It measures labour income rather than wages. Labour income in the EU-SILC refers to overall income from work in the previous calendar year, measured in gross terms (some countries, but not all, also provide net data). It does not necessarily refer to particular jobs, since it measures any labour-related income: an individual's income can come from more than one job if the respondent had more than one job in the previous year, either successively (if they changed jobs) or simultaneously (if they had multiple jobs). For example, the share of employees with more than one job in the countries included in EU-SILC in 2010 was 4.73% (ranging from nearly 9% in Poland to less than 2% in Bulgaria). The share of employees who changed jobs in the year used as reference for the income variables is 8% (ranging from 14% in the UK to 2% in Romania). This is not a huge problem, but it can have significant implications for the results, which have to be taken into account.
- The survey collects information about respondents' jobs, such as the relevant employment sector, at the time of the research – information that is required for this analysis. However, this information does not necessarily correspond to the job that originated the labour income reported. As mentioned before, around 8% of employees changed jobs last year, and all of them are potentially affected by this.
- A significant proportion of responses are imputed, for various reasons such as item non-response or the information being collected on a varying basis. Procedures for this can vary by country. Although there is a variable that flags imputed values, it is not consistently coded, so it is very difficult to evaluate the implications of this problem (Brandolini et al, 2010). This problem is not specific to this analysis, but applies to anyone using EU-SILC data.

To transform the EU-SILC variable of labour income into a variable fit for the purposes of this report, the following formula, based on Brandolini et al (2010), is applied.

$$\text{Monthly ft eq.gross wage} = \frac{\text{annual cash gross earnings}}{\text{months in ft jobs} + (\text{months in pt jobs} \times [\text{pt/ft ratio}])}$$

The main variable used here is monthly full-time equivalent gross wage, which equals the EU-SILC variable of annual cash gross earnings (in the previous year) divided by respondents' number of months in full-time jobs over the same year, plus the number of months in part-time jobs multiplied by a country–sex specific ratio of median hours of work in part-time jobs to median hours of work in full-time jobs.²

² This necessary adjustment for part-time work can produce a minor bias in countries where the hours of part-time work are highly spread (such as the UK), but it is highly unlikely to change the overall picture.

To adjust for the potential bias introduced by workers that hold more than one job, a further refinement is made to the previous figure: it is multiplied for a ratio of the hours worked in the first job to the total hours of work (in all jobs). This involves the assumption that the person had the same working arrangements over the previous 12 months as they have now, which is not necessarily true but is reasonable (and unavoidable unless it is preferred to ignore the problem of multiple job holders). No further adjustments are made to deal with the problem of workers that changed jobs over the reference period, because it is simply impossible to know how much of last year's labour earnings can be attributed to each job. The number of months worked is known (so months in unemployment or inactivity can be excluded), although it is not known how many of these months correspond to each job, if the individual changed job during the year in question. This means that regarding anyone who changed jobs in the previous year (around 8% of the total sample), the base variable used here collects the average wage for all jobs over the last 12 months. This is a good approximation, to the extent that those who changed jobs maintained a similar wage level.

Using the longitudinal module of the EU-SILC, it was possible to check directly how reasonable this assumption was by comparing wages in the previous and current year for those who changed and did not change jobs. The average wage increase of people who changed was only marginally above that of those who did not change (5.1% increase versus 5%). Furthermore, 55% of those who changed did so within the same two-digit occupation (in which case the increase in pay was even smaller); only for the remaining 45% (who changed job and occupation) was the increase in pay relatively significant (6.3% versus 5%). Overall, not adjusting for those who changed jobs is likely to lead to an inconsequential upwards bias, at most.

Finally, the resulting variable is adjusted to purchasing power parity using the PPS values provided by Eurostat. Cases with improbably low values setting a threshold of half the minimum wage of the country concerned in a particular year were eliminated. Data on minimum wages used can be found in Eurofound (2014). For those countries with no statutory minimum wage, the lowest value of collectively agreed minimum wages was used, as compiled by Kampelmann et al (2013). For Sweden (not available in this database), an average of the values of Finland and Denmark were used.

European Structure of Earnings Survey (SES)

The European Structure of Earnings Survey (SES) has been conducted every four years since 2002. It collects representative and harmonised data on wages in enterprises with more than 10 employees in all sectors except agriculture, fishing, public administration, education, health and community and social services. The inclusion of small enterprises and the above mentioned sectors is optional for the participating countries; many of them opted for such comprehensive coverage in the last edition of the survey (2010). Although the actual method for collecting the information can differ considerably across countries (between specific surveys and administrative registers), in all cases it is collected at the company level and based on payroll data (rather than on workers' responses). The sample is representative of both enterprises and workers in the covered sectors and company sizes.

The SES has some advantages over the EU-SILC for the purposes of this report, but it has some important problems too, and is mostly used here as a secondary source to complete the picture. Its main advantage is that it is a survey explicitly aimed at measuring wages with a high degree of detail, whereas EU-SILC measures labour income and only on a secondary basis. What this means is that the target variable for this report can be constructed in a much more direct and precise way, with less need for resorting to complicated assumptions. The problem of multiple and changed jobs does not apply either, because the data refer to jobs rather than workers; even if someone had more than one job, the information would be correctly gathered for each of them. The sample is also considerably bigger in most countries, and the degree of imputation is in principle much smaller (although the documentation for the data does not say much about this).

³ Data were unavailable for Austria, Belgium, Bulgaria, Denmark, Germany, Greece, Malta and the UK (Croatia was not included).

On the other hand, the SES presents one important problem: it only provides limited coverage of the target population for this report (EU workers). It was only possible to access SES data for 19 EU countries.³ Furthermore, for some countries the SES does not include small enterprises or many important sectors of the economy. The exclusion of small enterprises is especially problematic (affecting seven of the 19 countries), because it is known that low-paid workers are overrepresented in such companies.

The measure of wages that will serve as a basis for this report's analysis is very precise and corresponds more or less exactly with the target variable defined previously, according to the following formula:

$$\text{Hourly wage} = \frac{\text{monthly wage} + \text{monthly eq annual bonus}}{\text{monthly working hours}}$$

In this formula, all variables except the monthly equivalent annual bonus refer to the last month (adjusted for cases of partial unpaid absence). The monthly equivalent annual bonus is calculated as the total annual bonus received in the previous year divided by the number of months worked in that year.⁴ The only further adjustments applied were the rescaling to PPS and the elimination of implausibly low values as previously explained for EU-SILC.

³ Data were unavailable for Austria, Belgium, Bulgaria, Denmark, Germany, Greece, Malta and the UK (Croatia was not included).

⁴ Since the SES data allow hourly wages to be calculated with precision, there is no need to adjust for part-time work.

Recent trends in wage distribution 3 in the EU

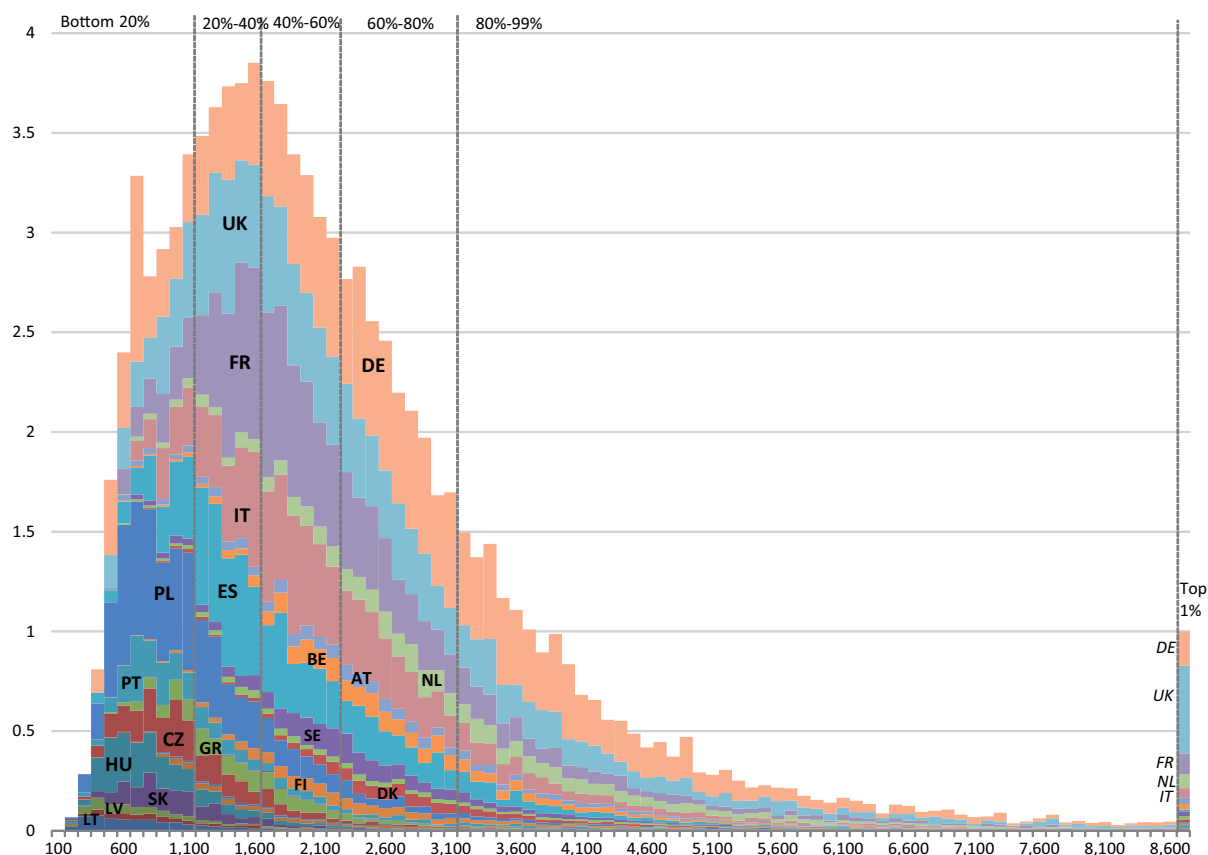
Wage distribution from an EU perspective

The key aim of this report is to study recent trends in the distribution of wages from an EU perspective. An EU perspective does not only mean taking a cross-country, comparative approach; it also involves investigating trends in the distribution of wages in the EU as a whole. This is an unusual exercise with surprisingly few precedents, as discussed earlier. This may be partly due to the availability of suitable data but it may also be an expression of doubt as to the analytical or political relevance of such an approach. Certainly it is the case that single national labour markets, in practice, represent reality much more than the European labour market; regulation of these national markets, by law or collective bargaining, is predominately also at the Member State level. However, differences in wage levels – particularly at the bottom of the wage distribution – are key to understanding, for example, much of the labour mobility between Member States. This places discussions on the possible coordination of minimum wages on a firmer empirical basis. Moreover, it could be argued that the European wage distribution is key to European integration at a very fundamental level. The preamble to the Treaty on the Functioning of the EU states the wish of the signatories ‘to strengthen the unity of their economies and to ensure their harmonious development by reducing the differences existing between the various regions and the backwardness of the less-favoured regions’. For the citizen, this is largely about wages. Presumably, a more even distribution of wages throughout Europe is an ultimate goal of European cohesion and structural policies.

Figure 1 shows a first approximation of the distribution of wages in the EU as a whole which has been broken down by the various Member States. The horizontal axis represents full-time equivalent monthly wages in euro, adjusted for purchasing power parity (PPP) – that is, taking into account the fact that price levels differ between Member States. Each bar in the chart corresponds to an interval of €100 in PPP wages. The vertical axis represents the percentage of all EU wage earners that corresponds to each of those intervals. So, for instance, the most common monthly wage level in the EU, at the highest peak of the graph, corresponds to the interval PPP of €1,500–€1,600, earned by almost 4% of wage earners in the EU. The other peak, to the far right, is due to the aggregation of all wage levels above a PPP of €8,700 and corresponds to the top 1% of the wage distribution in the EU.⁵ To help with the interpretation of Figure 1, vertical lines have been added for the levels that correspond to the quintiles of the EU wage distribution: in other words, the bars below a PPP of €1,100 add up to the lowest-paid 20% of the working population, and so on. Because of its significance for the distribution of wages, the top 1% has been singled out in Figure 1. It is important to bear in mind that EU-SILC, as with most income surveys, is likely to have a poor coverage of the top of the distribution and to underestimate significantly the upper wage levels (which is why inequality research is turning to fiscal data; see Piketty, 2014). For this reason, the figures of top wage levels presented here should be interpreted with caution; they should be seen more as the lower bound of an estimate than as an estimate as such.

⁵ The wages in the top 1% are so high that without such aggregation of all of them in a single bar, the upper tail of the histogram would continue over many pages.

Figure 1: Distribution (%) of employees by full-time equivalent wage levels in PPP euro



Source: EU-SILC

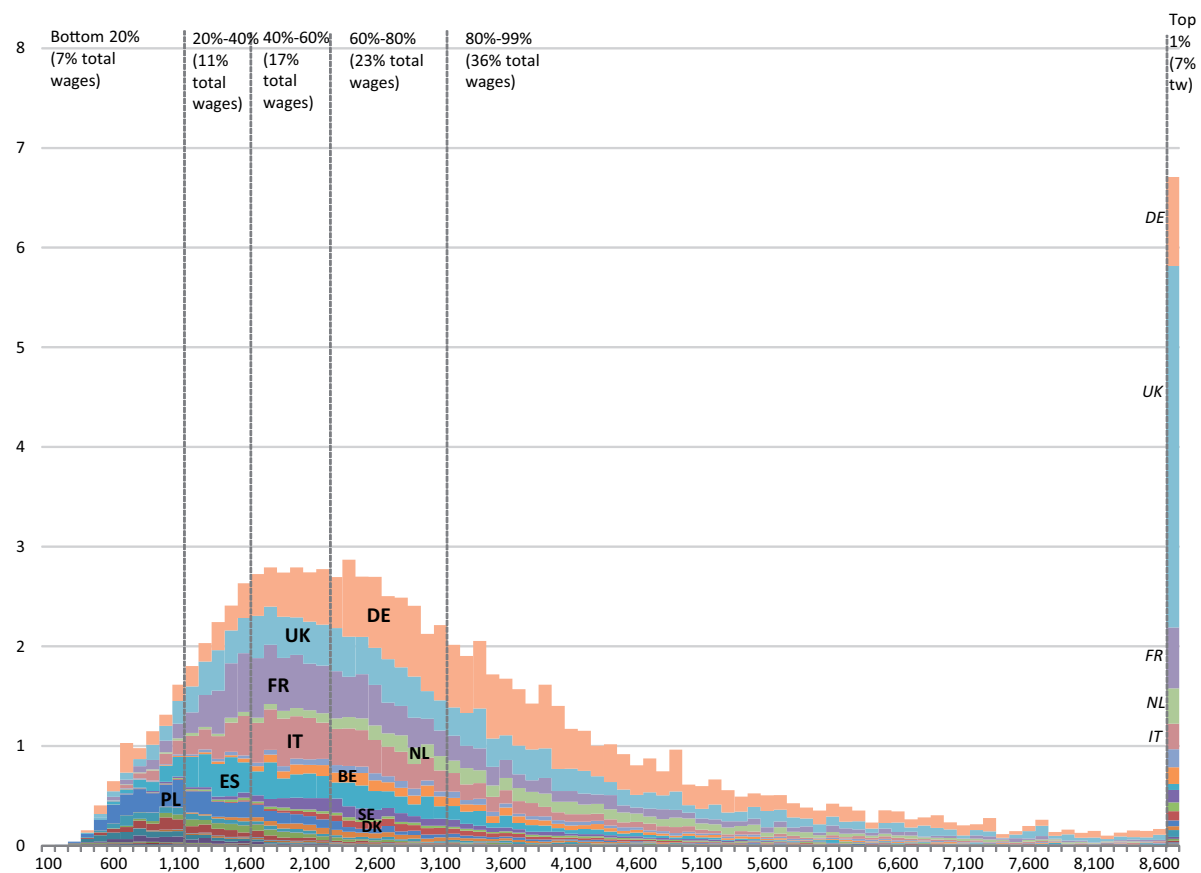
Overall, the EU wage distribution looks relatively similar to a typical national wage distribution. It has a large concentration of values around mid to low wage levels and is skewed to the right, with a long upper tail. But the most interesting aspect of Figure 1 for the purposes of this report is the way each bar has been broken down by Member State. This makes it possible to see how the distribution of wages in each Member State contributes to overall EU wage distribution. The bottom 20% is to a large extent dominated by eastern European Member States, which have only a very limited presence in mid to high wage levels. Still, it is interesting to see that Germany and the UK have a significant presence in the bottom 20% despite their high income levels. The UK is remarkable for its polarisation: it accounts for a very significant portion (nearly half) of the top 1% of wage earners in the EU, and yet it also has a substantial presence in the bottom two quintiles (it is important to remember that wages here are expressed in PPP). Germany has a significant presence in high wage levels, but not so much in the extremely high wages of the top 1%. France is considerably more concentrated in wages between 20% and 60% of the distribution, with a limited presence below and to some extent above this. To summarise, Figure 1 shows that countries do have distinct positions in the distribution of overall wages in the EU, but that there is also a considerable amount of overlap between them.

Figure 2 is identical to Figure 1 except in one crucial respect: instead of representing the proportion of workers in each €100 interval for the whole of the EU, each bar represents the proportion of total wages earned by workers in each €100 interval. So, for instance, the workers earning between a PPP of €1,200 and €1,300 per month account for around 2% of the total wage mass of the EU. The most striking feature of Figure 2 is the enormous increase in the size of the bar representing the wages earned by the top 1%, which accounts for nearly 7% of the total. This is roughly the same amount that accrues to the bottom 20% of the distribution, as is also shown in Figure 2. In other words, a group of workers that

is 20 times smaller than the top 1% gets the same total earnings. Figure 2 also highlights the disproportionate weight of the UK in the top 1% in terms of the distribution of the EU wage mass – it accounts for nearly one-half of it and nearly 4% of the total EU wage mass, despite comprising only 0.4% of all EU wage earners. Figure 2 also shows the low share of the total wage mass going to the bottom 60% of the working population (around 35%) and the high share of German wages in the top quintile (but not so much in the top 1%).

Most importantly, Figure 2, particularly its contrast with Figure 1, serves as a good illustration of the very significant degree of wage inequality that exists in the EU, and as a reminder of the need to take into account the distribution of wages across and within countries when studying this issue. This is a principal focus of this chapter of the report.

Figure 2: *Distribution (%) of total wage mass by full-time equivalent PPP wage levels, 2011*



Source: *EU-SILC*

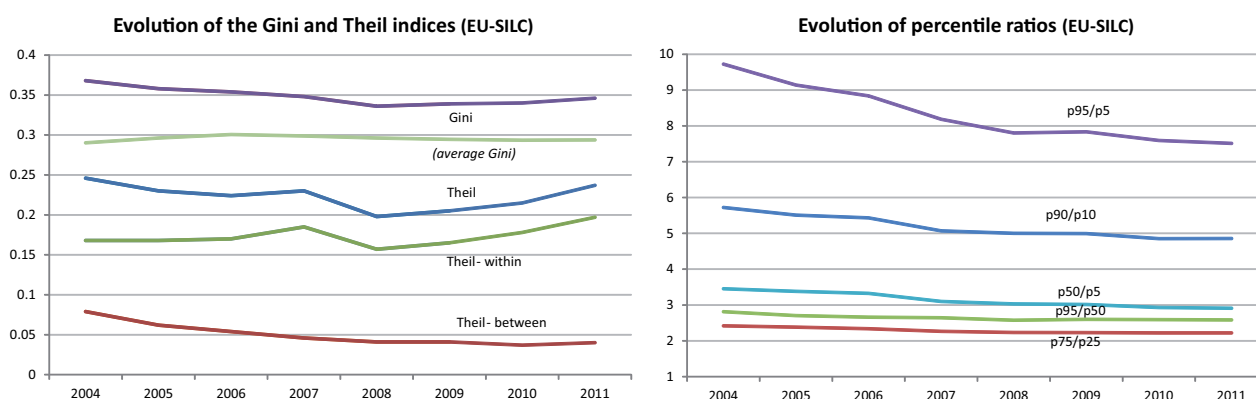
Distribution of wages in the EU: Aggregate patterns and recent developments

Figure 3 provides a number of summary measures of EU-level inequality in full-time equivalent wages, for the period 2004–2011. These measures were all calculated using EU-SILC, with the value of wages in euro adjusted to PPP so that they are comparable. In other words, the measures shown in Figure 3 reflect the inequality that exists in the EU as a whole in the purchasing power of full-time equivalent wages.

Figure 3: Summary measures of EU-level inequality, full-time equivalent wages in PPP

	2004	2005	2006	2007	2008	2009	2010	2011
Gini	0.368	0.358	0.354	0.348	0.336	0.339	0.340	0.346
u.a. Gini*	0.290	0.296	0.301	0.299	0.296	0.295	0.293	0.294
Theil	0.246	0.230	0.224	0.230	0.198	0.205	0.215	0.237
Between	0.079	0.062	0.054	0.046	0.041	0.041	0.037	0.040
Within	0.168	0.168	0.170	0.185	0.157	0.165	0.178	0.197
p5	100	105.7	115.5	125.2	130.9	133.3	139.8	145.8
p10	100	104.1	111.2	119.9	122.2	124.4	130.3	133.9
p25	100	103.9	111.7	115.3	118.9	120.1	123.4	127.3
p50	100	103.4	111.0	112.3	114.8	116.2	118.5	122.7
p75	100	102.3	108.1	108.1	109.7	110.6	113.3	116.9
p90	100	100.2	105.5	106.1	106.8	108.5	110.4	113.6
p95	100	99.4	105.0	105.4	105.1	107.4	109.2	112.6
p95/p5	9.7	9.1	8.8	8.2	7.8	7.8	7.6	7.5
p90/p10	5.7	5.5	5.4	5.1	5.0	5.0	4.9	4.9
p75/p25	2.4	2.4	2.3	2.3	2.2	2.2	2.2	2.2
p95/p50	2.8	2.7	2.7	2.6	2.6	2.6	2.6	2.6
p50/p5	3.5	3.4	3.3	3.1	3.0	3.0	2.9	2.9

* Unweighted average of EU Member States' Gini indices



Source: EU-SILC

The Gini index for the EU in 2011 – according to an estimation using EU-SILC data – is 0.346. This value is considerably higher than the unweighted average of the Gini index of all European countries (most European countries have a Gini index below or around 0.3), but lower than the Gini index of the three most unequal Member States (the UK, Portugal and Latvia, which have estimated Gini values of 0.404, 0.358 and 0.357 respectively). The EU value is also lower than that for the US, the most comparable international entity; according to the OECD, the Gini of wages of full-time workers in the US in the mid-2000s was around 0.4 (see OECD, 2011, p. 33). The lowest estimated values for the EU are for the three Nordic Member States and Slovakia (all below 0.25). The Gini index for wages without adjusting for PPP in Europe is around 0.38 – high, but still below that of the US and the UK. Figure 3 also shows some percentile ratios that may help provide an idea of the nature of this inequality: the top 10% of wages in the EU as a whole are around five times larger than the bottom 10% in purchasing parity terms (as shown by the p90/p10 ratio).

How has this EU-level inequality changed in the last decade? As Figure 3 shows, the evolution of inequality in the EU as a whole seems to have been significantly affected by the economic crisis of 2008 onwards. Between 2004 and 2008, there was a clear reduction in EU wage inequality, reflected in a fall in the overall Gini index from 0.368 to 0.336

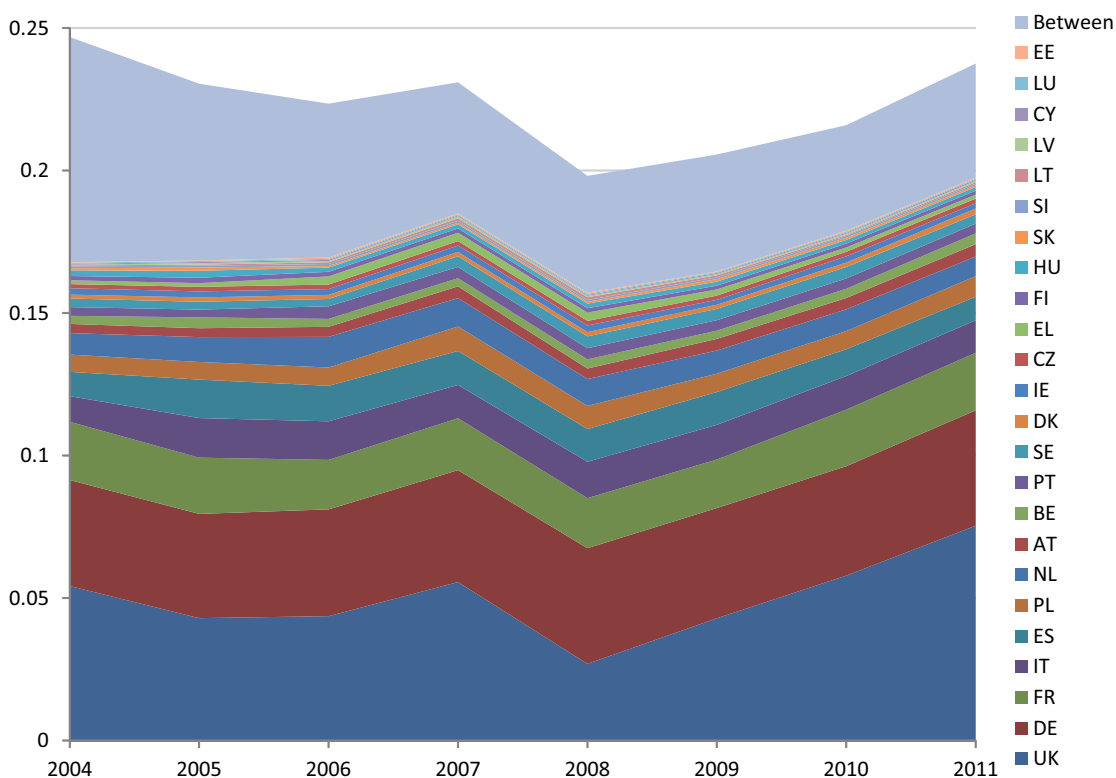
(a 10% decrease in four years). This fall came to a halt in 2008, and the trend started to slowly reverse, growing to 0.346 in 2011.

The reduction of inequality up to 2008 was mostly the result of an increase in the lowest wage levels, as shown in Figure 3. The wages of the lowest fifth percentile grew by 45% over the period, compared to slightly more than 10% for the highest fifth percentile. The ratio between the top and bottom fifth percentiles shrank by almost one-quarter (from 9.7 to 7.5), with most of the reduction concentrated in the first years of the period, as already mentioned.

Figure 3 also includes an estimation of the evolution throughout the period of the Theil index for EU wages in PPP. On its own, the Theil index is an alternative measure of inequality, which yields slightly lower numeric values and is, in the case of this analysis, a little more sensitive to changes in the distribution of income over time. But the real advantage of the Theil index is that it can be easily broken down into two separate components: the part of total EU inequality that results from differences between countries, and the part resulting from inequality within each Member State. This simple decomposition, which is also shown in Figure 3, yields a very interesting result: the decrease in overall inequality between 2004 and 2008 is the result of a reduction in the wage differentials between countries, while the increase in inequality after 2008 is the result of an increase in the inequality of wages within countries. In other words, before the crisis there was a convergence in wage levels across the EU, with little change in the overall level of within-country inequality (although such limited change in overall within-country inequality hides significant but contradictory changes in different countries, as will be shown later). After the crisis, this pattern is reversed: the process of cross-country convergence seems to have stalled (in the last year of data, between-country inequality even starts to grow marginally) while the level of inequality within Member States has increased significantly. The following two sections of Chapter 3 provide a detailed analysis of these two aspects of the evolution of overall EU wage inequalities. This involves a detailed discussion of the process of convergence in wage levels between countries and its change during the crisis, followed by a discussion and comparison of the evolution of inequalities in wages across Member States.

But before that analysis, this section continues to consider, in a little more detail, the overall EU patterns by further decomposing the Theil index and by comparing national wage distributions from an EU perspective. Figure 4 shows a full decomposition of the overall EU Theil index by Member State, differentiating not only the ‘between’ component but also the contribution of each individual country to the evolution of the ‘within’ component (that is, the portion of total inequality that is the result of inequalities within each Member State). The most striking aspect of Figure 4 is how it shows the importance of developments in the UK for the evolution of overall EU wage inequality. There are three reasons behind this. First, the UK has the highest level of wage inequality in the whole EU (with a Gini index of 0.404 in 2011). Second, the contribution of each Member State to the ‘within’ component of Theil equals the amount of inequality in each country weighted by the share of wages in that country in the EU overall. Since the UK is a large, high-income country and therefore accounts for a large proportion of total EU wages, it gets a very high weight in the Theil index. Thirdly, the UK experienced drastic changes over the period shown in Figure 4, while most other big countries only experienced slow incremental changes. As will be shown, the large shifts in inequality in the UK over the period, and in particular the sudden increase in 2007 and decrease in 2008, are driven by large year-to-year changes in the earnings declared by the highest-paid workers in the UK (the top 1%). Such large shifts are not observed in other countries in the EU-SILC data. It is difficult to assess whether such changes reflect real radical shifts in inequality in the UK in those years (which, after all, were very eventful years in terms of the distribution of wages) or are a statistical artefact – random sampling is not very good at capturing phenomena that affect a very small number of people; and if inequality grows because of an increasing accumulation of earnings at the very top, surveys may not be a very good method of studying it – as argued, for instance, by Piketty (2014).

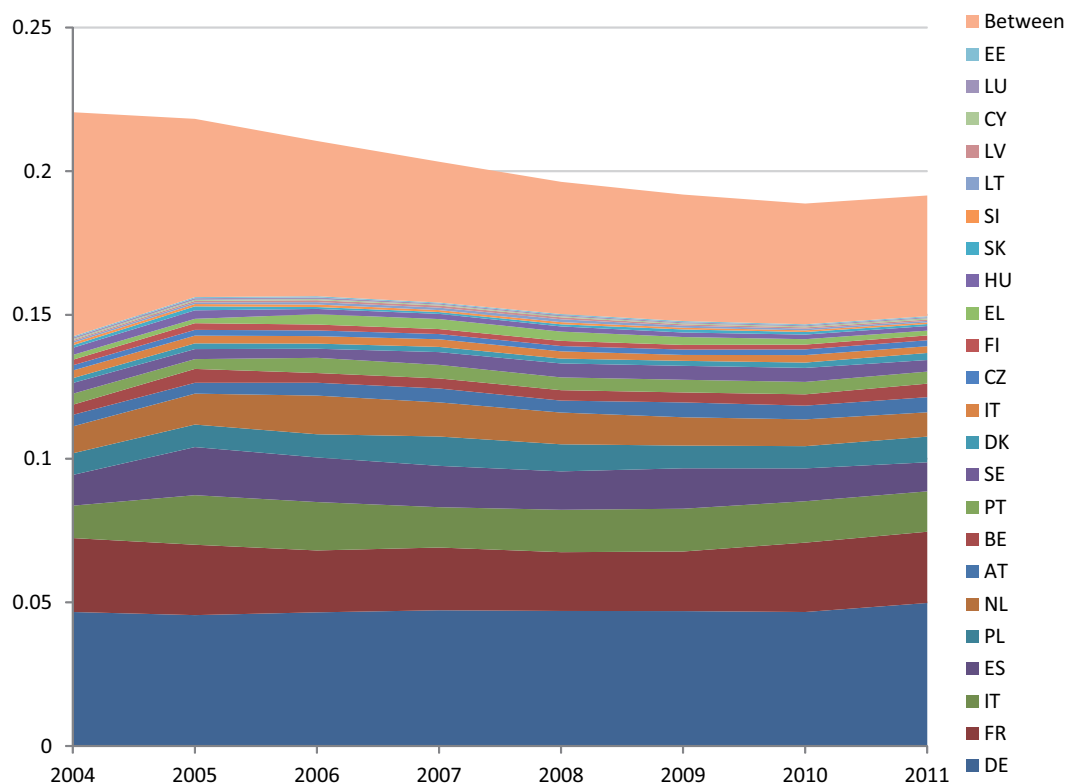
Figure 4: Decomposition of EU Theil index (including the UK)



Note: This figure shows the 'between' component and contributions to the 'within' component, full-time equivalent wages in PPP.
Source: *EU-SILC*

It is therefore worth looking at the evolution of wage inequality in the EU without including the UK in the analysis, as shown in Figure 5 (on facing page). Although the overall trends are similar, the shifts look notably less dramatic without the UK, and there are some differences in timing. In this case, the Gini index decreases from 0.357 to 0.336 between 2004 and 2007, stalling from then on and only increasing very marginally in the last year for which there are data (2011). The 'between' component of Theil decreases until 2010, although after 2008 the reductions are very small. But the overall picture without the UK is essentially the same: in the first period, there is a significant reduction in overall EU inequality driven by a reduction in the wage differentials between countries. Around 2008, this trend starts to change, with a clear deceleration in the decrease of inequality that eventually leads to a reversal, driven by an increase in the within-country component of inequality (which increases significantly in the larger countries).

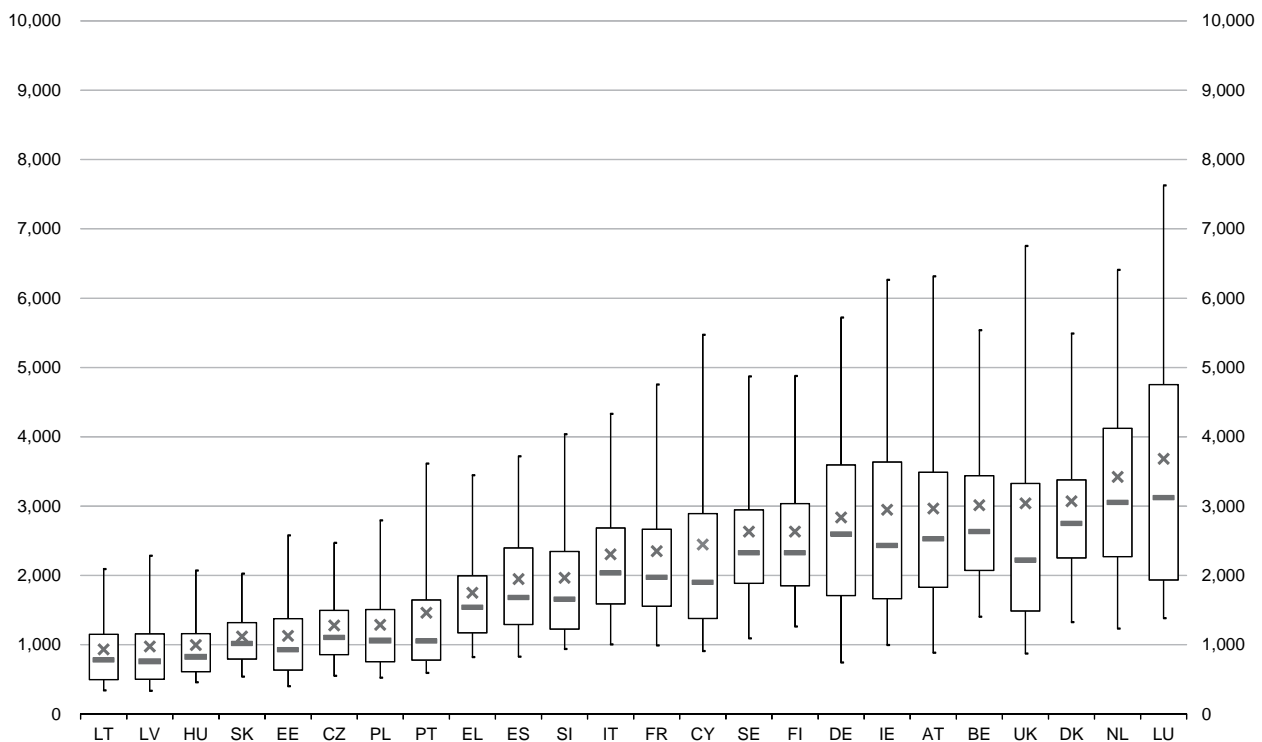
Figure 5: Decomposition of EU Theil index (excluding the UK)



Note: This figure shows the 'between' component and contributions to the 'within' component, full-time equivalent wages in PPP.
Source: *EU-SILC*

In order to better grasp the relationship between the 'between' and 'within' components of wage inequalities in Europe, it is useful to represent national wage distributions using a common axis, as is done in Figure 6. For each Member State represented, the cross represents the average wage in the country, the thick horizontal line shows the median, the box around it shows the interquartile range (that is, the 50% of workers with wages around the median are within the levels defined by the box) and the longer lines (known as whiskers) represent the wage levels that correspond to the fifth and 95th wage percentiles in the country – in other words, below the wage level indicated by the lower line are the 5% of workers that are the lowest paid and above the upper line are the 5% who are the highest paid. The longer the box and whiskers, the more wage inequality there is in the country: for instance, Figure 6 shows that Denmark and the UK have similar average wage levels in PPP, but that the level of inequality is much higher in the UK, especially at the upper tail (as shown by the much longer upper whisker, and the greater distance between the average and the median wage). But Figure 6 also shows the difference in wage levels between countries, since all countries are represented in a common axis of euro in PPP. So for instance, it shows that around 95% of workers in the four countries with the lowest wages earn less than a PPP of €2,000, whereas in Belgium, Denmark and the Netherlands, 75% of workers earn more than that.

Figure 6: *Distribution of full-time equivalent wages in PPP, 2011*



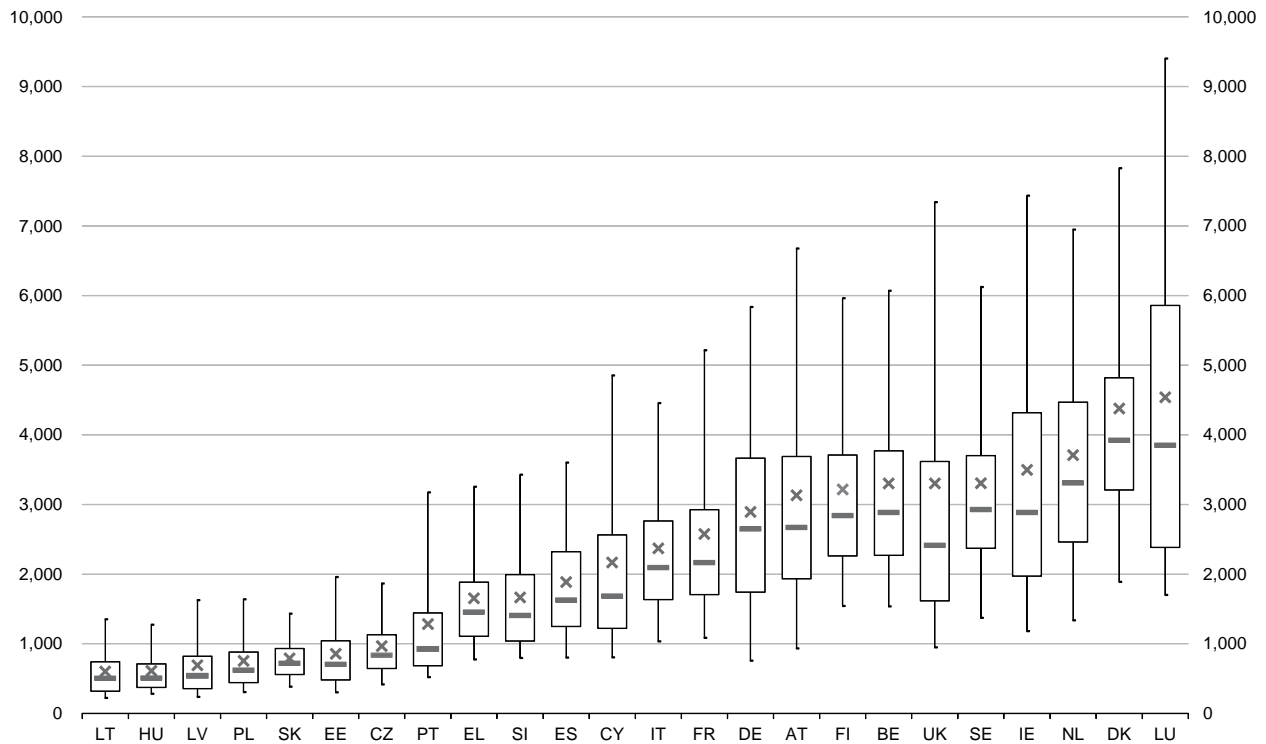
Source: *EU-SILC*

Figure 6 shows that there are large differences in both the ‘between’ and ‘within’ components of total EU inequality. With respect to the ‘between’ component, there is a 4:1 difference in the average levels of full-time equivalent wages, despite being compared in PPP. With respect to the ‘within’ component, with all wage levels there are significant differences in the spread of the distribution: the Nordic countries contrast with Luxembourg, Germany and the UK, at high wage levels, while at the other extreme, Slovakia and Hungary contrast with Estonia and Poland. There is some degree of overlap in wage distribution across Member States, but certainly not enough to be able to speak of a single common distribution. In particular, eastern and southern Member States have clearly much lower wage levels. For instance, at the level of around PPP €2,000, there is a divide in full-time equivalent wages: in all eastern Member States (except Slovenia) and Greece and Portugal, more than 75% of workers are below this level, whereas in most Nordic and continental Member States, nearly 75% of workers are above this level. It is also useful to compare the extremes: the top 5% of wage earners in poor EU countries have wages that would be average in rich EU countries, while the bottom 5% of wage earners in rich EU countries have wages that would be around average in poor countries.

This type of representation can help improve understanding of two aspects already discussed but that are difficult to grasp in abstract terms: the impact of making the comparison in purchasing parity levels, and the degree of convergence in the period studied. Figure 7 is essentially the same as Figure 6, except that PPP has not been adjusted for – figures are represented in euro, at market rates. As might be expected, the differences in wage levels between countries widen significantly: the ratio of the highest to the lowest mean wage nearly doubles (going from 4 to 7.5) and the distance between the eastern Member States and the rest of the EU becomes much wider. In this case, the significant divide occurs at €1,000 rather than €2,000: in nearly all eastern Member States, 75% of workers fall below that level, whereas in most other countries the equivalent level is well below the 25th percentile. To the extent that the EU is a single market, with freedom of movement of goods, services, capital and people, the differences and evolution of wages in market euro are very relevant. It is important to be aware that from this perspective, the differences are much bigger. Nonetheless, this

report focuses on PPP adjusted wages for two reasons: this approach permits the comparison of actual differences in purchasing power and therefore life chances associated with the wage levels in different countries; and it avoids bias in the analysis of trends by different developments in terms of inflation.

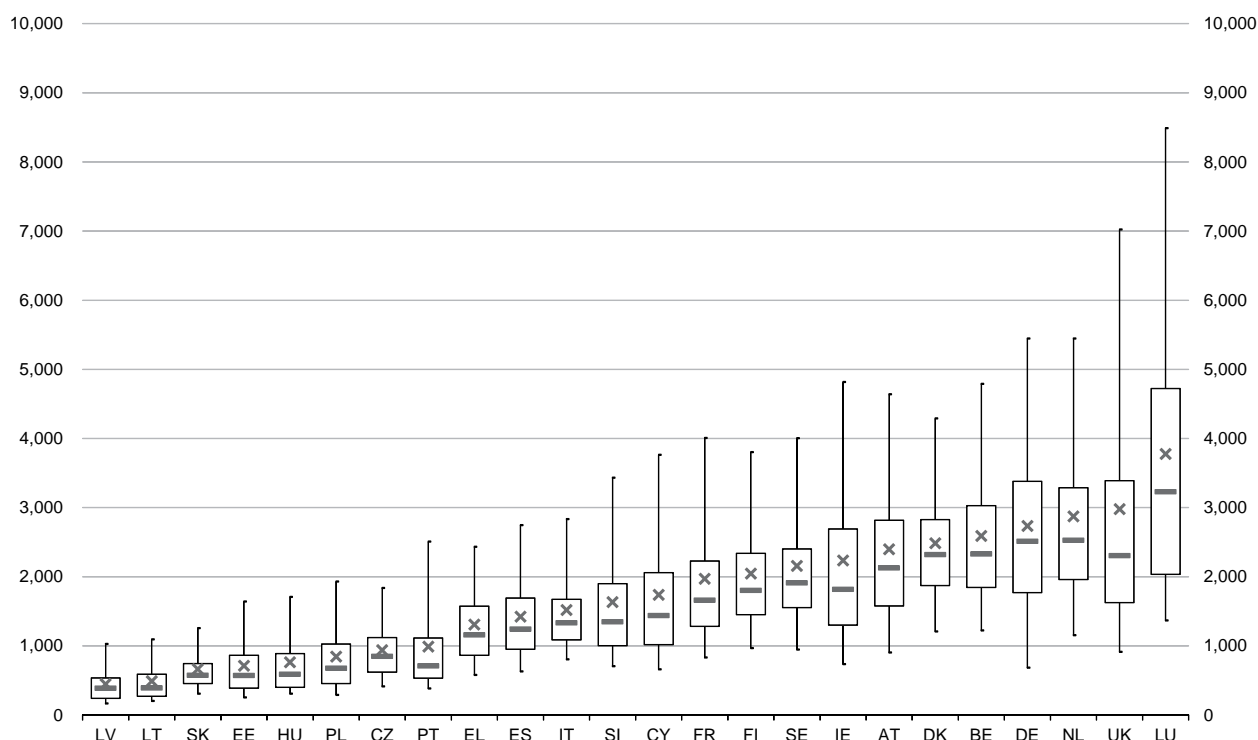
Figure 7: Distribution of full-time equivalent wages, 2011



Note: No adjustment made for PPP
 Source: EU-SILC

Figure 8 shows the same type of information as Figure 6 (going back to full-time equivalent wages in PPP levels), but here it is calculated for 2004 rather than 2011. Comparing Figures 8 and 6 enables an evaluation of the extent of the convergence in wage levels: although wage levels increased in most countries, the increase was clearly much more significant in low-wage countries. The next chapter discusses in more detail this process of convergence in national wage levels.

Figure 8: *Distribution of full-time equivalent wages in PPP, 2004*



Source: *EU-SILC*

Box 1: Regional decomposition of EU wage inequality

EU-SILC incorporates regional information for some countries, which allows the significance of regions to be tested in analysing the distribution of wages at the EU level. A simple way to do this is to compare the ‘between’ component of the EU-level Theil index for countries and regions. Since regions are nested within countries, the difference between both indices can be understood as a measure of how much inequality is accounted for by regional differences that go beyond country differences. This is shown in Table 2 below, which presents the countries included in this analysis and the number of regions identified.

Table 2: *A Theil decomposition of 2011 EU wage inequality by country and region*

COUNTRY	France	Spain	UK	Czech Republic	Poland	Italy	Greece	Finland	Austria	Hungary	Sweden
REGIONS	22	19	12	8	6	5	4	4	3	3	3
Overall Theil index for full-time equivalent wages in PPS for this subsample of countries:										0.259	
Between-country component:										0.038	14.8%
Additional Theil between regions within countries:										0.007	2.6%
Residual (within regions) Theil component:										0.214	82.6%

Source: *EU-SILC*

According to this simple approximation, countries matter much more than regions in terms of wage inequality, at least for the 11 countries included in the sample shown in Table 2, and with the regional specification included in EU-SILC (NUTS at the two-digit level). The overall Theil value and the between-country component for this 11 country sample are very similar to the values previously shown for the EU as a whole. The between-country differences account for 15% of total EU wage inequality, while the regional differences within those 11 countries only account for 2.6% more.

Figure 9: Average wages by NUTS-2 regions, 2011

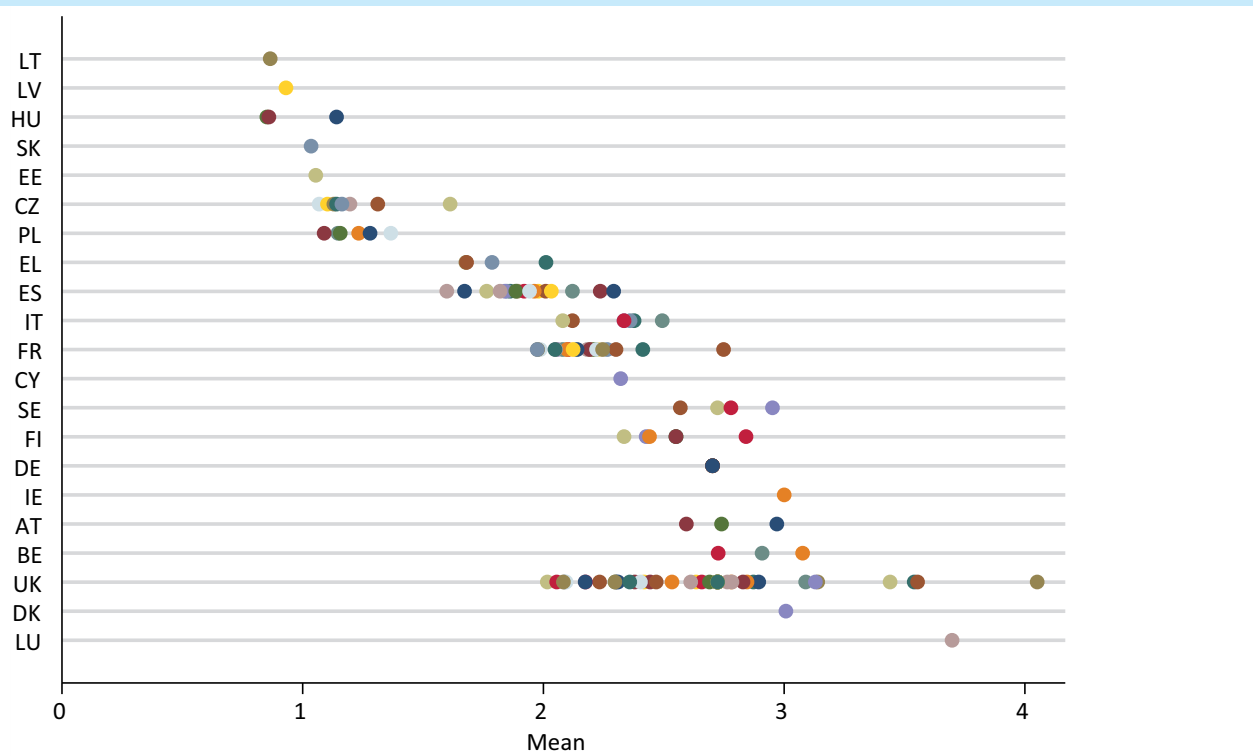
Source: *EU-SILC*

Figure 9 shows between-country and between-region components of wage differentials in Europe. The values for regional average wages (for the countries with regional information available) are shown along a line for each Member State. It is immediately apparent that although regional differences do matter to some extent (the dots for some countries are significantly spread, and overlap in some places), the between-country differences matter more, with the regional averages tending to cluster around the regional mean and be reasonably differentiated from those of other countries. The clearest exception is the UK, whose regional averages are spread considerably across the chart, from the highest absolute average (the London region, which is even above Luxembourg) to mid-level values comparable to the richest Spanish regions.

Wage differentials between EU countries: 4 a more detailed look

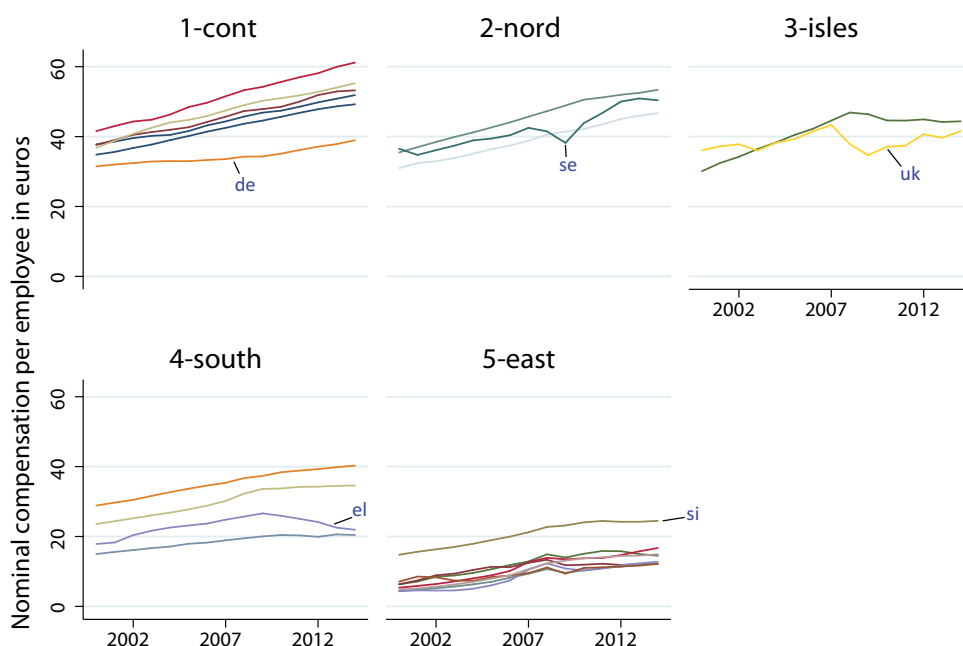
The previous section identified an interesting pattern in the development of EU wage inequalities between and within countries: inequality that results from differences in average wages across countries shrank markedly before the crisis, more than compensating for a small overall increase in the average inequality within countries and leading to a significant reduction in overall wage inequality at EU level. This trend came to a halt around 2008, when significant reductions in wage differentials between countries stopped while within-country inequality continued to increase. In the last year for which EU-SILC data are available (2011), the ‘between-component’ of the Theil index even increased slightly, suggesting an increase in wage differentials across countries.

These between-country developments merit a more detailed analysis. Thankfully another source is available for that purpose – the annual macroeconomic database of the European Commission (AMECO). This covers a longer time span and does not present the same problems of EU-SILC (although it has others). It is a database of country-level economic statistics compiled annually from different sources, most importantly from national accounts. On its own, AMECO is not very useful for studying wage inequality, because it only covers national aggregate measures; however, it can be extremely useful as a complement to the EU-SILC analysis in this report, because it enables a more detailed analysis of the changes in average wage levels across the EU, which, as already shown, make up an important part of the story. AMECO also covers a longer time span around the crisis, from 2000 to 2014.

The wage variables in AMECO are not identical to those used in this report. AMECO refers to ‘compensation of employees’, which includes not only wages and salaries but also employer’s social contributions. To transform it into an average wage per employee, the total national value of this variable is divided by the total number of full-time equivalent employees in the country (where there are no full-time equivalents, it is simply divided by the total number of employees). Although it is not identical, it is sufficiently similar to be used as a complement to the analysis of EU-SILC and SES. As will be shown, the overall results and trends are consistent across these different sources.

The simplest approach to analysing the evolution of wage differentials with AMECO involves using data on nominal compensation per employee. This concept refers to wages (and social contributions) as they are received by employees, without any adjustment for purchasing power differences (the currencies of non-euro zone countries are also expressed in euro). Figure 10 shows the evolution of this variable for all EU countries, grouped into five broad regions: continental, Nordic, the Isles, Southern and Eastern (see note under Figure 10 for a list of the countries under each grouping). Although this chart directly reflects wage developments over the period, it means little on its own because it does not adjust for differences in living costs or by inflation. But it is interesting to note that even if the general trend is obviously upwards throughout the period (partly reflecting inflation), there is a significant exception before the crisis in continental Europe. That exception is Germany, where nominal wages were essentially flat until 2009. After the crisis, a change is observed in this trend in many countries: nominal wage developments are either reduced (Slovenia and Spain) or nominal wages show an outright decrease (Greece and Ireland). The sharp drops in one of the Nordic and one of the ‘isle’ countries reflect fast currency devaluation at the outset of the crisis in two non-euro zone countries (Sweden and the UK).

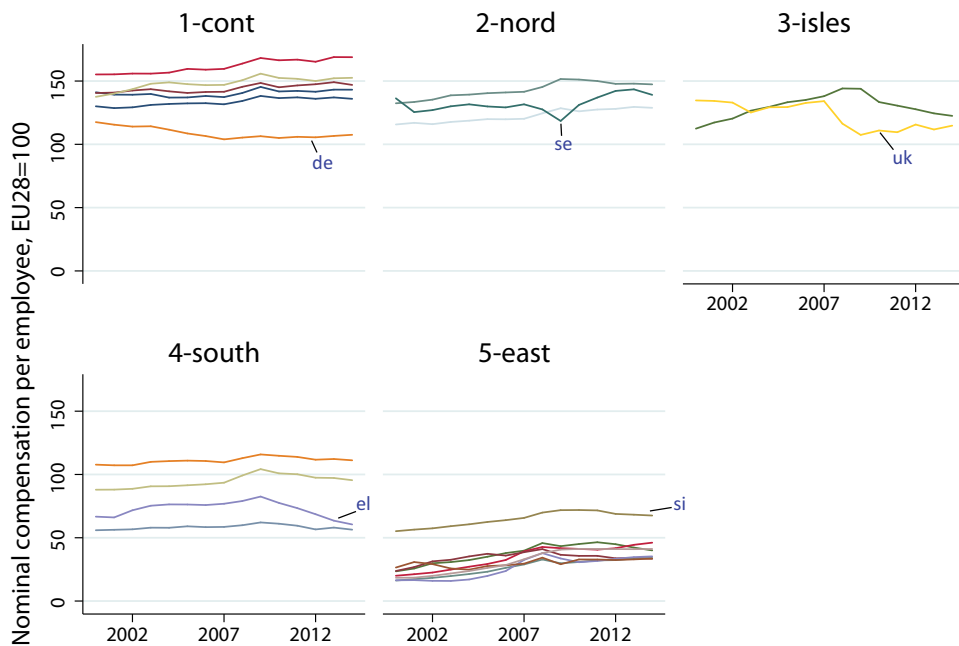
Figure 10: Evolution of nominal wages in EU countries, 2000–2014



Note: 23 countries included in the analysis. Country groupings used are: Cont (Continental): AT, BE, DE, FR, LU, NL; Nord (Nordic): DK, FI, SE; Isles: IE, UK; South: EL, ES, IT, PT; East: CZ, EE, HU, LT, LV, PL, SI, SK.
Source: AMECO database

Figure 11 rescales national average wages to the overall EU average for each year, thus removing from the picture the growth shared by all countries (including average inflation). It also facilitates an evaluation of convergence by looking at the evolution of the distance between the country lines and the '100' horizontal line that represents the EU average (convergence is reflected in the lines converging towards the 100 value, while divergence is reflected in the opposite trend). Consistent with the above findings using a Theil decomposition approach and EU-SILC data, Figure 10 (above) shows a significant degree of convergence in nominal wages in the period up to the crisis and a slow reversal afterwards. Figure 11 (below) shows that the pre-crisis convergence is driven by two developments: above the EU average, the relative decrease of nominal wages in two of the largest EU countries (Germany and the UK); below the EU average, a generalised increase in nominal wages in southern and eastern Member States. After the crisis, the nominal wages of southern and eastern Member States start to diverge downwards from the EU average, while Germany and the UK move slowly upwards.

Figure 11: Evolution of nominal wages in EU countries relative to EU average, 2000–2014

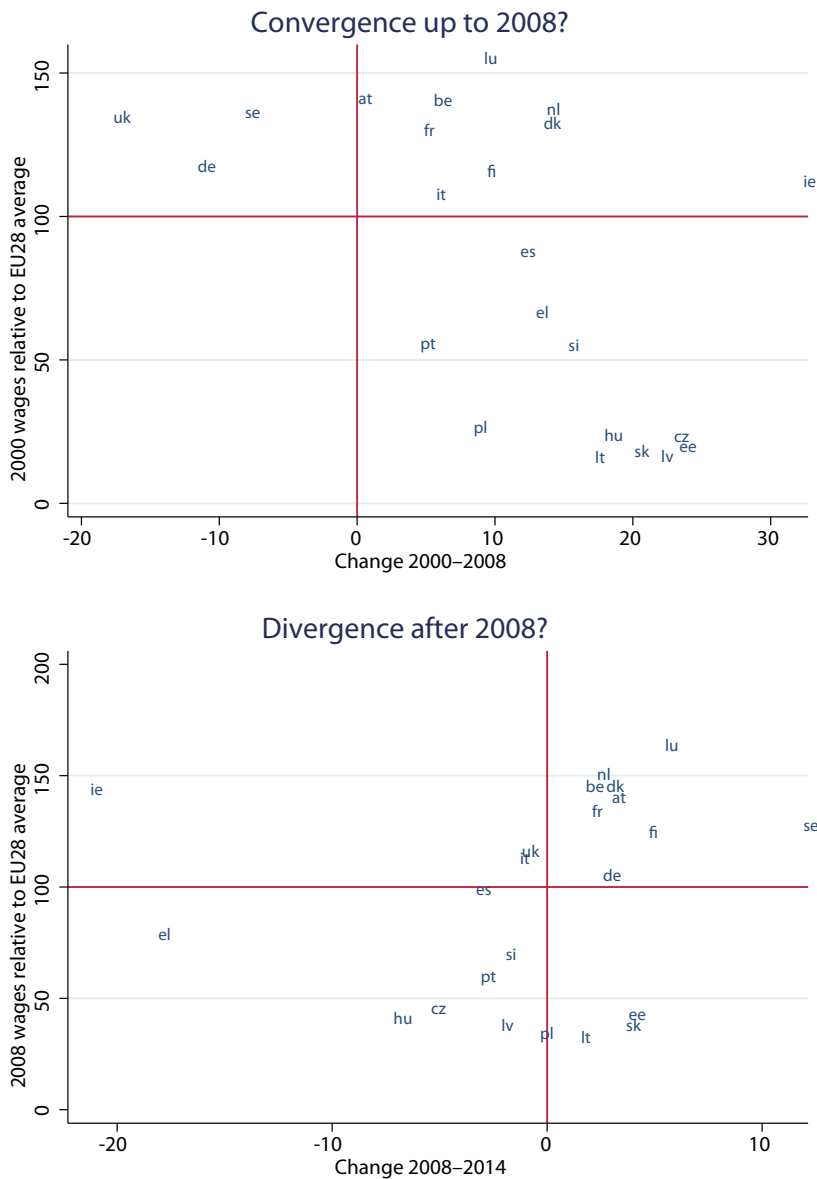


Note: For a breakdown of the countries in each grouping, see Note under Figure 10 (p.28).

Source: AMECO database

The contrast in the process of convergence in nominal wages before and after the crisis is more clearly seen in Figure 12, which plots change against initial levels during the pre-crisis period (2000–2008) and during the crisis (2008–2014). Up to 2008 (the first chart in Figure 12), there was a clear negative association between initial wage levels and wage growth: countries with higher initial wage levels experienced less growth than countries with lower initial wages. There were some significant outliers, the most important of which is Ireland, which was already slightly above the EU average in 2000 and whose nominal wages expanded substantially until 2008. Distance from the average rate also increased in Belgium, Denmark, Finland, France and the Netherlands, despite these Member States starting out above it. But Germany, Sweden, the UK and all southern and eastern Member States fall approximately on the (invisible) diagonal line that would represent convergence. The second chart in Figure 12 shows almost exactly the opposite picture: the relationship between the initial position and relative change becomes positive, with most countries occupying the diagonal space from bottom-left to top-right. So, after 2008, the higher the initial position, the more growth that took place relative to the EU average. Again, there are some significant outliers: Ireland, with a massive drop in nominal wages despite an initially high position, and some eastern Member States that continued growing despite being below the average (Estonia, Lithuania and Slovakia; Poland maintained its relative position during this period).

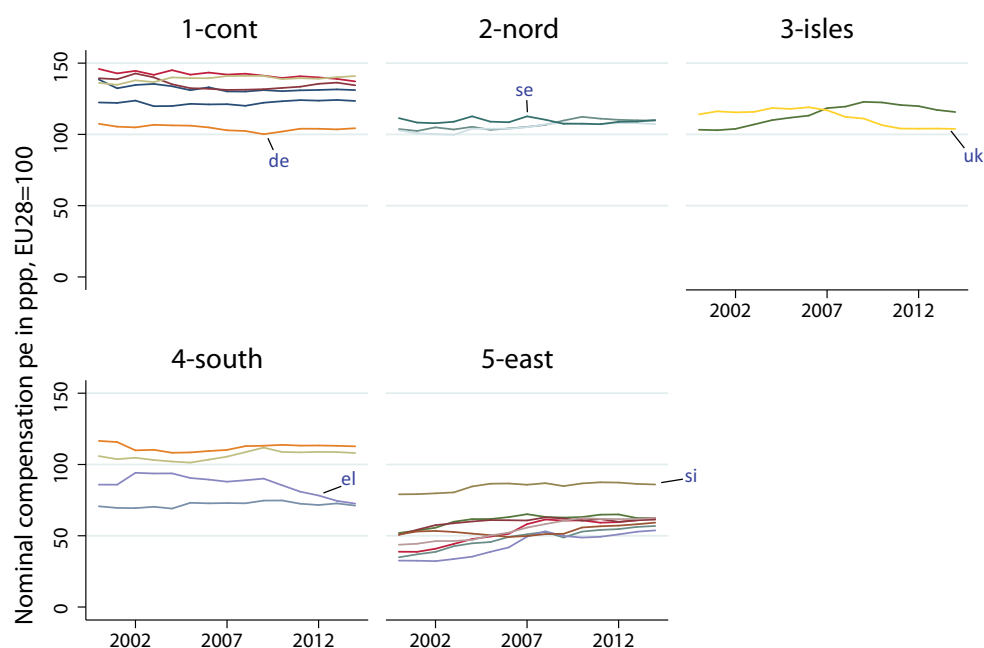
Figure 12: Initial levels and change in nominal wages in EU countries before and after the crisis



Source: AMECO database

The results discussed so far can be misleading because they only reflect nominal wages, with no adjustment for differences in the costs of living and inflation. Figure 13 shows the change in nominal wages adjusted for PPP, again relative to the EU average. It suggests some important qualifications need to be made to what has been said so far. Most importantly, it shows that most of the increase in the relative position of southern Member States only occurred because of higher inflation; PPP also eliminates the effect of differences in inflation by expressing wages in terms of a comparable purchasing power. The other main elements of the explanation presented remain valid, however: Germany and the UK saw relative reductions in their wage levels whereas eastern Member States saw significant increases, a process of convergence that came to a halt around 2008 after which it began to reverse itself, although not to a large extent – in fact, eastern Member States remained more or less stagnant, while some southern Member States fell significantly.

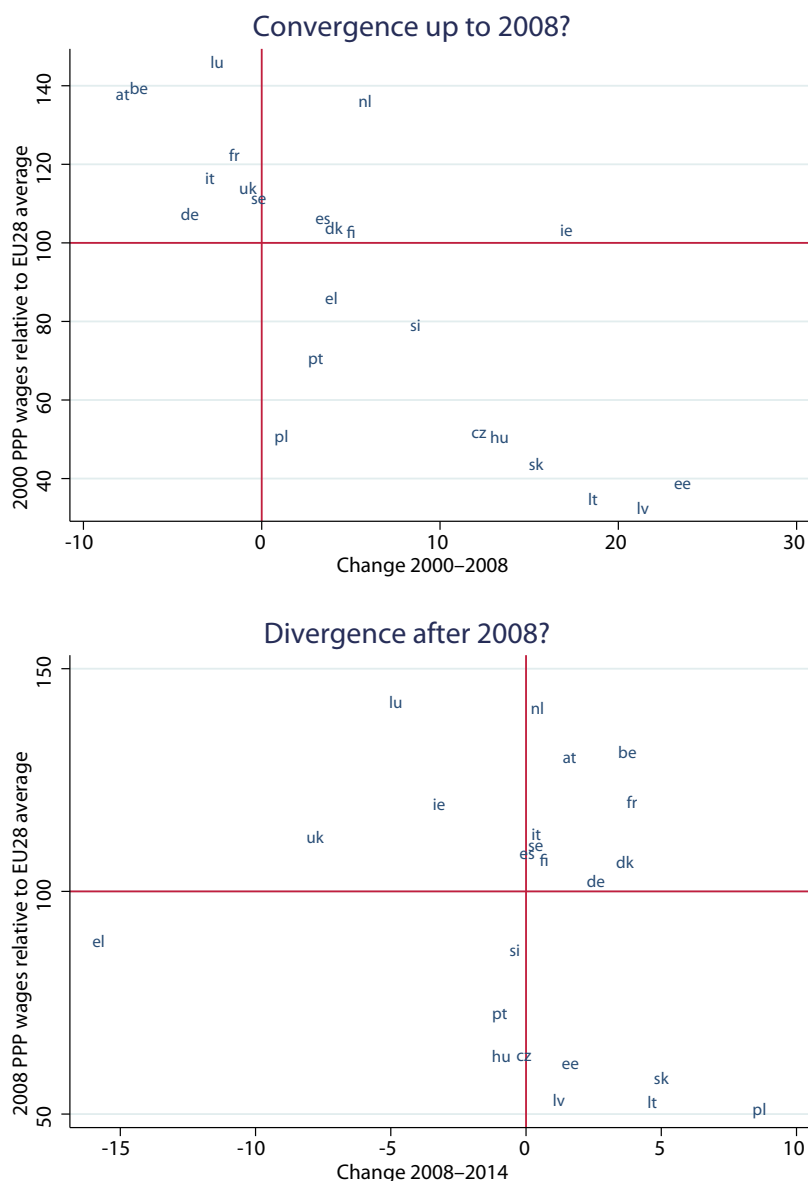
Figure 13: Evolution of nominal wages in PPP in EU countries, 2000–2014



Note: PE = per employee. For a breakdown of the countries in each grouping, see Note under Figure 10 (p.28).
Source: AMECO database

Figure 14 presents its data in the same manner as Figure 12 for nominal wages, but instead shows wages in PPP to examine the convergence–divergence patterns. Here, the process of convergence before 2008 looks equally clear, confirming the results previously discussed using EU-SILC data. The only significant outliers in this case are Ireland and the Netherlands, which grew more than expected according to their initial wage level relative to the EU average; however, all the other countries are positioned within the ‘convergence diagonal’. At the same time, the pattern of divergence after the crisis is not so clear here as it was with nominal wages. Many countries do fit the ‘divergence diagonal’, including all continental, Nordic and southern Member States. But there are more outliers than before: below the EU average, the Baltic Member States, Poland and Slovakia continued the catching-up process even during the crisis period after the initial hit (although at a much slower pace); above the EU average, Ireland, Luxembourg and the UK suffered significant drops in their relative position in terms of PPP wages. Nevertheless, it can be said that the general pattern of significant convergence before the crisis and mild divergence after the crisis holds, albeit with the qualifications outlined above.

Figure 14: Initial levels and change in nominal wages in PPP in EU countries before and after the crisis

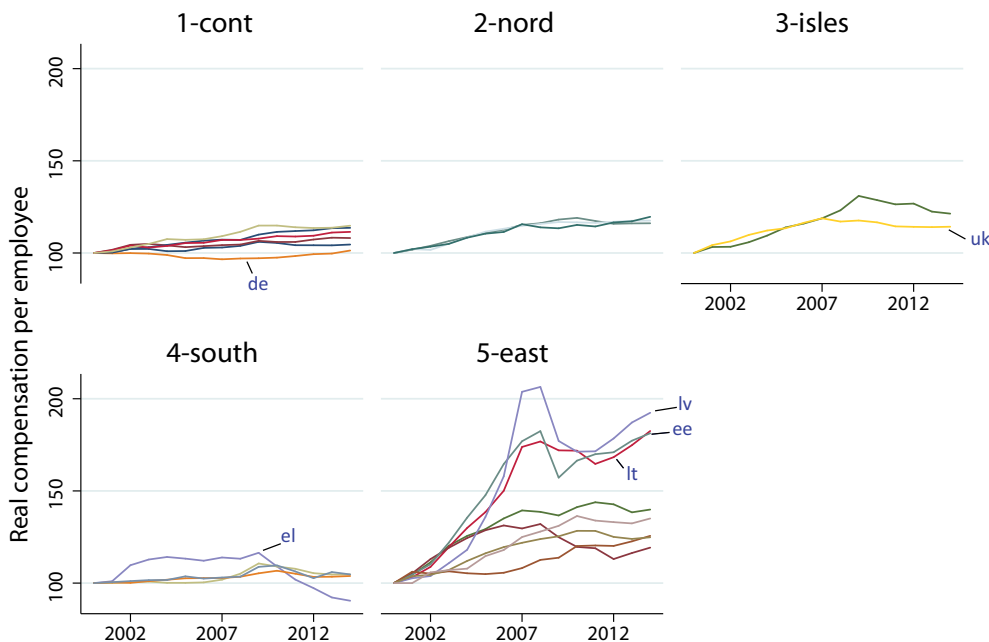


Source: AMECO database

Finally, Figure 15 focuses on the most important issue for the workers themselves: the change in real wages, or the change in the actual purchasing capacity of the money earned. This is just nominal wages deflated by a national price index, and therefore not entirely suited to discussing convergence or divergence around the EU average. Nonetheless, it provides the best illustration of the scale of differences in wage developments across Europe in the period discussed. In the eastern Member States, which, as already noted, experienced a process of catch-up that explains at least half of the convergence story, real wages grew quite significantly in the period 2000–2014: the value of 2000 real wages nearly doubled in the three Baltic Member States, and grew by 25% or more in the other eastern Member States (except in Hungary, where it grew by 20%). The three Nordic countries experienced the highest levels of growth in real wages in the rest of Europe (almost 20% in each country), together with Ireland (20%), the Netherlands (15%), the UK (14%) and France (13%). In most continental and southern Member States, real wages hardly expanded at all during this period

(less than a 5% increase overall), Germany remained stagnant (a growth of 1%) and Greece reduced the value of its real wages by 10%.

Figure 15: Evolution of real wages in EU countries, 2000–2014



Note: For a breakdown of the countries in each grouping, see Note under Figure 10 (p.28).

Source: AMECO database

Of course, important variations occurred within these developments before and after the economic crisis. With the single exception of Germany, all countries experienced some increase in their real wage levels up to 2008, but the increase was greatest in eastern Europe, the isles (Ireland and the UK), the Nordic countries and some continental countries (France and the Netherlands). In southern Europe, only Greece saw a significant increase in real wages before the crisis: in Spain, Portugal and even Italy, real wages grew so little that they can almost be considered to have been stagnant during that period. The crisis had a drastic impact on eastern Member States' real wages in the immediate term. After a couple of years they continued growing, though not as fast as before. In southern Europe, the crisis led first to a sudden increase in real wages – the compositional effect of the disappearance of many low-paid jobs at the beginning of the crisis, as well as the effect of an initial deflation that only after some time was reflected in wage developments. This was followed by a more consistent but slow decrease, up to the most recent data shown in Figure 15. In Ireland and the UK, and to some extent in the Nordic countries, the crisis also led to a significant reversal of the previous trend of real wage growth, with significant drops in real wages in Ireland and the UK and some near-stagnation in the Nordic countries. In continental Europe, real wages stagnated only in Austria and the Netherlands, whereas in Belgium and France they continued to grow, and in Germany they started to do so, although only to a marginal degree.

This chapter has highlighted the following key points:

1. There was a process of convergence in wage levels in Europe up to 2008, after which a slow reversal of this trend was observed.
2. The convergence can be accounted for, to a large extent, by the catch-up process of eastern Member States, which continued, albeit to a lesser extent, after the initial shock of the crisis.

3. In southern Member States, the catch-up process was only significant in regard to nominal wages; when wages are converted to PPP or to real terms, it can be seen that prior to 2008 they essentially remained at the same level but dropped significantly post-crisis.
4. Some of the convergence is due to a decrease in the relative level of nominal and PPP wages in Germany and the UK up to 2008. In the case of Germany, this trend reversed after 2008, contributing to the diverging trend, but it continued in the UK.

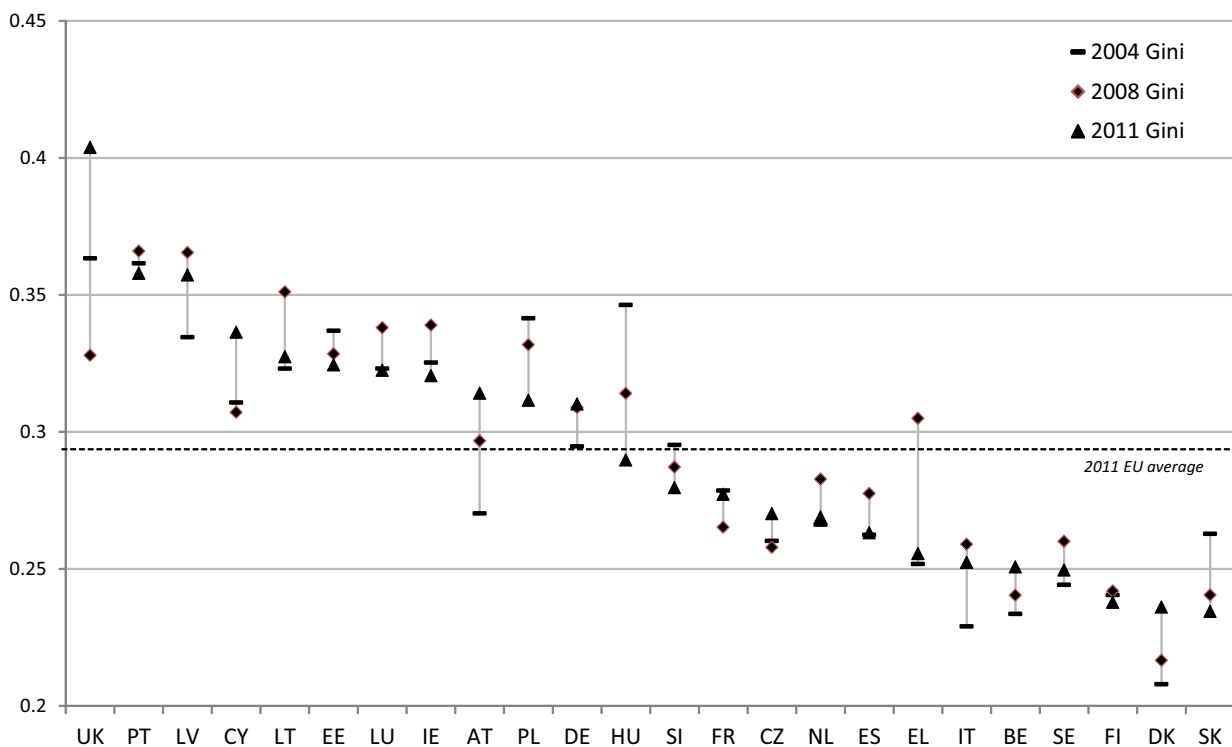
Comparative analysis of wage inequality developments in EU countries 5

This chapter examines developments in inequality within Member States. This was already briefly looked at, from an EU perspective, in the analysis of the contribution of within-country developments to overall EU inequality. Observed changes in that regard were much less significant, with contrasting developments in different countries leading to a very marginal increase at EU level.

Developments in wage inequality, 2004–2011

Figure 16 shows the Gini index of inequality for full-time equivalent wages in the 24 European countries for which EU-SILC data are available, for the years 2004, 2008 and 2011. The countries have been ordered according to their Gini index in 2011: the most unequal countries in 2011 (in descending order) were the UK, Portugal, Latvia, Cyprus, Lithuania and Estonia, while the most equal (in ascending order) were Belgium, Sweden, Finland, Denmark and Slovakia. It is important to remember that this refers to inequality in full-time equivalent wages, not income. As will be shown later, for some countries there is a marked contrast between the two forms of inequality, a contrast that has been exacerbated by the crisis.

Figure 16: *Gini index of full-time equivalent gross wages*



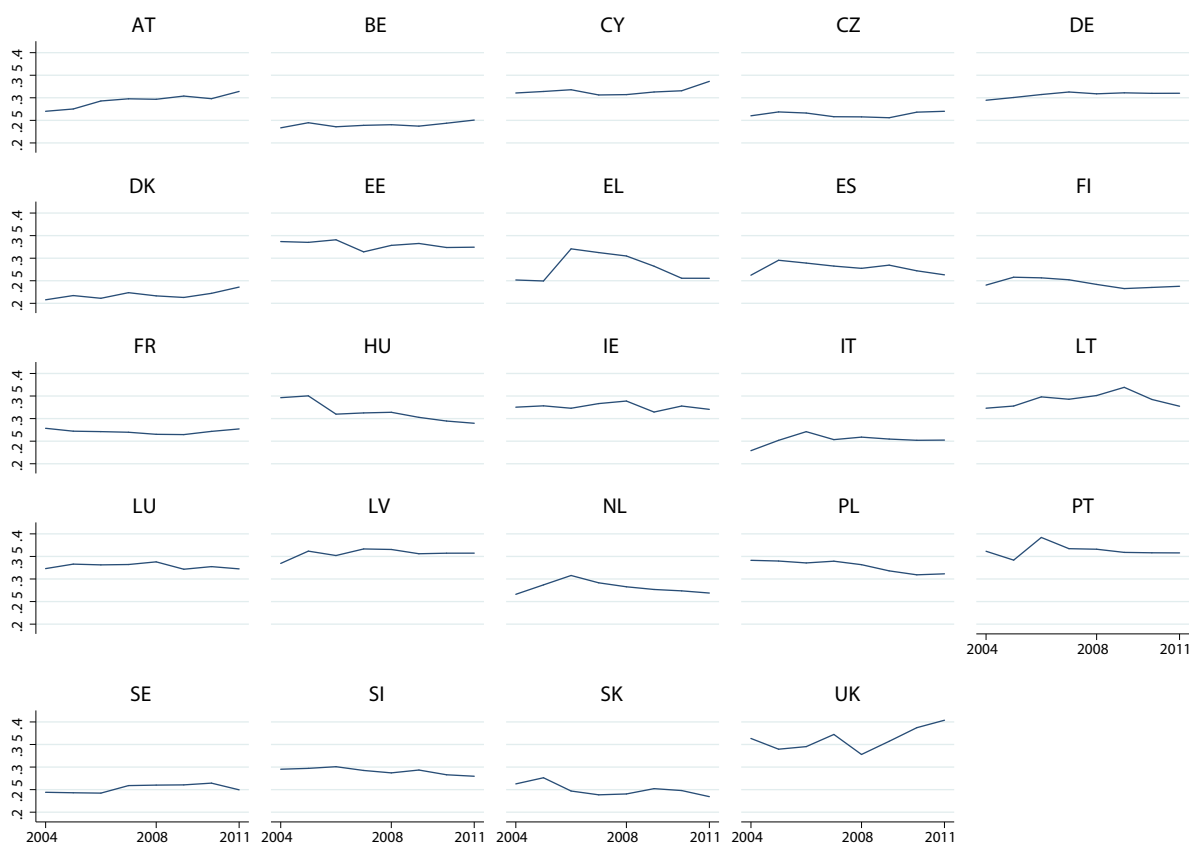
Sources: *EU-SILC, 2005, 2009, 2012*

Figure 16 also shows how the Gini index changed throughout the period 2004–2011, with the values for the beginning and end of this period as well as for the middle year (2008) roughly corresponding to the change in the economic cycle and the beginning of the crisis. By looking across the three values, it is possible to get an idea of the scale of change in wage inequality throughout the period in each Member State. The most significant changes took place in the UK, Greece, Austria, Hungary, Poland and Denmark. Both in this group of countries and in general it is possible to observe a very significant degree of heterogeneity in the patterns of change of wage inequality: in some countries, levels of wage

inequality consistently increased (Austria and Denmark, for instance), in others they consistently decreased (Hungary and Poland) while other countries experienced significant contradictory or cyclical shifts throughout the period (such as the UK, where wage inequality decreased markedly up to 2008, after which it rebounded even more sharply up to 2011).

In many countries, the crisis marked a shift in inequality trends between the two periods. This is reflected in Figure 16 by the fact that wage inequality reached its highest level in 2008 in 11 of the 24 Member States, in 2011 in seven Member States and in 2004 in only six Member States. Generally, between 2004 and 2008, wage inequality increased (in 15 out of 24 countries), whereas in the second period it decreased in a majority of countries (16 out of 24). So national-level wage inequality in the period covered has generally followed a cyclical pattern (expanded with growth and shrunk with recession), although with some very significant exceptions that will be discussed later. This contrasts with the EU-aggregated picture presented earlier, which was countercyclical because of the strong effect of between-country wage differentials compressing up to the crisis and stalling or even slightly expanding afterwards.

Figure 17: Year-on-year evolution of Gini index of full-time equivalent gross wages



Source: *EU-SILC*

Figure 17 presents a more detailed picture by showing the year-on-year changes in the Gini index for the 24 Member States covered in EU-SILC. Although in most cases the lines are relatively straight, in many cases a change is observed around 2008. Three Member States shows sudden year-on-year shifts that are seemingly off trend: Greece, Portugal and the UK. In Greece and Portugal the jump takes place between 2005 and 2006, with a five-point increase in both cases. This seems very implausible: such a big shift in the index would be the result of unknown, drastic changes in the distribution of wages. It is therefore likely to reflect some change in the methodology of EU-SILC during those years

rather than real developments. As for the UK, the fact that large shifts in the indices coincide with the economic crisis suggests they should be taken more seriously. As already mentioned, these large shifts are entirely the result of developments at the very top of the wage distribution of the UK sample for EU-SILC (particularly at the top 1%). This group plays a very important role in terms of earnings yet it is so small that it can generate some volatility in the index, perhaps especially in times of crisis.⁶ The 2007 bump in the UK data, however, gives an implausibly high level (the 2008 value is more in line with pre-2007 and post-2008 data) and therefore can be more easily ignored when evaluating the long-term trend. Before 2008 in the UK, with the exception of 2007, wage inequality decreased, while after 2008 it increased.

The countries can be divided into four groups based on the trends observable over the two time periods.

1. Countries where wage inequality consistently decreased over 2004–2011: Estonia, Hungary, Poland, Slovakia and Slovenia. All of these countries are eastern Member States that experienced significant increases in relative wages. The majority of eastern Member States are in this group, with initially high levels of wage inequality but significant and consistent decreases over the period.
2. Countries where inequality consistently increased between 2004 and 2011: Austria, Belgium, Denmark and to some extent Germany, although the trend in Germany slowed down in this period, stopping completely after 2008. These countries only experienced a mild recession after 2008 with no or very small impact on employment except, to some extent, Denmark.
3. Countries where inequality increased up to 2008 and decreased afterwards: Greece, Ireland, Lithuania, Luxembourg, the Netherlands, Portugal, Spain and Sweden, and, to a lesser extent, Italy and Latvia. This cyclical pattern is the most common one. This is obviously a very heterogeneous group, which includes all southern Member States as well as countries from all the other European regions. Most of these countries were strongly impacted by the economic crisis in terms of gross domestic product (GDP) and employment, with the exception of the Netherlands and Sweden.
4. Countries where the trend is countercyclical, with wage inequality decreasing until 2008 and increasing afterwards: France and the UK are the clearest cases in this small but significant group, although Cyprus and the Czech Republic can also be included to some extent here.⁷

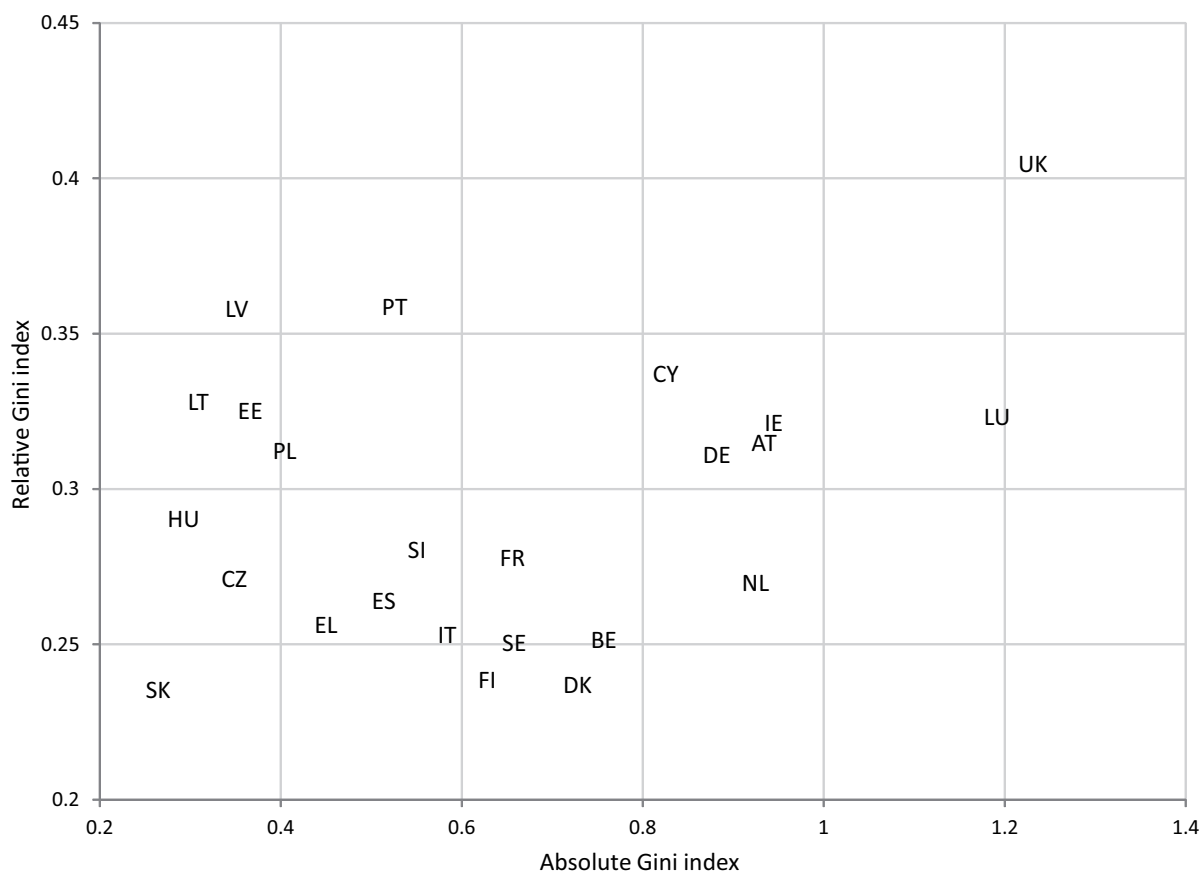
Perhaps the key points to note from this detailed examination of countries are the consistent decrease of wage inequality in most eastern Member States and the association between the economic cycle and wage inequality in most of the rest of Europe. Economic growth was often associated with increasing wage inequality and sharp downturns with a reversal of such a trend.

⁶ For instance, the willingness to declare high wages in the context of public indignation regarding high wages in the financial sector may increase non-response or the underreporting of high wages.

⁷ Finland would also be in this group if it had not experienced a small increase in the first year of data (2004–2005). But because of this, and because the changes in Finland have been extremely small, it is classified as a country with no major change over this period in terms of wage inequality.

The discussion so far has focused on the relative Gini index, which is the most well-known and widely used version. Yet some inequality experts argue that the absolute version of the Gini index, which is simply calculated as the relative Gini index multiplied by the average income (or wage in this case) of the population in question, should be used instead of, or at least as a complement to, the relative index (Wade, 2013). The main problem with the relative Gini index is that, being relative, it is blind to changes in absolute income differences in the population, which also seem important. For instance, if all wages are multiplied by two, the relative Gini index would remain identical despite the fact that the absolute increase in high wages would be much larger than that regarding low wages.⁸ The absolute Gini index, by multiplying the relative Gini by the average wage, takes such changes in absolute wages into account. Following on from the previous example, doubling all wages would double the absolute Gini index as well, reflecting the fact that the absolute differences between high and low wages would double too.⁹ Any increase in average wages that is not accompanied by a compensating reduction in relative inequality would be immediately translated into an equivalent increase in the absolute Gini index. The implicit assumption is that absolute inequality matters, and that the same relative distance at a higher wage level is necessarily larger in absolute terms.

Figure 18: Absolute vs. relative Gini indices for EU countries in 2011, full-time equivalent wages in PPP



Source: EU-SILC

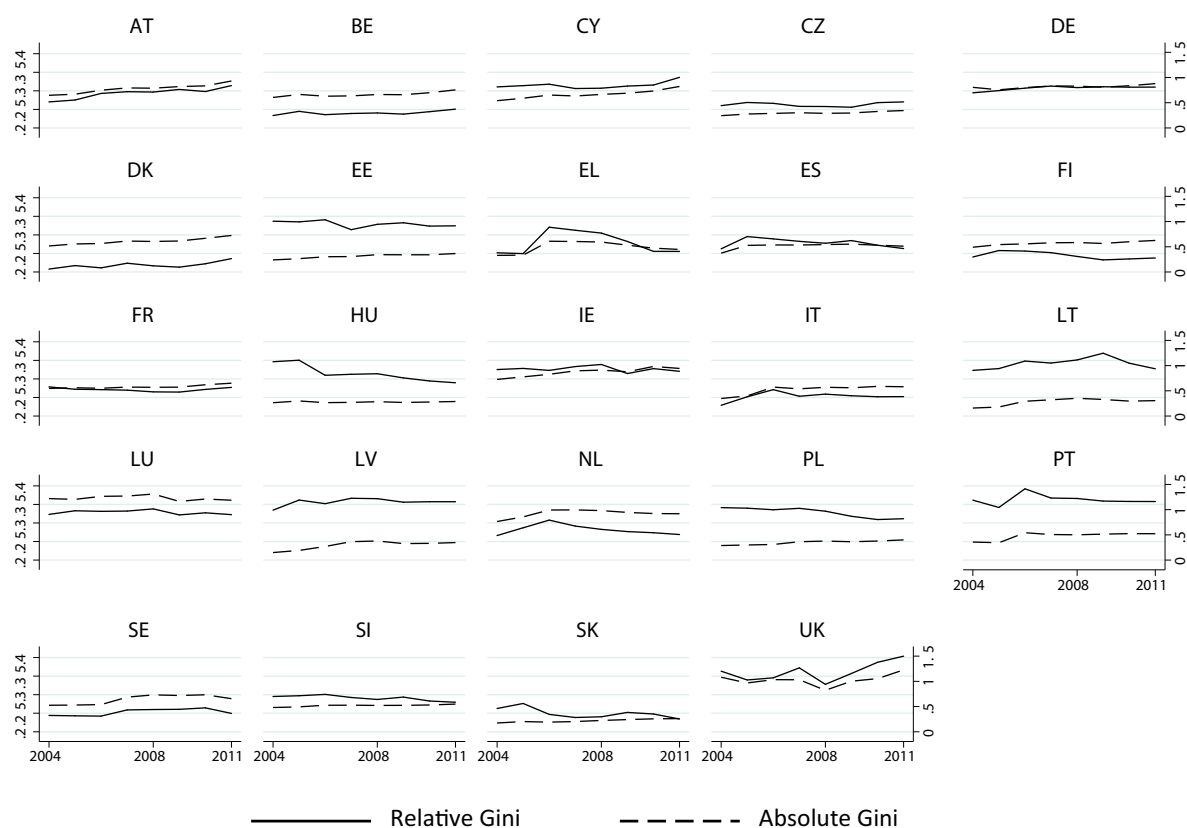
⁸ Using an example from the results presented here: doubling all wage levels (in PPP full-time equivalents) would shift the value of the lowest EU decile from €850 to €1,700, and the highest decile from €4,100 to €8,200. The absolute increase for the lowest decile would be just €850, while at the top level it would be more than €4,000 (the absolute difference between both would double, from €3,250 to €6,500). And yet the Gini index would remain totally unaffected.

⁹ Using the data analysed here, the relative Gini of 0.346 corresponds to an absolute Gini of 0.83 (expressed as thousands of euro in PPP). As noted, the doubling of all wages would leave the relative Gini unaffected, but it would double the absolute Gini to 1.67.

Figure 18 compares the scores in the absolute and relative Gini indices of all Member States in 2011, for full-time equivalent euro in PPP. The vertical axis shows the relative Gini scores discussed previously, while the horizontal axis shows the absolute Gini values. It is immediately apparent that the scales are rather different: whereas the relative Gini scores range from slightly less than 0.25 to slightly more than 0.40, the absolute Gini scores range from around 0.20 to slightly more than 1.2. This is because the absolute Gini equals the relative Gini index multiplied by the average wage in PPP (expressed here in thousands), and therefore it is not scale independent as the latter is; nor does it have a 0–1 range. But the scale is nevertheless comparable because all countries are expressed in the same currency: so the horizontal axis reflects the extent of absolute inequality in the different countries in a PPP euro scale.

The differences between both versions of the Gini index are quite significant in Figure 18. Most eastern Member States get a much lower value when Gini is calculated in absolute terms, reflecting the fact that their wage levels are generally much lower and therefore the range of variation in wages is lower. They go from having a mid–high position in terms of relative inequality to a low position. The opposite happens to Belgium, the Netherlands and the Scandinavian countries, which have low scores in relative inequality but mid-level scores in absolute terms (again, their wage levels are so high comparatively that their small levels of relative inequality become large differences in absolute terms). The other countries fall more or less on the diagonal plane, with similar positions in both measures.

Figure 19: Absolute vs. relative Gini indices for EU countries, 2004–2011



Note: Charts show full-time equivalent wages in PPP.
Source: *EU-SILC*

What about changes over time in the levels of inequality? If the absolute version of the Gini index is used rather than the relative one, which has been used up to now, the picture also changes significantly, as shown in Figure 19 (above). The biggest difference is that with the absolute version, there are no cases of (absolute) inequality reduction in the period

2004–2011. This is because, as already noted in the previous section, the eastern Member States that experienced a significant reduction in relative inequality simultaneously experienced an even more significant increase in their wage levels, so that absolute inequality actually increased even in those countries. By contrast, in most cases of growing relative inequality, the evolution of the absolute Gini is very similar: in fact, in some cases the increases are moderated in the absolute measure, partly because of wage developments (in other words, PPP wages shrunk in relative terms). The clearest case of this development is the UK, where the massive increase in inequality after 2008 is more significant in relative than in absolute terms (as shown in the previous chapter, real wages decreased in the UK during that period).

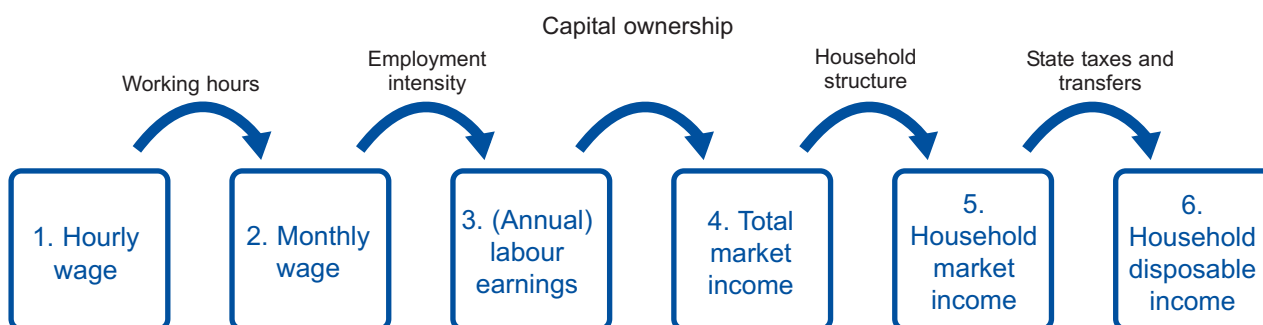
The absolute version of Gini provides an informative contrast to and qualification of the analysis based on the more usual relative measure of inequality, even if the latter remains the main focus of this report. It shows that even in rich countries with the lowest levels of relative inequality, the absolute differences in wage levels are much larger than in poorer countries. It also shows that economic growth tends to significantly expand absolute wage differentials, even when relative inequality remains stable or even shrinks.

Inequality of wages versus inequality of income

The main focus of this report is on wage inequality, which is most directly measured by hourly or full-time equivalent wages. But of course, wages are only part of the story of income inequality, if an important one. Many other variables affect the distribution of income aside from the wages paid by firms to employees. In fact, hourly or full-time equivalent wages do not even tell the full story with respect to the inequality of labour earnings. This section aims to contextualise the analysis of wage inequality by linking it to wider measures of labour earnings and income inequality.

The most widely used and general measure of income inequality is household disposable income, which refers to the total income received from any source by all members of a household, minus taxes and social contributions.¹⁰ In order to analyse this measure at the individual rather than household level, it can be ‘equivalised’ by dividing it by the number of ‘equivalent adults’ using a standard scale. Wages are just one of several components of household disposable income. The link between wage inequality and the inequality in household disposable income can be broken down into six steps, as illustrated in Figure 20; this is a partial adoption of the OECD’s approach to this issue (2012).

Figure 20: *From hourly wages to household disposable income*



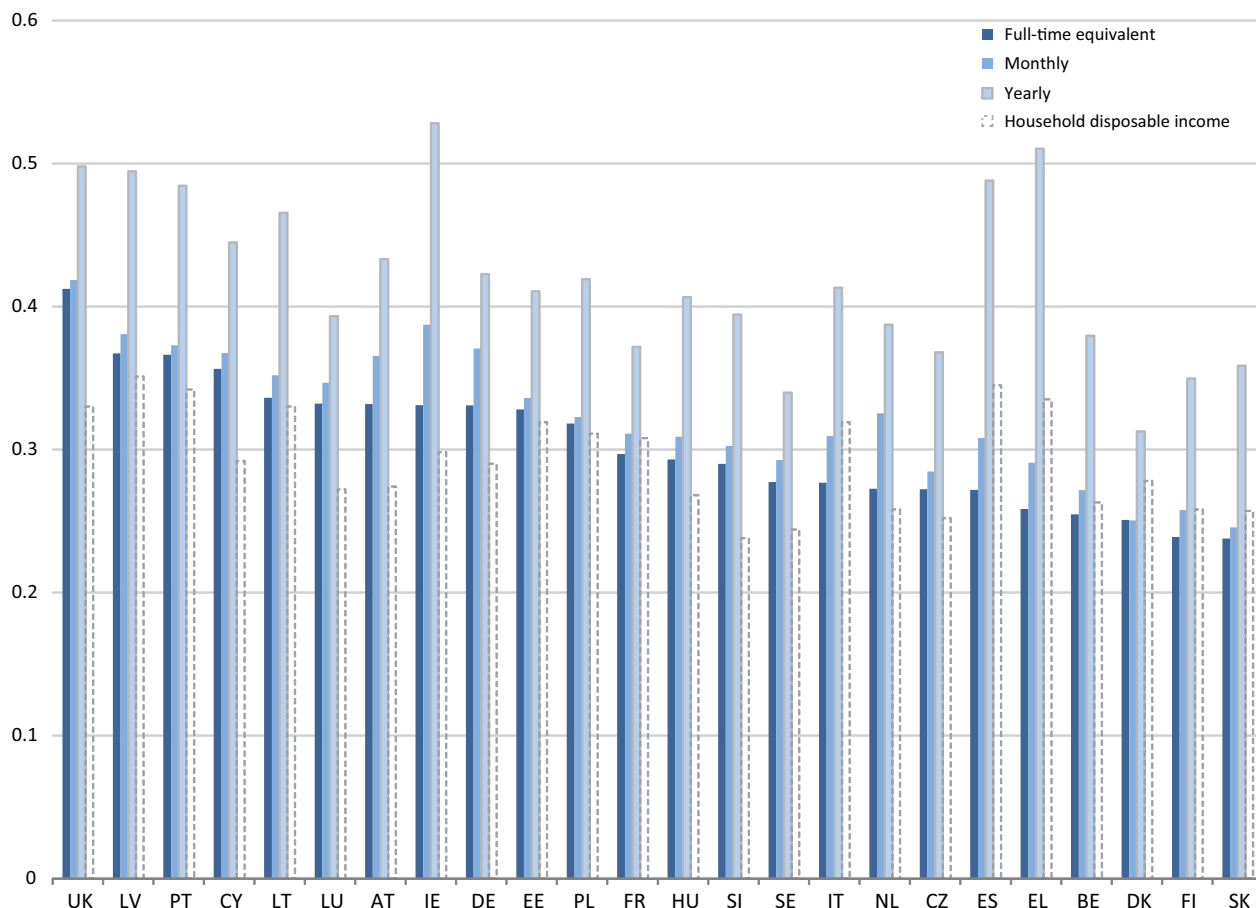
- Hourly wage:** The first step is wage inequality itself, measured as inequality in hourly or full-time equivalent wages. This inequality results directly from the wage rates paid by companies to employees, and is affected by a number of factors such as human capital, productivity and technology, workers’ and employers’ relative bargaining power and representative structures, and labour market institutions such as minimum wages.

¹⁰ Such a measure is sometimes further adjusted to include public ‘in-kind’ (those with no monetary value) transfers, such as education or health. The measure used here, taken directly from Eurostat, does not include such an adjustment.

2. **Monthly wage:** The second step refers to the inequality of monthly (or yearly) wages of employees, which is affected not only by step 1, but also by the inequality in the number of hours worked by each employee. The importance of this factor increases with the extent of dispersion of working time. More precisely, the greater the proportion of part-time workers, the more important this factor becomes. The number of hours worked is often correlated with gender, reflecting an underlying inequality in domestic workload and the persistence of traditional gender roles, but it can also vary depending on other factors.
3. **(Annual) labour earnings:** The third step refers to overall inequality of income from work, and adds employment status as a factor of inequality. Those workers who are willing and able to work but cannot find a job can be understood as having a zero labour income. This factor obviously adds to the inequality of labour income of those in work derived from the previous two steps. The main determinants of this factor of inequality are the rate of unemployment and the dynamism of the labour market.
4. **Total market income:** This step adds capital, which is the main source of market income besides work. According to Piketty (2014), capital can be defined as ‘the sum total of nonhuman assets that can be owned and exchanged on some market’, including all forms of real property as well as financial and professional capital. Capital contributes strongly to income inequality, its distribution being much more unequal than that of labour earnings (for more details, see Piketty, 2014).
5. **Household market income:** Individuals live in households that generally pool resources, including the market income sources described in the four steps outlined above. For this reason, the formation and composition of households is the next step in connecting wage and income inequality. Gender, age and other socio-demographic variables determine the impact of this factor on income inequality: because it involves the pooling of resources in family units, it reduces rather than adds to inequality, although the extent of this effect can vary significantly depending on factors such as family structures, social mobility and interclass marriage.
6. **Household disposable income:** The final step adds on taxes and transfers between households and the public sector. This is a redistributive mechanism that at least partly aims at reducing the income inequality generated by the previous factors, and empirically that is generally the case (although there can also be taxes and transfers that add to inequality). In most Member States, welfare state systems have a significant alleviating effect on pre-existing income inequality arising from labour and capital across households.

Steps 1 to 3 in Figure 20 refer to the individual level and take place in the labour market. Step 4 refers to both the individual level and to capital markets. Steps 5 and 6 generally take place within the household. As previously mentioned, step 1 (inequality in wages) comprises the main focus of this report. However, in order to better understand its wider significance and implications, it is useful to briefly expand the focus to include steps 2 and 3. While steps 4–6 are beyond the scope of this report, step 6 will also be briefly discussed using national aggregate information published by Eurostat.

Figure 21: Gini indices for full-time equivalent, monthly wages, annual labour earnings and household disposable income, 2011



Source: EU-SILC

Figure 21 presents estimations of the Gini indices of inequality for steps 1–3 (full-time equivalent wages, monthly wages and overall labour income), and Eurostat’s published figure of the Gini indices for step 6 (equivalised household disposable income).¹¹ The countries have been ranked according to their values in step 1 (inequality of full-time equivalent wages), which are discussed in detail in this report. The most interesting aspect here is the way in which initial wage inequality changes when different factors represented earlier in Figure 20 are added to the equation. In step 2, inequality of working time is added to that of hourly wages, which obviously increases the figure, but the effect is very heterogeneous across countries: in some, the effect is rather small, while in some others it is quite significant. Inequality increases the most in relative terms in the Netherlands (from 0.27 to 0.33, an increase of nearly 20%), because the most important factor behind working hours inequality is the rate of part-time work. But the difference between the typical working hours of part-time and full-time workers and other types of working hours inequality, such as the incidence of

¹¹ The Gini of full-time equivalent wages shown in Figure 21 corresponds to the main variable of wages used in the rest of this report, but it is not 100% identical. The reason for this is that some of the applied adjustments in the rest of the report cannot be applied to the other measures shown in Figure 21. For the sake of consistency, such adjustments have not been applied to the measure of full-time equivalent wages shown in Figure 21. However, the differences are minimal, and the correlation between the Gini values using both versions of the variable is 0.97.

very long work schedules, also affect working time inequality and its impact on monthly wages inequality. This means that for some countries, the difference between the Gini of steps 1 and 2 is different from what could be expected from simply looking at the share of part-time workers in those countries. For instance, in Germany, Greece, Ireland and Spain, inequality increases more than expected; whereas in Scandinavian countries and the UK, it increases very little despite a relatively high proportion of part-time workers.

In nearly all cases, the biggest jump in the Gini index takes place between steps 2 and 3. The total wage mass and the value of wages for those working consistently (without any periods of employment) does not change between steps 2 and 3 (the only difference being that in step 3 wages are annualised rather being monthly). However, by step 3, those who are unemployed all or part of the year before the survey are included in the calculation of Gini, with a value of zero wages allocated to the relevant months. This increases inequality significantly. This most important factor affecting the increase is the level of unemployment, but its fluidity also matters: long-term unemployment would have a more significant impact on labour income inequality (since all unemployed people would get a value of zero in wages), while short employment spells alternating with employment would mean some annual labour earnings and therefore higher Gini values.

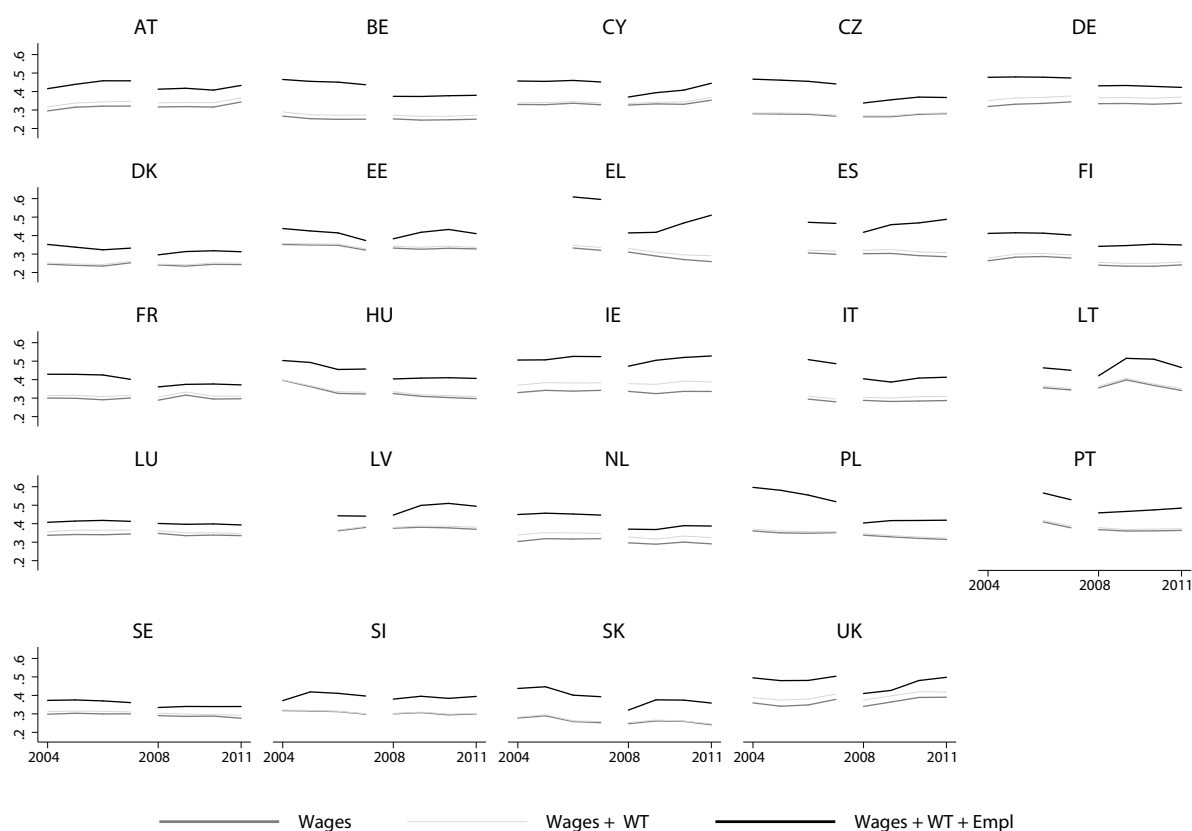
On average, the increase in the Gini index between steps 2 and 3 is around 30%. As already mentioned, in those countries with more unemployment (particularly if it is long-term), the increase is much larger. Examples include Greece and Spain (an increase of more than 50% in the Gini index in both cases), as well as Belgium, Ireland and Slovakia, where unemployment is not as high but a significant level of long-term unemployment occurs. The difference is smaller in countries where unemployment is comparatively low and more fluid: Austria, Denmark, France, Germany, Luxembourg, Germany, the Netherlands, Sweden and the UK.

As could be expected, the inclusion of unemployed people in the calculation of the Gini index of labour earnings significantly changes the relative positions of countries. Taking this approach, Ireland emerges with the highest level of labour earnings inequality; in 2011, Ireland had relatively high levels of wage inequality and a significant share of long-term unemployment. It is followed by Greece, the UK, Latvia and Spain; at the bottom of the list are the three Nordic States (with low levels of wage and employment inequality), Slovakia, the Czech Republic, France and Belgium.

The difference between inequality of total labour earnings and inequality of wages is mostly determined by unemployment. In many countries, the distance between labour earnings inequality and hourly wage inequality remains more or less constant over time (with the former being significantly higher, as previously explained). But in those countries that were most affected by the crisis, there is an increasing divergence between the inequality of labour earnings and labour earnings: the former increases very significantly while the latter remains relatively stable or even decreases. This is shown in Figure 22. Greece and Spain are the clearest examples of this pattern of a dramatic increase in inequality in labour earnings after 2008, alongside a slowly shrinking hourly wage inequality. Other countries falling into this category are Cyprus, Ireland, Italy and Portugal. Poland is an interesting case, with a significant convergence between labour earnings inequality and hourly wage inequality up to the crisis, after which this trend reversed. In the three Baltic Member States and Slovakia, labour earnings inequality increased quickly after 2008 because of growing unemployment, but this trend rapidly reversed around 2010.¹²

¹² Between 2008 and 2009 there was a change in the EU-SILC variable measuring the months of employment in the previous year. This strongly affects the calculation of the total annual labour earnings measure. For that reason, a break appears in the series between 2007 and 2008 (the years to which the earnings in 2008 and 2009 refer). Between those two years, the results are not comparable, but they are during the previous and later years.

Figure 22: Evolution of Gini index for full-time equivalent wages, monthly wages and total annual labour earnings

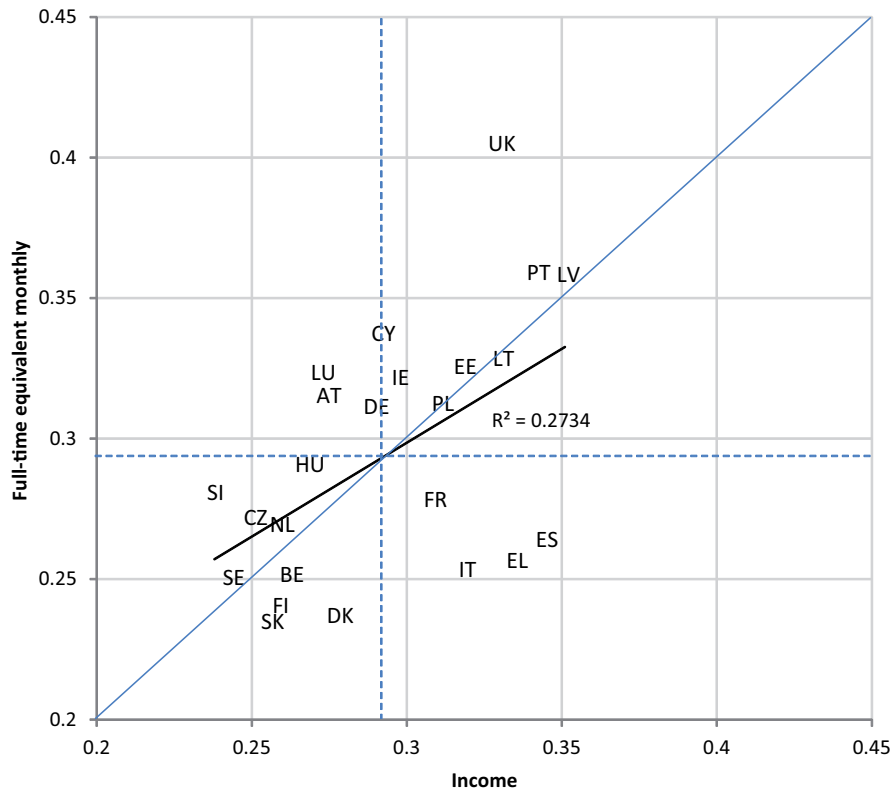


Source: EU-SILC

Returning to Figure 21, it is possible to compare the three measures of labour earnings inequality with the Gini index of equivalised disposable household income. As previously mentioned, although this figure also comes from EU-SILC, the estimation presented here was published by Eurostat. This figure is not strictly comparable to the other three figures, since it refers to a different population (all working age), includes all sources of income and is calculated at the household level (although it is later transformed into an equivalised individual figure). Nonetheless, it is comparable in a broad sense, and useful as a reference: if the three first bars represent the extent of earnings inequality generated by the labour market, the fourth bar represents a final assessment of overall income inequality that also includes the mechanisms indicated in steps 4–6 of Figure 20 above.

The fact that there are different and contradictory factors affecting the change in Gini from the third and fourth bar makes it much more difficult to interpret than the previous cases. Final income inequality is on average around 30% lower than that found in the assessment of overall labour income inequality, a difference that is bigger in Austria, Greece, Ireland, the Netherlands and Slovenia, and smaller in Denmark, Estonia, France and Italy. The main point of this comparison is to have a reference for the three measures of labour earnings inequality. Overall income inequality is much lower than inequality in overall labour earnings, which means that the combined effect of capital, household composition and taxes and transfers leads to a significant reduction in the inequalities generated by the labour market, although the three factors do not contribute in the same way: typically, capital adds inequality while household income pooling and state transfers reduce it. In fact, as is apparent in Figure 21 above, overall income inequality is generally of a similar magnitude as the initial (full-time equivalent) wage inequality according to the estimation presented here: around 0.30 in most countries.

Figure 23: Correlation between Gini index for full-time equivalent wages and Gini for equivalised disposable household income, 2011



Source: EU-SILC

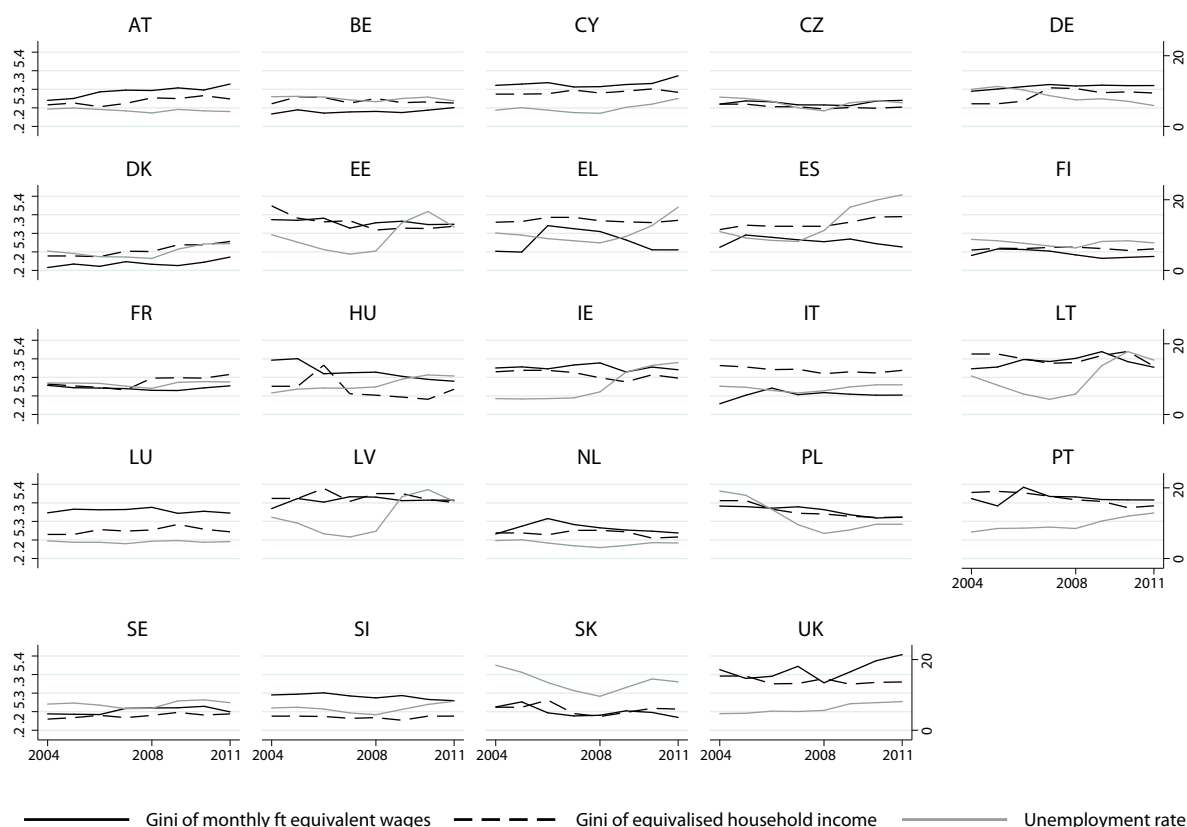
But the levels of wage and income inequality vary differently across countries: the correlation between both at the country level is relatively low (r^2 of 0.27), as illustrated in Figure 23 for 2011. Despite the fact that wage inequality is one of the main components of income inequality, the other factors affecting income inequality make the relationship between the two measures highly indeterminate. In Figure 23, the EU average of wage and income inequality are also plotted (the dashed horizontal and vertical lines). The resulting four quadrants provide the basis for the following proposed classification.

1. Countries with high levels of wage and income inequality: the clearest case is the UK, but this category also includes Portugal, Latvia, Lithuania, Estonia, Poland and to a lesser extent Ireland (near the EU average in terms of income inequality).
2. Countries with high levels of wage inequality but low levels of income inequality: Luxembourg, Austria and to a lesser extent Germany (around the average in income inequality) and Cyprus (at the EU average on income inequality).
3. Countries with low levels of wage and income inequality: Sweden, Finland, Slovakia, Belgium, Denmark, Netherlands, the Czech Republic, Slovenia, and to a lesser extent Hungary (near the average in wage inequality).
4. Countries with low levels of wage inequality but high levels of income inequality: Spain, Greece, Italy, France.

Although, as usual, there are several significant exceptions, this classification of countries seems to be roughly associated with European social models: the first with the Anglo-Saxon or Liberal model; the second with a Germanic

variant of the continental model; the third with the Nordic model and the most social-democratic continental countries; and the fourth with the Mediterranean model. In broad terms, it also seems that the wage inequality (vertical) axis should be more associated with the strength of collective bargaining (the stronger the collective bargaining, the lower the level of wage inequality), whereas the income inequality (horizontal) axis should be more associated with levels of social protection and welfare provision.

Figure 24: Evolution of Gini indices for wages and household income, and unemployment rate



Sources: EU-SILC and EU Labour Force Survey (EU LFS)

Figure 24 depicts the change in the original measure of inequality in full-time equivalent wages and the overall inequality of household disposable income. This figure also shows the change in the unemployment rate over the same period (in the secondary axis, since it has an entirely different scale). This can be used as a measure of the impact of the crisis and can inform understanding of the relationship between developments of wage and income inequality.

Countries where unemployment increased rapidly after 2008 can be divided in two groups.

1. Mediterranean countries: Income inequality grew rapidly after the crisis while wage inequality remained stagnant or even decreased. This is the case in Greece and Italy and Spain. The increase in unemployment explains both developments to a large extent: a downwards-biased destruction of employment compressed wage inequality at the bottom while crushing the earnings of low-income families. This puts the decrease in wage inequality in these countries in a very different light, showing that it was largely a compositional effect that shifted inequality outside of work, significantly expanding it in overall terms.

2. Some eastern Member States (the Baltic Member States of Slovakia and Slovenia) as well as Ireland and Portugal: Both wage and income inequality remained stable despite rapidly increasing unemployment rates. All these countries had relatively high levels of inequality throughout the period, but the impact of the crisis was not so strong in this respect.

The remaining countries, where the impact of the crisis on unemployment was less strong or even absent, can also be divided into two groups.

1. Countries where income inequality decreased while wage inequality increased: This is the opposite to the Mediterranean pattern described above. The clearest cases would be Austria, Belgium and Germany. Low or shrinking levels of unemployment contributed to reductions in overall income inequality while wage inequality remained stagnant or even grew. The UK is a very peculiar case, which in some ways also fits into this category. As noted several times in this report, wage inequality increased rapidly in the UK after 2008 but overall income inequality remained basically stagnant, which is even more remarkable considering that unemployment did increase slightly after 2008.
2. Countries with few significant changes in this respect: These countries include the Czech Republic, the Netherlands, Poland and Sweden.

In light of these results, it is important to emphasise that wage inequality on its own provides only a very partial representation of inequality, even within the labour market. As already shown, wage inequality can in some cases evolve in total contradiction to overall inequality within the labour market and at the household level. Unemployment is the key factor behind this, which can itself be considered an indicator of inequality in the labour market. This tension between wage inequality developments and other forms of income inequality was exacerbated in countries where the recession had a big impact in terms of unemployment (southern and Baltic Member States in particular). Of course, this does not mean that wage inequality on its own (measured as hourly or full-time equivalent wages) is not a relevant topic for research, even in the context of the current crisis. It only means that this issue must be grounded in a broader, more comprehensive approach, as done in this section.

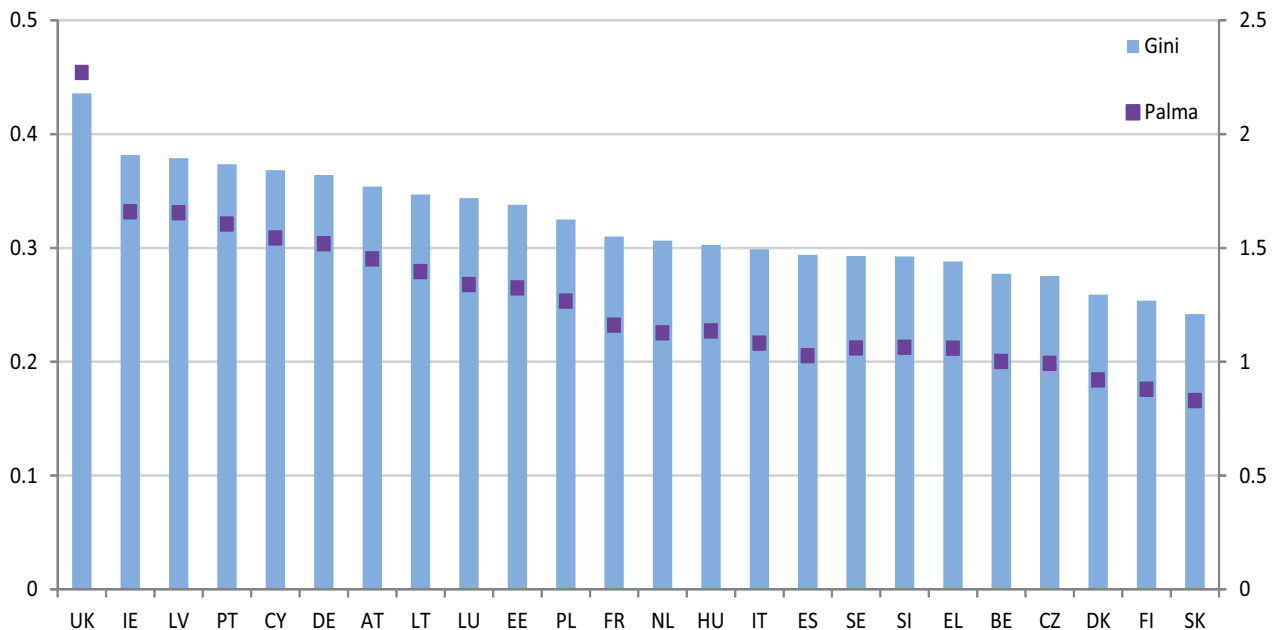
Palma index and the distribution of wage mass over time

Although it is the most widely used measure of inequality, the Gini index is not without problems. It is very sensitive to changes in the middle of the distribution, though less so regarding changes at the distribution's top and bottom (Atkinson, 1970). It could be argued that the latter are more important for an evaluation of the social implications of distributional changes. It is an abstract measure that serves for comparative purposes but has no simple intuitive interpretation, which may obscure the discussion about the implications of recent distributional changes (Piketty, 2014). An alternative measure that has been gaining some traction in recent years is the so-called Palma ratio, based on the work of Chilean economist Gabriel Palma (Palma, 2011, 2014). Comparing income distributions around the globe, Palma found a striking regularity in the amount of total income that went to the middle class, defined as deciles 5–9 of the income distribution – the 50% of the population that is between the richest 10% and the poorest 40%. He called this regularity the 50/50 rule: 'a state of affairs in which half of the population in each country located within deciles 5 to 9 tends to appropriate about 50 per cent of the national income' (Palma, 2014, p. 1). Most of the variation between countries depended on how the remaining 50% was distributed between the richest 10% and the poorest 40%. It is important to note that this empirical observation makes the insensitivity of Gini to changes at the edges of the distribution even more problematic, since that is where most of the variation takes place (and where it has more significant consequences). As a result of these findings, Palma proposed to simply use the ratio between the total income going to the top 10% and the total income going to the bottom 40% as an alternative measure of inequality.

This alternative approach at least partly solves the problems of Gini mentioned earlier: it is particularly sensitive to changes at the extremes of the distribution and has a much more direct intuitive appeal, since it directly reflects the ratio between the income going to the rich and the income going to the poor in society. But the Palma index is not without problems either: it is insensitive to the middle of the distribution, does not meet some of the typically required properties of inequality indices and the 50/50 rule on which it is based does not necessarily apply to wage inequality. Nonetheless, it can provide a valuable alternative perspective on the results presented here.

Figure 25 below compares the Gini index and the Palma index for monthly wages in this study’s sample of EU countries, in 2011.¹³ Although the actual values are obviously different (Palma is a ratio with no upper bound, while Gini is constrained to a 0–1 range), their country rankings are almost identical. The main differences are: the Palma index considerably expands the distance between the UK and other European countries in terms of wage inequality (because the UK is particularly unequal in its tails); and the ranking of some countries changes very marginally – Spain and the Netherlands, for instance, get a slightly lower position in Palma than in Gini, due to less inequality in the tails.

Figure 25: *Gini vs. Palma values for monthly wages, 2011*

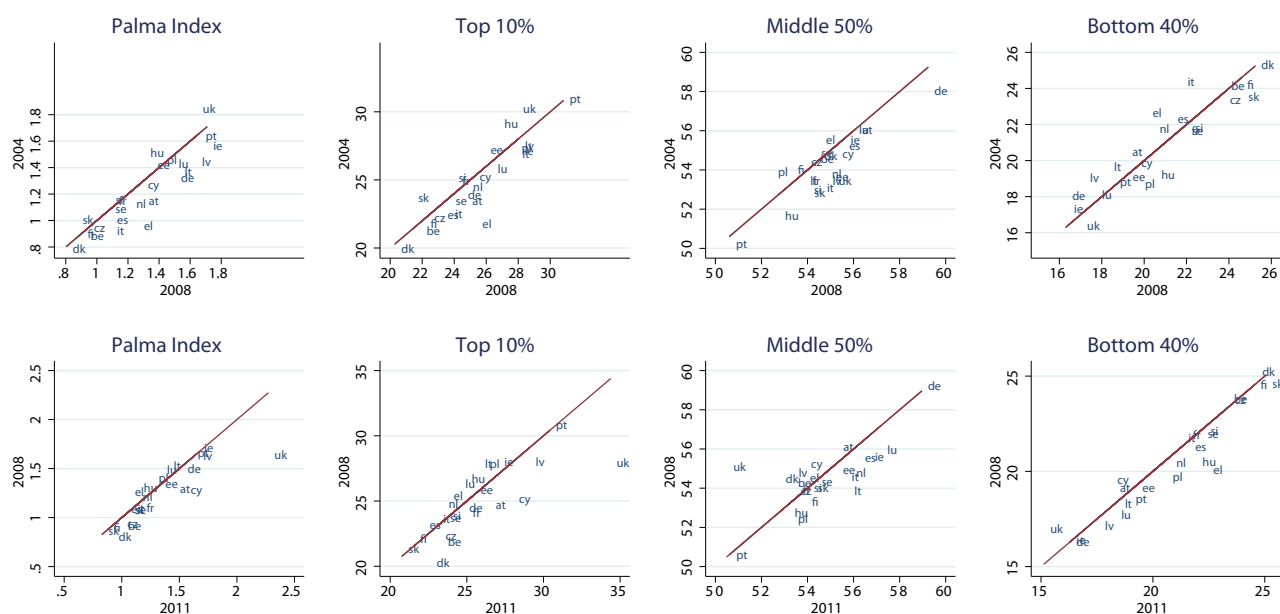


Source: *EU-SILC*

But the main topic of interest is how wage distribution changed in recent years. This can be found in the Palma ratio and the share of total wages going to the three big wage classes implicit in this measure: the top 10%, the middle 50% and the bottom 40%. These data are shown in Figure 26 below, with the period 2004–2011 divided into two sub-periods with 2008 as pivot, as previously done.

¹³ Monthly wages rather than full-time equivalent wages were used because they are a better fit with the intuitive interpretation of Palma – the ratio between the share of total wages captured by the top and the bottom. For consistency, the Gini shown in Figure 25 is also based on monthly wages.

Figure 26: Change in the Palma index and its components for monthly wages, 2004–2011



Source: *EU-SILC*

Firstly, the 50/50 rule can be checked to see if it applies to wages. Although the values in this case are around 55% rather than 50%, there is indeed much less variation between countries in the share of total monthly wages going to the middle group. Both before and after 2008, almost all countries fell between 54% and 56% in this measure, with the significant exceptions of Germany (with a much larger share of total wages going to the middle group, around 60%), Portugal (with a smaller share, around 51%) and the UK (with a share similar to Portugal after 2008). The level of variation in shares going to the top 10% and the bottom 40% is much larger.¹⁴

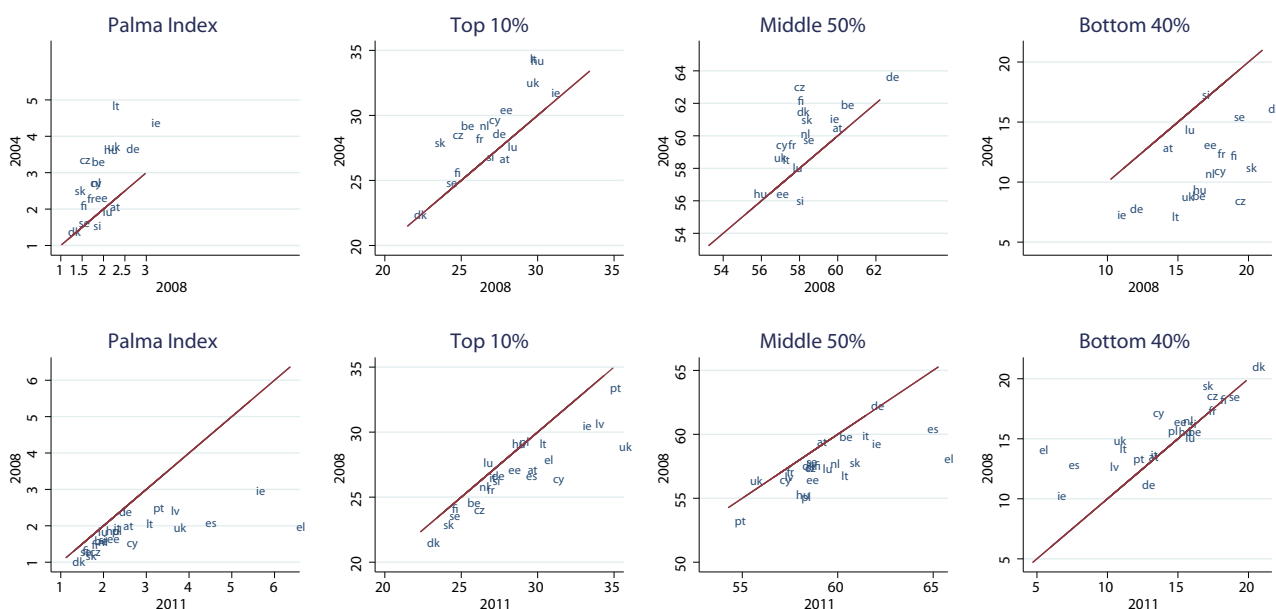
Secondly, the evolution of the Palma ratio is relevant. Compared to the Gini results, the Palma ratio shows a more clear and consistent increase in inequality over time, particularly in the first period. Only the UK, Hungary and Slovakia saw a decrease in the ratio before 2008, while after that period the Palma ratio remained more stable in most countries and increased significantly in a few of them (the most extreme case here is the UK, followed by Cyprus, Austria, Denmark and Belgium). Before 2008, there was a more or less generalised increase in the share of wages going to the top 10% (the biggest exceptions again being the UK and some eastern Member States), while the share going to the bottom 40% shrank in many countries (with similar exceptions). After the crisis, the majority of countries saw a small increase in the share of wages going to the bottom 40%, with the top increasing their share in a few countries mostly at the expense of the middle group.

The increase in the share of wages going to the bottom 40% after the crisis may seem surprising, although it is not inconsistent with results presented in previous pages. This occurred because the way in which the crisis had a different effect on the three income groups. The lowest 40% suffered a much higher probability of losing their jobs after 2008,

¹⁴ The coefficients of variation across countries of the shares are the following: 0.12 for the top 10%, 0.04 for the middle 50% and 0.14 for the bottom 40%.

which meant that the composition of this group was more altered than the others, increasing for purely compositional reasons their share on the total.¹⁵ This can be easily checked by recalculating the Palma ratio and the associated wage shares for the measure of annual labour earnings presented in the last section (the one that includes all economically active people, with a value of zero for the months not worked last year), as shown in Figure 27. Once this is done, the contrast between the periods before and after 2008 become much more stark: whereas before the crisis there was a significant reduction in the Palma ratio in some countries (though not in all), after the crisis there was a significant and generalised increase in the ratio between the wage share of the top 10% earners and the bottom 40%. The charts showing the shares for the three groups of the working population also contrast strongly, particularly for the bottom group, which saw important increases in its wage share before 2008 but equally significant decreases after the crisis (with the exceptions of Belgium, Germany and Scandinavia).

Figure 27: Change of the Palma index and its components for annual labour earnings wages, 2004–2011



Source: EU-SILC

Box 2: Gender effect

Gender is an important vector of social inequality in general, and wage inequality in particular. The gap between wages paid to men and women has become a widely used and publicly discussed social indicator (European Commission, 2014). This box presents a brief discussion of the inequality of wages between and within genders in the context of overall inequality.

Table 3 shows, for the most recent year of available EU-SILC data (2012, referring to 2011 wages), a number of indicators for the EU as a whole and for each Member State. Firstly, it shows the unadjusted ratio between male and

¹⁵ If people from the low-paid group lose their jobs, some people that were previously in the middle-pay group will join the low-paid ranks, thus increasing the share of wages of the low-paid group. If the lowest paid group shrinks, some people from the middle group will have to move into the lowest paid group (until it becomes 40% again), so the share of total wages of the lowest paid group will increase.

female average wages, without controlling for differences in their characteristics or those of their jobs. The gap between genders is around 20% for full-time equivalent wages and around 30% for monthly wages for the EU as a whole. The difference between gaps for full-time equivalent and monthly wages results from the much higher proportion of women in part-time work. Table 3 also shows the same ratio for all countries, sorted from higher ratio (and therefore a smaller gap) to lower ratio. For full-time equivalent wages, the lowest gaps are found in Slovenia, Lithuania, Luxembourg and Hungary (all below 10%); the largest gaps are found in Estonia, the UK and the Czech Republic (all above 25%). The country ranking alters when monthly wages are considered: countries with a large share of part-time work move upwards in the gender gap ranking and the top countries are now Germany, Netherlands and Austria.

Table 3: *Theil decomposition of 2011 EU wage inequality by Member State and region*

Full-time equivalent wage	EU24	SI	LT	LU	HU	PL	ES	BE	IT	PT	IE	DK	SE
Wage gap (ratio female-male average wage)	80.5	94.6	89.9	89.7	88.7	87.4	86.6	85.1	85.0	84.7	84.2	83.6	83.3
Between genders component of Theil	2.4	0.3	0.8	0.8	1.1	1.2	2.1	2.5	2.7	1.3	2.1	3.1	3.2
Within component for men	60.7	55.6	51.4	61.4	59.4	62.7	55.5	62.8	62.7	55.6	50.3	69.2	56.2
Within component for women	36.8	44.1	47.8	37.8	39.5	36.1	42.4	34.7	34.6	43.1	47.6	27.7	40.6
	EU24	LV	NL	FR	FI	EL	SK	DE	AT	CY	CZ	UK	EE
Wage gap (ratio female-male average wage)	80.5	82.4	81.8	81.5	80.9	80.0	79.7	78.6	75.6	75.5	75.0	74.8	70.3
Between genders component of Theil	2.4	2.0	3.8	3.4	5.4	4.7	6.4	4.3	5.0	4.4	7.2	2.6	8.6
Within component for men	60.7	54.7	58.3	59.4	60.1	73.7	57.5	54.9	64.5	64.1	57.7	63.8	54.3
Within component for women	36.8	43.3	37.9	37.2	34.6	21.6	36.1	40.8	30.5	31.6	35.1	33.6	37.1
Monthly wage	EU24	SI	LT	HU	PL	DK	PT	LV	ES	SK	FI	IT	SE
Wage gap (ratio female-male average wage)	70.1	91.5	88.4	86.8	83.9	82.3	81.7	81.5	79.1	78.6	78.2	77.7	76.0
Between genders component of Theil	5.8	0.6	0.9	1.4	1.9	3.1	1.8	2.0	4.5	6.7	6.4	4.7	5.4
Within component for men	58.5	54.4	51.1	59.1	62.4	67.9	54.2	54.0	51.8	57.0	58.2	57.8	52.7
Within component for women	35.7	45.0	47.9	39.5	35.7	29.0	44.0	44.0	43.7	36.3	35.4	37.5	41.9
	EU24	EL	FR	IE	BE	CZ	LU	EE	CY	UK	AT	NL	DE
Wage gap (ratio female-male average wage)	70.1	75.8	74.5	73.7	73.7	73.2	71.9	68.1	67.6	66.2	64.8	62.0	60.3
Between genders component of Theil	5.8	5.8	5.8	4.6	7.3	8.3	6.2	9.5	7.3	5.0	9.5	16.1	13.1
Within component for men	58.5	68.5	53.9	46.9	58.5	57.3	60.6	53.1	56.8	60.3	61.0	52.5	50.3
Within component for women	35.7	25.7	40.4	48.4	34.2	34.4	33.2	37.4	35.9	34.7	29.5	31.4	36.5

Source: *EU-SILC*

The main focus here, however, is to put gender wage differentials within the context of general wage inequality. Table 3 uses the Theil index for this purpose. As already explained, Theil can be decomposed into two broad components for any population divided in subgroups: a between-component, summarising the degree of inequality among those subgroups; and a within-component that measures the remaining inequality within those subgroups. A simple gender pay gap approach, as was just discussed, overlooks the fact that there can be a significant (and diverse) country-level variation in the wages of men and women; in this sense, the Theil approach is superior because it relates the difference in averages to the variation around the averages in both groups. The between-component of Theil is shown in Table 3 only as the share it represents of the overall total Theil in the Member State concerned. It can be directly interpreted as an assessment of how much of total wage inequality is directly explained by gender differentials: for the EU as a whole, this would be 2.4% (5.8% if monthly wages are not adjusted to full-time equivalents), ranging from 8.3% in Estonia to 0.3% in Slovenia, or from 16% in the Netherlands to 0.6% in Slovenia if not adjusting for part-time work. Although the values of the unadjusted pay gap and the between-Theil component for gender tend to reflect a similar trend, there is quite a lot of variation in the latter component, even in countries with similar wage gaps. For instance, the UK has a gap similar to that of the Czech Republic (around 25%) yet it accounts for a much smaller

proportion of total inequality according to the Theil approach (2.6% compared to 7.2%). The reason for this is that there is much more general inequality in the UK than in the Czech Republic, so a similar gap between genders accounts for a much smaller share of the total. Table 3 also shows a breakdown of the within-component of Theil (the residual once the gender gap is controlled for) into a male and a female part, showing that in most countries there is greater wage inequality among male workers than female workers. The reason is not so much that men's wages are slightly more unequal than women's (although they are) but, more importantly, that they are considerably higher (so that they receive a higher weight in the final calculation of Theil).

Figure 28: Change in gender gap and inequality within genders, 2004–2011



Source: EU-SILC

Finally, Figure 28 shows how the gender ratio between average full-time equivalent wages has changed in recent years, as well as the Gini index for male and female workers. In the period before the crisis, there were different trends in different countries with respect to the gender pay gap: in some countries it was closing (such as Estonia, Hungary and Latvia) while in others it was expanding (such as Greece, Poland and the UK). After 2008, there was a rather generalised moderate reduction of the gender pay gap, to some extent as a result of the composition effects already mentioned in other sections of this report, because men were more affected by the crisis than women in terms of employment, in many countries (see Eurofound, 2013, for more details). There are no major differences between men and women in terms of the evolution of the Gini index, besides a slightly more pronounced expansion of Gini for men after the crisis, most likely because of the reasons outlined previously.

6

Sector perspective on recent developments in wage distribution

This chapter looks at wage inequality in Europe from a sector perspective. Previous literature shows that wage differentials between sectors are sizeable, relatively stable over time and surprisingly consistent across countries (Du Caju et al, 2010). This perspective should prove useful in gaining a better understanding of recent developments in the distribution of wages in Europe. In practical terms, this perspective can also be useful because the sector classification (NACE) is highly standardised and is included in many surveys, which facilitates the linking of different data sources for expanding the scope of analysis.

However, although the sector perspective is potentially very fruitful, two practical and methodological difficulties make it highly problematic for the purposes of this report. Firstly, the sector classification used in the EU (NACE) was updated in 2008, with changes so profound that they make it impossible to construct consistent time series for sectors before and after this year. This is particularly problematic given that this report's analysis focuses precisely on the periods immediately after and before 2008. In practice, this means that very little trend analysis can be conducted from a sector perspective. Secondly, neither of the two sources used here includes the range and coding of sectors needed. EU-SILC covers all sectors of the economy but only uses the one-digit version of NACE, which is too broad for the purposes of this report. SES includes a two-digit version of NACE but leaves out important sectors of the economy (as well as small enterprises, as already mentioned).¹⁶

Because of these problems, this section is less detailed and more exploratory than the previous ones. Findings presented here should be understood as initial approximations, which can be completed when better data are available.

Table 4: *The between component of Theil for sectors in Europe*

	Theil between NACE 2-digit sectors	Theil between NACE 1-digit sectors	Total Theil	% of Theil between 2-digit sectors	% of Theil between 1-digit sectors
CY	0.080	0.058	0.213	37.7%	27.5%
PT	0.092	0.046	0.302	30.3%	15.1%
IT	0.041	0.023	0.149	27.6%	15.7%
RO	0.082	0.024	0.297	27.5%	8.1%
ES	0.039	0.017	0.155	24.9%	10.7%
EL	0.030	0.014	0.129	23.1%	10.7%
LU	0.060	0.028	0.269	22.2%	10.3%
NL	0.033	0.011	0.149	22.2%	7.2%
PL	0.050	0.026	0.228	21.9%	11.6%
IE	0.041	0.026	0.191	21.4%	13.7%
FI	0.018	0.008	0.090	20.0%	9.2%
CZ	0.039	0.009	0.197	19.7%	4.8%
SE	0.016	0.008	0.081	19.6%	9.3%
HU	0.055	0.021	0.281	19.6%	7.5%
EE	0.051	0.010	0.273	18.8%	3.6%
LV	0.047	0.017	0.262	18.0%	6.5%
LT	0.039	0.011	0.219	18.0%	5.2%
SK	0.035	0.008	0.199	17.7%	4.0%
SI	0.032	0.012	0.182	17.4%	6.8%
FR	0.027	0.014	0.157	17.2%	8.9%
EU24	n.a.	0.014	0.237	n.a.	5.9%

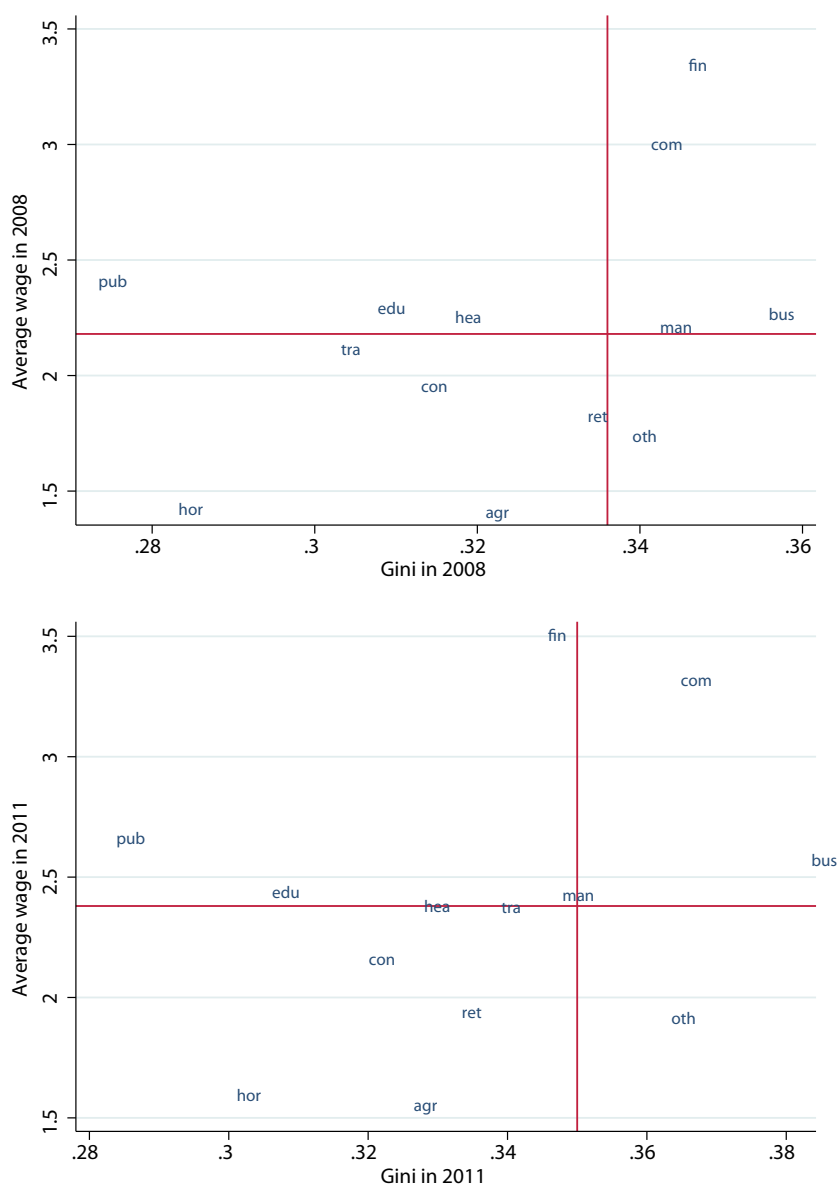
Sources: SES, 2010 and EU-SILC, 2012

¹⁶ The 1.1 version of NACE (available until 2008) has 17 categories at the one-digit level, and 60 at the two-digit level. The 2.0 version (available after 2008) has 19 categories at the one-digit level and 85 at the two-digit level.

Table 4 shows, for hourly wages in PPS, the values of the between-component of Theil for sectors at the one-digit and two-digit levels, using data from SES. (This means that some countries are missing, and the coverage of the economy in the available countries is not complete; see Chapter 2 on methodology for more detail.) For reference, the value of the between-component of Theil for the EU as a whole has also been included, although only the one-digit sector value is available because it draws from EU-SILC.¹⁷ According to this calculation, between-sector wage differentials account for less than 6% of the total inequality in wages in PPS in the EU as a whole. This may seem like a low value, but it is important to remember that using the same data and approach, the between-country differentials accounted for 17% of total inequality, which is just three times larger. Also, the between-gender differentials accounted for just 2.6% (or nearly 6% when wages were measured in monthly rather than hourly terms). In addition, it is important to bear in mind that this value refers to sectors measured at the NACE one-digit level, which is much less detailed and therefore conceals much variation. At the country level, the between-sector component accounts for a larger share of total wage inequality, even when measured at the one-digit level (in most countries, it is above the EU value). In most countries, the inter-sector differentials account for between 5% and 10% of total wage inequality when a sector is classified at one digit, and between 20% and 30% when classified at two digits. Inter-sector wage differentials account for a larger share of wage inequality in Portugal and some eastern Member States (particularly, the Baltic Member States, Hungary and Poland), and for a smaller share in the Nordic Member States, the Netherlands and the Mediterranean countries, according to SES data.

Figure 29 shows, for the EU in 2008 and 2011, both between-sectors differentials (reflected in the distance between the average wage in each sector) and within-sector inequality. These account for a much larger share of total inequality, around 94% according to the Theil approach seen earlier. They are shown here by the Gini value of wages in each one-digit sector for the EU as a whole. As already seen for countries and regions, there is a positive correlation between the average wage and internal inequality within each sector: sectors with an above-average wage tend to have higher inequality and vice versa. Average wages are highest in the financial sector, with a level of inequality similar to the full population in 2011 but higher in 2008: the crisis did not reduce the relative position of this sector in terms of average wage but it did reduce the amount of wage inequality within it. This did not happen in the second highest paid sector, communications, which remained above average in terms of inequality throughout the crisis. The public sector and business services have similar levels of average wages but widely different degrees of internal inequality, the former being the least and the latter the most unequal of all sectors. Hotels and restaurants have very low average wages and rather low inequality levels as well. Manufacturing lies at around the overall average in terms of both wage levels and inequality.

Figure 29: Average wage and Gini of wages by sector, EU27

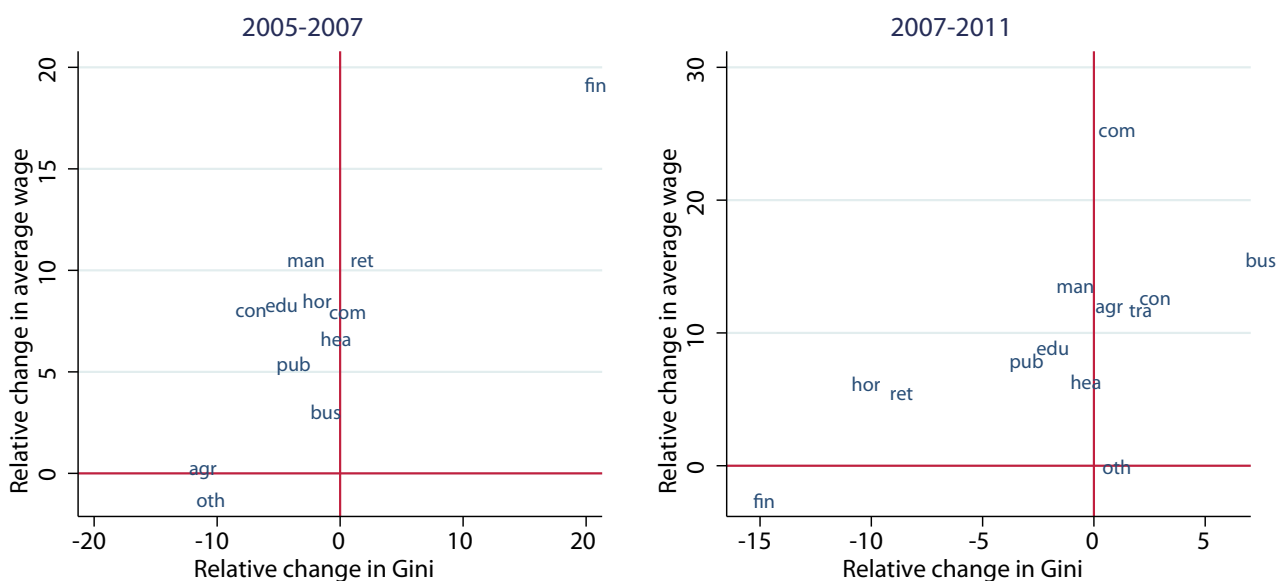


Note: pub = public administration; hor = accommodation and food service activities; tra = transportation and storage; edu = education; con = construction; hea = human health and social work activities; agr = agriculture, forestry and fishing; ret = commerce; oth = other service activities; man = manufacturing; bus = real estate, professional, scientific and technical; and administrative and support service activities; com = communication and information; fin = financial and insurance.

Source: *EU-SILC*

Figure 30 gives a clearer picture of change in between-sector and within-sector inequality after the crisis for the EU as a whole, with the earlier period 2004–2007 providing a context. The financial sector stands out in both periods, but for almost completely opposite reasons: before the crisis, its average wage and inequality levels increased massively, while during the crisis the average figures hardly changed at all (only slightly decreasing). At the same time, its internal wage inequality decreased very significantly. In the period before the crisis, most sectors except the financial sector behaved similarly to each other, with a relative increase in average wage of between 5% and 10%, and a stable internal inequality; only agriculture and ‘other services’ saw a significant change in the form of a reduction in internal inequality.

Figure 30: Change in average wages and Gini of wages, EU



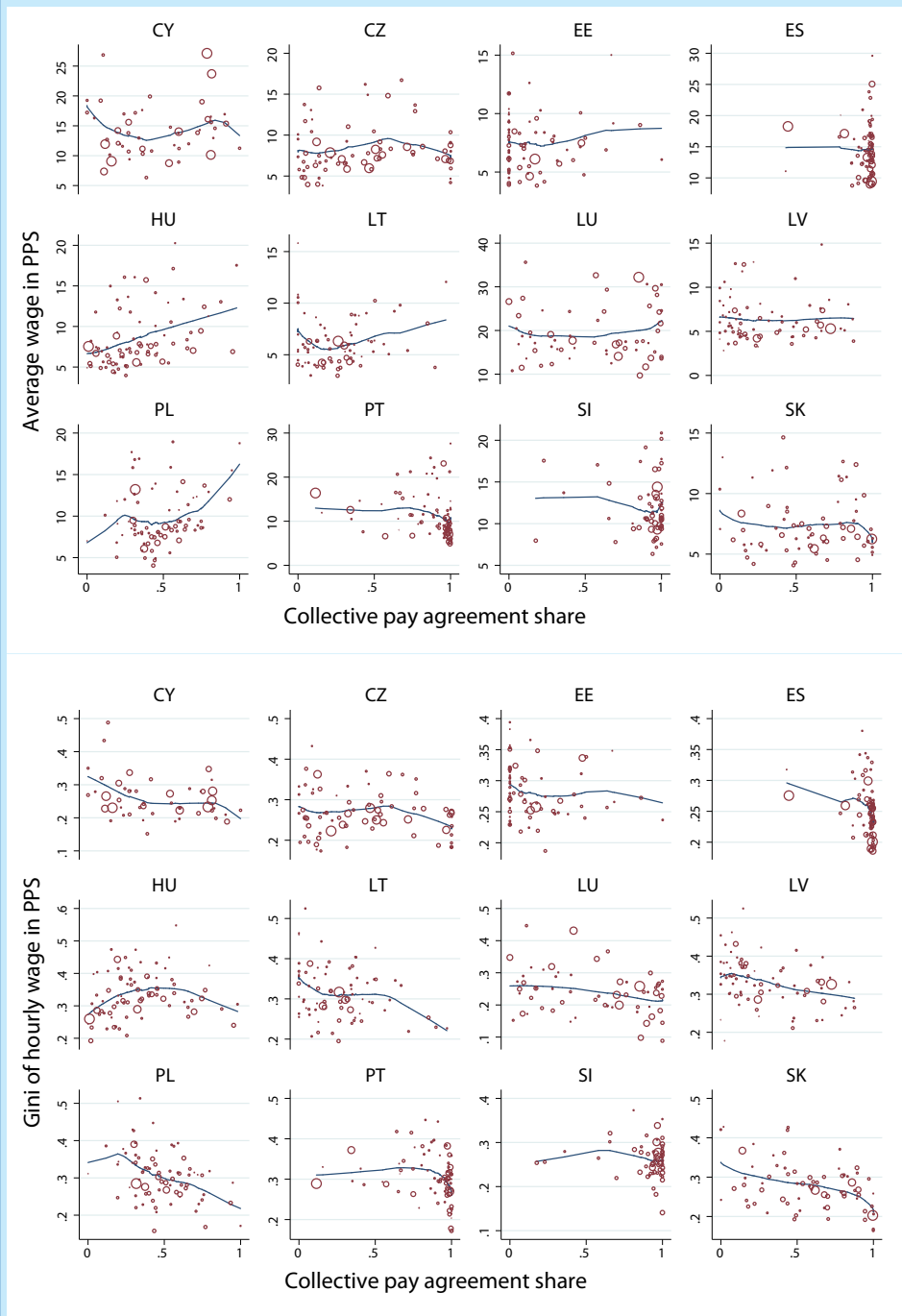
Note: See note under Figure 29 for an explanation of the sector abbreviations used in the graph.
 Source: EU-SILC

Some aspects of the relationship of the wage distribution with collective bargaining and labour productivity at sectoral level are explored in Boxes 3 and 4, respectively.

Box 3: Wage bargaining and wage distribution

Collective bargaining has a strong and direct impact on the distribution of wages: in particular, it tends to compress the wage structure in those sectors (or countries) in which it is strongest. This means that higher levels of wage bargaining should be related to lower inequality at the sector level. The relationship between the intensity of bargaining and average wage levels across sectors is less clear, however: on the one hand, it depends on the relative position of the most unionised sectors in the overall pay structure; on the other, it depends on the effect wage bargaining itself can have on average pay levels. In principle, higher levels of bargaining could secure higher pay levels, all other factors being equal, but there are many confounding factors to make this a general point (for a more detailed discussion of collective bargaining and pay levels in recent years, see Eurofound, 2014). Figure 31 shows a very simple correlation between the intensity of collective bargaining in the sector, average wages and the level of within-sector inequality (measured by the Gini index). Each dot in the chart represents a particular sector in a particular Member State: the dots are marked with the country label in order to roughly identify where each sector is. Average wages are shown in PPS euro. A Lowess curve was added to illustrate the relationship between both variables allowing for a non-linear shape.

Figure 32: Share of collective agreements on pay and average wages at the two-digit sector level

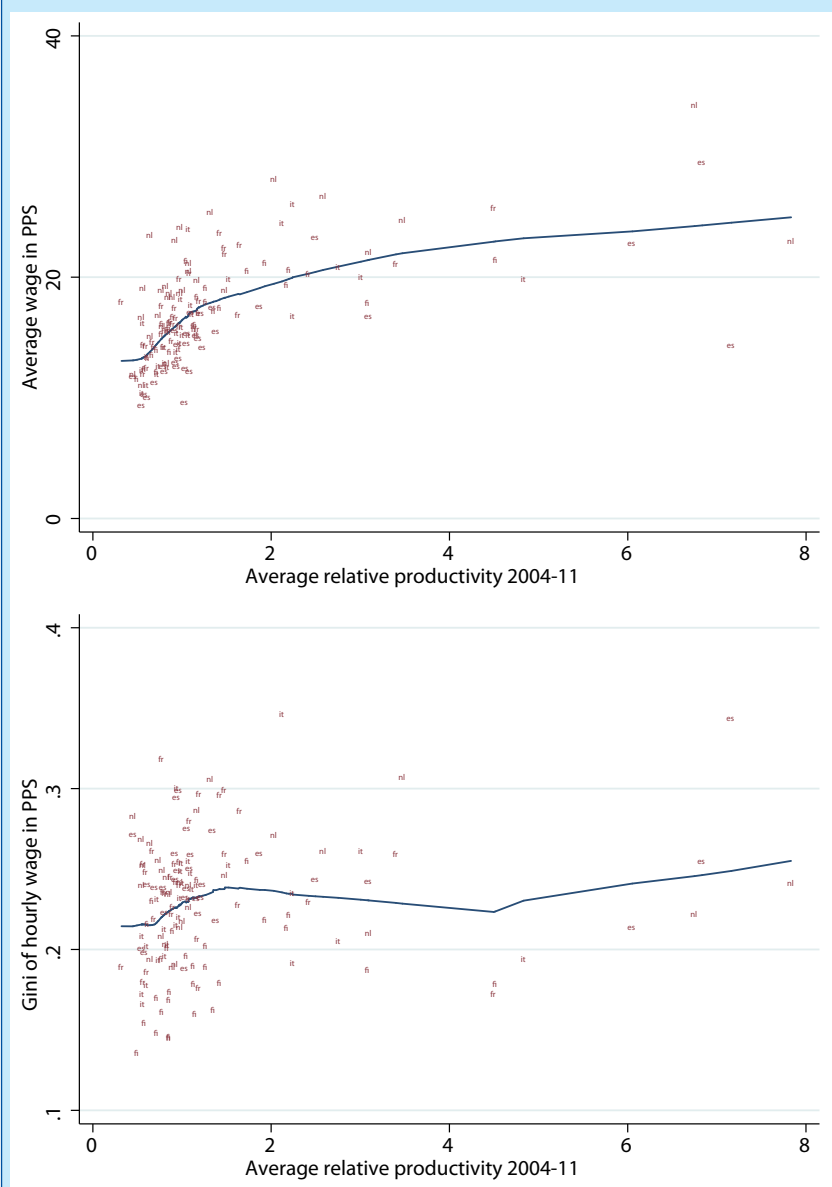


Source: SES, 2010

Box 4: Labour productivity and wages at sector level

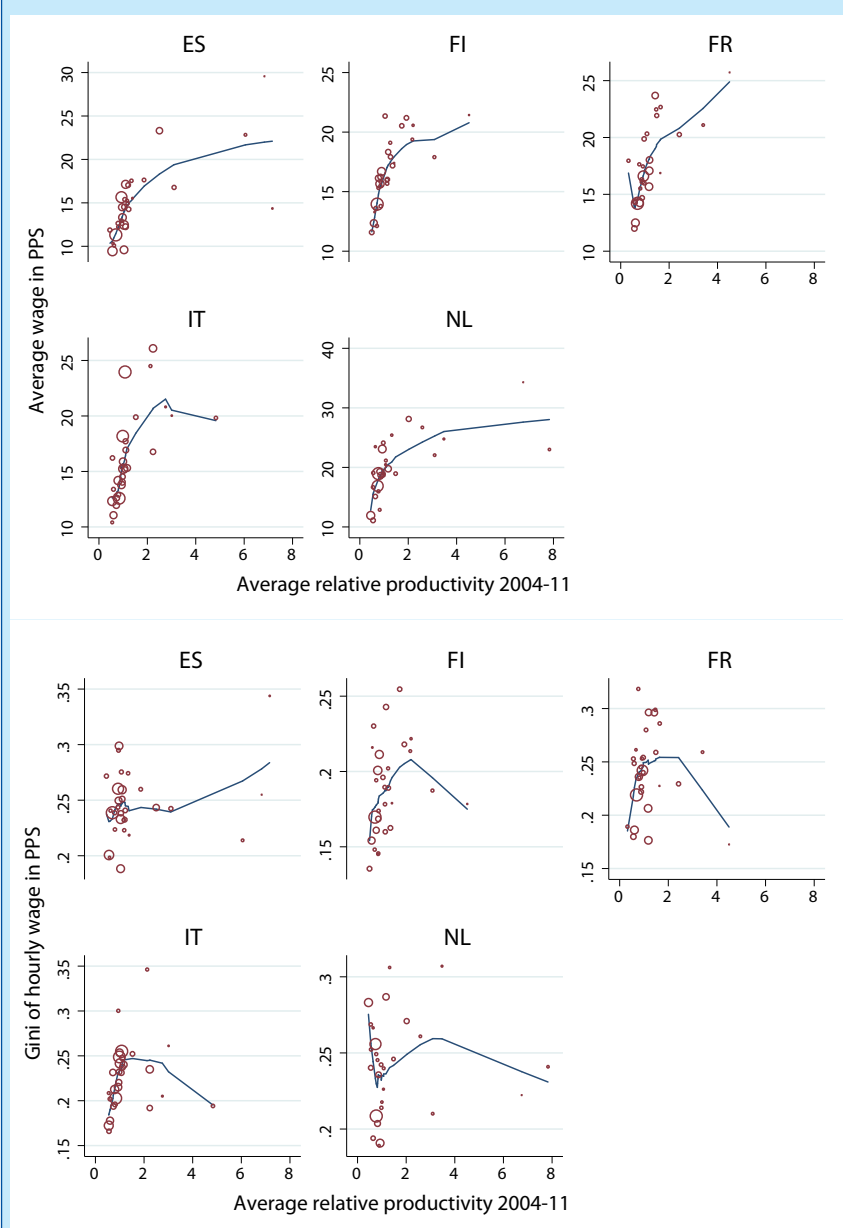
In standard economic theory, wages are determined by the marginal productivity of labour. Therefore, the differences in average wages across sectors should reflect differences in the levels of productivity, for instance as a result of the use of workers with different levels of human capital; any between-sector wage differential beyond that would in fact be contradictory with standard economic theory and suggest the intervention of non-competitive factors such as efficiency wages or rent sharing in the determination of inter-sector wage differentials (Du Caju et al, 2010). Figures 33 and 34, constructed in the same way as Figure 31 and Figure 32 above, show a very rough approximation of the relationship between ‘apparent’ productivity at the sector level (measured as value added per hour worked) and average wages. The relationship is positive as expected, although not very high; this approximation is too rough to attempt any interpretation. Figures 33 and 34 also show the relationship between ‘apparent’ labour productivity and the extent of wage inequality within sector, measured again by the Gini index: in this case, there is no obvious pattern either at the EU or Member State level.

Figure 33: Average relative productivity of labour 2004–2011 and wage distribution, EU



Source: SES, 2010

Figure 34: Average relative productivity of labour 2004–2011 and wage distribution, EU



Source: SES, 2010

Note on data in Figures 33 and 34

For Figures 33 and 34, the data regarding value added per hour worked come from the EU-KLEMS database, which in turn is drawn from national accounts. To facilitate the comparison, each sector-specific value was divided by the national average. This variable has to be interpreted with care: it is just a broad approximation to labour productivity, and is problematic. For instance, the values for public services can be misleading because gross value added in this sector is often unpriced; also, financial costs and depreciation are not considered in the calculation, and these can constitute the main costs faced in some parts of the real state sector and telecommunications sector, thus artificially inflating their values.

Summary and conclusions 7

This report has given an overview of recent developments in the distribution of wages in Europe, with emphasis on the EU perspective but also looking at within-country developments in a comparative way. It explored the following key points.

- There is an abundant and increasing body of research literature on wage and income inequality in Europe. Most of this literature refers to an increasing inequality trend over the last couple of decades, although there is considerable diversity in findings regarding the extent and timeframe of this trend. While many studies focus on individual Member States, very few take an EU perspective. Those that do have found that overall EU income inequality is at a similar level to that in the US, if income is measured in purchasing power parity (PPP) terms. They have also found that although between-country differences are important, the bulk of inequality takes place within Member States.
- There is a considerable lack of adequate statistical sources for studying wage developments at EU level. Even though progress has been made in recent years, the available data are still insufficient. The two sources that currently exist, and which were used for this report, are: EU Statistics on Income and Living Conditions (EU-SILC) and the Structure of Earnings Survey (SES). While they are both useful, they also have considerable problems: EU-SILC measures wages only indirectly and rather imprecisely, while the SES has a very limited coverage of the European working population and a very infrequent regularity (periodicity).
- According to the analysis presented in this report, the level of wage inequality in the EU as a whole is below that of the US or the three most unequal countries in the EU, when wages are measured in terms of purchasing power parity. The Gini index for wages in the EU as a whole is 0.346 (for full-time equivalent wages measured in PPS), while the comparable measure for the US is around 0.4, and in the UK, the most unequal EU country, it is 0.404. The majority of EU countries have values of Gini for full-time equivalent wages well below the overall EU figure.
- The Great Recession changed the trend of overall EU wage inequality. Between 2004 and 2008, EU wage inequality decreased; after 2008, it increased. The decrease before the crisis was entirely due to a significant reduction in between-country wage differentials (in other words, a process of convergence in pay levels), which came to a halt in 2008 and even started to reverse at the end of the period of this analysis (2011). The main driver behind the increase in wage inequality after 2008, nevertheless, was within-country inequality, which until that point had remained more or less stable. But such increase was to a large extent driven by developments in the UK, without which the overall EU within-country component of inequality remained more or less stable as a result of rather diverse developments at the country level.
- The convergence in national wage levels before 2008 was mostly driven by a rapid process of catch-up by eastern Member States and a stagnation (even decrease) of wages in the two biggest countries (Germany and the UK). Southern European average wage levels only converged in nominal terms before 2008 (remaining stagnant in real terms), and suffered a large drop in nominal and real terms afterwards; while German average wages started to grow very marginally and in eastern Member States regained growth after an initial significant drop.
- With respect to inequality trends within Member States, there was significant variation across countries. The most common pattern was cyclical, where wage inequality increased until 2008 and decreased afterwards. In many eastern Member States, wage inequality consistently decreased throughout the whole period of 2004–2011, while it consistently increased in some continental Member States (Austria, Belgium, Denmark and to a lesser extent Germany). In France and the UK, wage inequality decreased before 2008 and increased afterwards, particularly in the UK.
- In some cases, the observed trends of wage inequality contrast markedly with developments of wider income inequalities, which have often moved in opposite directions. Where this has happened (mostly in Spain, Greece and Italy), it was the result of a very significant impact of the crisis on unemployment, which increased income inequality by drastically reducing the earnings of those who lost their jobs, while at the same time decreasing wage inequality

by eliminating some relatively low-paid segments of employment. In other words, increases in unemployment led to some inequality moving out of the labour market, thus producing a decrease in wage inequality but an increase in overall inequality levels.

- Inter-sector wage differentials account for a significant proportion of total wage inequality in most European countries – between 20% and 40% if sectors are measured at the two-digit NACE level, or between 5% and 20% if measured at the one-digit level. The sector most affected by the crisis, by far, was the financial sector, which saw a significant reduction in overall wage levels and in its levels of internal wage inequality.
- Collective bargaining has a compressing effect on wages, so that the sectors with a higher bargaining coverage have had noticeably lower levels of wage inequality. At the EU level, collective bargaining coverage is associated with higher average wages, although this does not always apply within countries and is to some extent the result of country level differences – countries with higher levels of collective bargaining also tend to have higher wage levels.

Three key points arising from these findings have policy implications and must be emphasised. First, there is a need for better and more frequently updated data on wages at the EU level. This need will become more pressing as the EU continues to integrate economically. This can be easily addressed by expanding the coverage of the existing Structure of Earnings Survey (SES), increasing its periodicity and making it more accessible to external researchers. Second, it is important to note that the recent reversal of the process of convergence in wage levels that took place before 2008 may be a reason of concern for the cohesion objectives of the EU project. An ever closer Union should also be reflected in ever closer standards of living, and wages are an obviously important element of that. Third, European economic policies should take into account the widely different fortunes of different European regions in recent wage developments, with few unambiguously positive cases. Only Member States in eastern Europe saw clearly positive developments throughout the period, in the form of convergence to the EU average and declining levels of wage inequality. Recent developments in southern Member States look particularly problematic, with no convergence in real wages and increasing inequality before the crisis that mostly reversed because unemployment shifted inequality outside of the labour market. Some key continental Member States suffered significant increases in inequality throughout the period, while in the UK wage inequality grew very rapidly after 2008.

Bibliography

- Alvaredo, F., Atkinson, A. B., Piketty, T. and Saez, E. (2013), 'The top 1 percent in international and historical perspective', *Journal of Economic Perspectives*, Vol. 27, No. 3, pp. 3–20.
- Atkinson A.B. (1970), 'On the measurement of inequality', *Journal of Economic Theory*, Vol. 2, pp. 244–263.
- Atkinson, A. B. (1995), 'Poverty, statistics and progress in Europe', in Atkinson, A. B. (ed.), *Income and the welfare state – essays on Britain and Europe*, Cambridge University Press, Cambridge, pp. 64–77.
- Atkinson, A. B. (1996), 'Income distribution in Europe and the United States', *Oxford Review of Economic Policy*, Vol. 12, No. 1, pp. 15–28.
- Atkinson, A. B. (2009), *The changing distribution of earnings in OECD countries*, Oxford University Press, Oxford.
- Atkinson, A. B. and Brandolini, A. (2009), 'On data: A case study of the evolution of income inequality across time and across countries', *Cambridge Journal of Economics*, Vol. 33, No. 3, pp. 381–404.
- Atkinson, A. B., Piketty, T., and Saez, E. (2011), 'Top incomes in the long run of history', *Journal of Economic Literature*, Vol. 49, No. 1, pp. 3–71.
- Ballarino, G., Bogliacino, F., Braga, M., Bratti, M., Checchi, D., Filippin, A., Maestri, V. Meschi, E. and Scervini, F. (2012), *Drivers of growing inequalities*, Gini Intermediate work package 3 report, AIAS, Amsterdam.
- Barlevy, G. and Tsiddon, D. (2004), *Earnings inequality and the business cycle*, NBER Working Paper No. 10469, National Bureau of Economic Research, Cambridge MA.
- Beblo, M. and Knaus, T. (2000), 'Measuring income inequality in Euroland', Luxembourg Income Study Working Paper No. 232, Luxemburg.
- Blau, F. D. and Kahn, L. M. (2009), 'Inequality and earnings distribution', in Salverda, W., Nolan, B. and Smeeding, T. M. (eds.), *The Oxford handbook of economic inequality*, Oxford University Press, Oxford.
- Boix, C. (2004), 'The institutional accommodation of an enlarged Europe', Friedrich Ebert Stiftung, *Europäische Politik*, Vol. 6, pp. 1–9.
- Bonesmo Fredriksen, K. (2012), 'Income inequality in the European Union', OECD Economics Department Working Paper No. 952, OECD Publishing, Paris.
- Bonhomme, S. and Hospido, L. (2012), 'The cycle of earnings inequality: Evidence from Spanish social security data', Banco de España Working Paper No. 1225, Banco de España, Madrid.
- Brandolini, A. (2007), 'Measurement of income distribution in supranational entities: The case of the European Union', in Jenkins, S. P. and Micklewright, J. (eds), *Inequality and poverty re-examined*, Oxford University Press, Oxford, pp. 62–83.
- Brandolini A. and Smeeding, T. M. (2009), 'Income inequality in richer and OECD countries', in Salverda, W., Nolan, B. and Smeeding, T. M. (eds.), *The Oxford handbook of economic inequality*, Oxford University Press, Oxford.

Brandolini, A., Rosolia, A. and Torrini, R. (2010), 'The distribution of employees' labour earnings in the European union: Data, concepts and first results', in Atkinson, A. B. and Marlier, E. (eds.), *Income and Living conditions in Europe*, Eurostat Statistical Books, Publications Office of the European Union, Luxembourg.

Burniaux, J. M. (1997), 'Inégalités et emplois: effet de redistribution lié à la structure familiale', *Economie Internationale*, Vol. 71, No.3.

Burtless, G. (1999), 'Effect of growing wage disparities and family composition shifts on the distribution of US income', *European Economic Review*, Vol. 43, pp. 853–865.

Castaneda, A., Diaz-Gimenez, J. and Rios-Rull, J.-V. (1998), 'Exploring the income distribution business cycle dynamics', *Journal of Monetary Economics*, Vol. 42, No. 1, pp. 93–130.

Criverallo, E. (2014), *College wage premium over time: Trends in Europe in the last 15 years*, Department of Economics Research Paper 03/WP/2014, University of Venice, Venice.

Dauderstädt, M. and Kelttek, C. (2011), 'Immeasurable inequality in the European Union', *Intereconomics*, Vol. 47, No. 1.

Dauderstädt, M. and Kelttek, C. (2014), *Crisis, austerity and cohesion: Europe's stagnating inequality*, Friedrich-Ebert-Stiftung.

Deaton, A. (2010), 'Price indexes, inequality, and the measurement of poverty', *The American Economic Review*, Vol. 100, No. 1, pp. 5–34.

Deininger, K. and Squire, L. (1998), 'New ways of looking at old issues: Inequality and growth', *Journal of Development Economics*, Vol. 57, No. 2, pp. 259–287.

Du Caju P., Katay, G., Lamo, A., Nicolitsas, D. and Poelhekke, S. (2010), 'Inter-industry wage differentials in EU countries: What do cross-country time-varying data add to the picture?', *Journal of the European Economic Association*, Vol. 8, No. 2–3, pp. 478–486.

Dumenil, G. and Levy, D. (2011), *The crisis of neoliberalism*, Harvard University Press, Cambridge, MA.

Eurofound (2013), *Employment polarisation and job quality in the crisis: European Jobs Monitor 2013*, Eurofound, Dublin.

Eurofound (2014), *Pay in Europe in the 21st century*, Publications Office of the European Union, Luxembourg.

European Commission (2011), *Employment and social developments in Europe 2011*, Publications Office of the European Union, Luxembourg.

European Commission (2013), *Employment and social developments in Europe 2013*, Publications Office of the European Union, Luxembourg.

European Commission (2014), *Tackling the gender pay gap in the European Union*, European Commission, Publications Office of the European Union, Luxembourg.

European Parliament (2014), *Income inequality: Wage dispersion in the European Union*, Directorate General for Internal Policies, Policy Department A: Economic and Scientific Policy.

- Flaig, G. and Rottmann, H. F. (2013), 'Labour market institutions and unemployment: An international panel data analysis', *Empirica*, Vol. 40, pp. 635–654.
- Foster-McGregor, N., Leitner, S., Leitner, S. Poschl, J. and Stehrer, R. (2014), *Study on various aspects of earnings distribution using micro-data from the European Union Structure of Earnings Survey*, European Commission.
- Franzini, M. (2009), 'Why Europe needs a policy on inequality', in Klasen, S., 'Inequality: Origins, impact and policies', *Intereconomics*, Nov/Dec, pp. 328–332.
- Giammatteo, M. (2009), *Economic inequality of Europe*, mimeo.
- Gottschalk, P., and Danziger, S. H. (2005), 'Inequality of wage rates, earnings, and family income in the United States, 1975–2002', *Review of Income and Wealth*, Vol. 51, No. 2, pp. 231–254.
- Groshen, E. (1991), 'Sources of intra-industry wage dispersion: How much do employers matter?', *Quarterly Journal of Economics*, Vol. 106, pp. 869–884.
- Guscina, A. (2006), *Effects of globalization on labor's share in national income*, IMF Working Paper WP/06/294, International Monetary Fund.
- Jenkins, S. P. and J. Micklewright (2007), *New directions in the analysis of inequality and poverty*, IZA Discussion Papers No. 2814, Institute for the Study of Labor (IZA), Bonn, Germany.
- Jenkins, S. P., Burkhauser, R. V., Feng, S. and Larrimore, J. (2011), Measuring inequality using censored data: A multiple imputation approach, *Journal of the Royal Statistical Society*, Vol. 174, No. 1, pp. 63-81.
- Kahanec, M. and Zimmermann, K. F. (2009), *Migration in an enlarged EU: A challenging solution?*, European Economy – Economic Papers 363, Directorate General Economic and Monetary Affairs, European Commission.
- Kampelmann, S., Garnero, A. and Rycx, F. (2013), *Minimum wages in Europe: does the diversity of systems lead to a diversity of outcomes?*, Report 128, European Trade Union Institute, Brussels.
- Kuznets, S. (1955), 'Growth and Income Inequality', *American Economic Review*, Vol. 45, pp. 1–28.
- Maestri, V. and Roventini, A. (2012), *Inequality and macroeconomic factors: A time-series analysis for a set of OECD countries*, Laboratory of Economics and Management (LEM), Sant'Anna School of Advanced Studies, Pisa, Italy.
- Maestri, V. and Roventini, A. (2012), *Stylised facts on business cycles and inequality*, GINI Discussion Paper 30, AIAS (Amsterdam Institute for Advanced Labour Studies), Amsterdam.
- Maliar, L., Maliar, S. and Mora, J. (2003), *Income and wealth distributions along the business cycle: Implications from the neoclassical growth model*, IVIE Working Paper WP-AD 2003-02, Valencian Institute of Economic Research, Spain.
- Milanovic, B. (1999), 'Explaining the increase in inequality during transition', *Economics of Transition*, Vol. 7, No. 2, pp. 299–341.
- Milanovic, B. (2005), *Worlds apart: Measuring international and global inequality*, Princeton University Press, Princeton NJ.

Moretti, E. (ed.) (2015), *The Journal of Economic Perspectives*, winter edition, Vol. 29, No. 1.

Mortensen, D. T., (2005) *Wage dispersion: Why are similar workers paid differently?*, Zeuthen Lecture Book Series, MIT Press, Cambridge, MA.

Nolan, B., Salverda, W., Checchi, D., Marx, I., McKnight, A., Tóth, I. G. et al (eds.) (2014), *Changing inequalities and societal impacts in rich countries thirty countries' experiences*, Gini project, Oxford University Press, Oxford.

OECD (2008), *Growing unequal? Income distribution and poverty in OECD countries*, OECD Publishing, Paris.

OECD (2011), *Divided we stand: Why inequality keeps rising*, OECD Publishing, Paris.

OECD (2012), 'Income inequality and growth: The role of taxes and transfers', OECD Economics Department Policy Notes, No. 9, January 2012.

OECD (2013), 'Crisis squeezes income and puts pressure on inequality and income', New results from the OECD Income Distribution Database, OECD Publishing, Paris.

Palma, J.G. (2011), *Homogeneous middles vs. heterogeneous tails, and the end of the 'Inverted-U': The share of the rich is what it's all about*, Cambridge Working Papers in Economics 1111, Department of Economics, University of Cambridge, Cambridge.

Palma, J.G. (2014), 'Why is inequality so unequal across the world? Could it be that every nation gets the inequality it deserves?', in Stiglitz, J. and Basu, K. (eds.), *Proceedings of IEA roundtable on shared prosperity and growth*, Palgrave Macmillan, Basingstoke.

Papathodorou, C. and Pavlopoulos, D. (2003), *Accounting for inequality in the EU: Income disparities between and within Member States and overall income inequality*, CHER Working paper 9, CEPS/INSTEAD, Differdange, Luxembourg.

Piketty, T. (2014), *Capital in the twenty-first century*, Belknap Press, Portland OR.

Rosnick, D, and Baker, S. (2012), *Missing the story – The OECD's analysis of inequality*, Center for Economic and Policy Research, Washington DC.

Storesletten, K., Telmer, C. I. and Yaron, A. (2004), 'Cyclical dynamics in idiosyncratic labor market risk', *Journal of Political Economy*, Vol. 112, No. 3, pp. 695–717.

Violante, G. L. (2008), 'Skill-biased technical change', in Blume, L. and Durlauf, S. (eds.), *The new Palgrave dictionary of economics*, MacMillan.

Visser, J. and Checchi, D. (2009), 'Inequality and the labor market: Unions', in Salverda, W., Nolan, B. and Smeeding, T. M. (eds.), *The Oxford handbook of economic inequality*, Oxford University Press, Oxford, pp. 230–256.

Wade, R. (2013), 'Our misleading measure of income and wealth inequality: the standard Gini coefficient', in [Triplecrisis](#). Post of 6 May.

Annex: Indicators of wage distribution in the SES

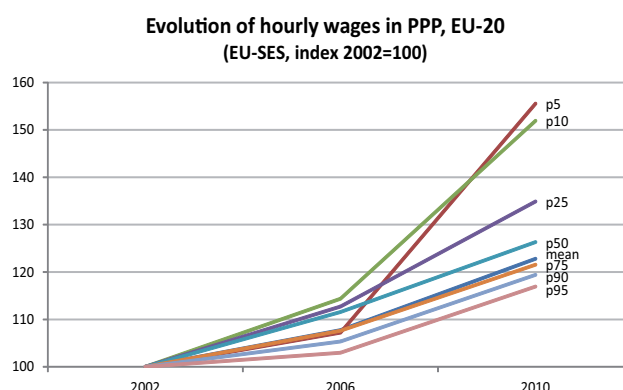
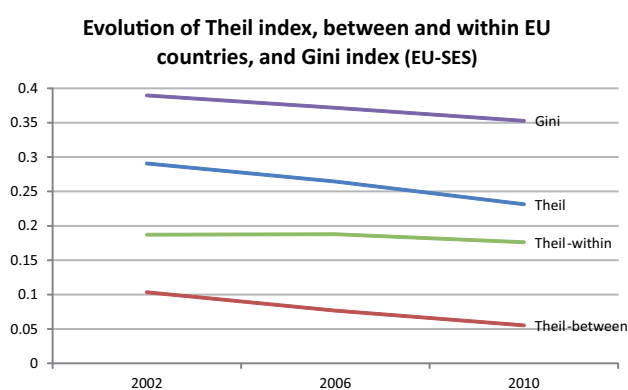
The main results presented earlier are consistent with those obtained when using the Structure of Earnings Survey (SES) instead. For the EU as a whole, this source points to a reduction of inequality in the period 2002–2010. The reversal of the trend after 2008 does not appear in these data, but this is mostly the result of the sparser periodicity: the only data points are for 2002, 2006 and 2010, so the difference between the last two still cannot capture any reversal.

Figure A1 presents a set of indicators characterising wage distribution at EU level. (This figure is similar to Figure 3 in the main report.) A constant reduction in wage inequality during the period of observation is reflected both by the Gini and Theil indices. According to the SES data, the fall in wage inequality is also largely driven by the between-country component; while some reduction also occurred for the within-country component, it was much less significant. As already noted, the diverging impact of the crisis on both components of the Theil index that was described using EU-SILC data cannot be identified here.

Those employees occupying the lowest positions in the European wage distribution (especially the fifth and tenth percentiles) registered the largest wage growth during the period, while those occupying the upper positions in the wage distribution registered more modest wage increases. This explains why the reduction in inequality was larger when comparing the extremes of the distribution (see data on ‘p90/p10’ in Figure A1 below).

Figure A1: *Summary measures of EU-level inequality, full-time equivalent wages in PPP*

	2002	2006	2010
Gini	0.389651	0.371796	0.352826
Theil	0.290643	0.264437	0.231329
Between	0.103409	0.076615	0.055215
Within	0.187234	0.187821	0.176114
p5	100	107.2289	155.5481
p10	100	114.3856	151.9044
p25	100	112.7167	134.8828
p50	100	111.5621	126.322
p75	100	107.6186	121.5625
p90	100	105.351	119.4164
p95	100	102.9741	116.9253
mean	100	107.7687	122.8036
p90/p10	6.809083	6.271276	5.352813
p75/p25	2.416401	2.307108	2.177771



Source: SES

This report gives an overview of recent developments in the distribution of wages in Europe from 2004 to 2011 – the period before and after the onset of the Great Recession. While the main focus is on the EU dimension, the report analyses relevant trends and developments within countries in a comparative perspective. The findings are drawn from two key data sources: the EU Statistics on Income and Living Conditions (EU-SILC) and the Structure of Earnings Survey (SES). The analysis shows that wage inequality in the EU as a whole decreased up to 2008 due to a process of convergence in wage levels between European countries, while it increased after 2008, mainly as result of inequality developments within countries. Mixed patterns in the evolution of wage inequality are found across European countries. The report highlights the need for better and more frequently updated data on wage developments at EU level.

The European Foundation for the Improvement of Living and Working Conditions (Eurofound) is a tripartite European Union Agency, whose role is to provide knowledge in the area of social and work-related policies. Eurofound was established in 1975 by Council Regulation (EEC) No. 1365/75, to contribute to the planning and design of better living and working conditions in Europe.

