

Chapter 3

Labour Losing to Capital: What Explains the Declining Labour Share?

During the past three decades, the share of national income represented by wages, salaries and benefits – the labour share – has declined in nearly all OECD countries. The chapter examines the drivers of this decline, stressing the role played by factors such as increased productivity and capital-deepening, increased domestic and international competition, the reduction of workers' bargaining power and the evolution of collective bargaining institutions. The decline of the labour share went hand-in-hand with greater inequality in the distribution of market income, which might endanger social cohesion and slow down the current recovery. Enhanced investment in education and use of the tax and transfer system can effectively reduce these risks.

Key findings

In recent decades, the labour share, or the share of labour compensation (wage, salaries and benefits) in the total national income, has been declining in almost all OECD countries. The median labour share dropped to 61.7% in the late 2000s, from 66.1% in the early 1990s and in some countries this decline began over 30 years ago.

A declining labour share does not necessarily imply declining living standards for workers, however. Even if average real labour incomes have grown less rapidly than incomes from capital, workers may still be better off to the extent the decline in the labour share was accompanied by faster economic growth. Nevertheless, the decline in the overall labour share hides significant differences across earning groups. On average, the wage income share of the top 1% of income earners increased by 20% in the countries for which data are available over the past two decades. By contrast, despite rising employment at the bottom end of the skill ladder, the wage share of the lowest educated slumped. This suggests that the position of certain workers, notably the least educated, in the income distribution worsened over the period. To the extent that less wealthy people tend to have a higher consumption propensity, the worsening of their labour income share might have an adverse effect on the level of aggregate demand and on how quickly economies can recover from the recent crisis. More generally, the unequal distribution of both labour and capital income growth that went hand-in-hand with the decline of the labour share suggests that these trends might endanger social cohesion.

What explains the decline of the labour share? Total factor productivity (TFP) growth and capital deepening – the key drivers of economic growth – are estimated to jointly account for as much as 80% of the average within-industry decline of the labour share in OECD countries between 1990 and 2007. This is consistent with the idea advanced by many studies that the spread of information and communication technologies (ICTs) has created opportunities not only for unprecedented advances in innovation and invention of new capital goods and production processes, thereby boosting productivity, but also for replacing workers with machines for certain types of jobs, notably those involving routine tasks.

There is also evidence that another driver of economic growth, the rise in domestic and international competition, had an impact on the labour share. In advanced economies, at least 10% of the decline of the labour share is accounted for by increasing globalisation – and in particular by the pressures from the delocalisation of some parts of the production chain as well as from import competition from firms producing in countries with low labour cost. The significant trend towards reducing public ownership of companies operating in the business sector also appears to have played an important part in shrinking the labour share, probably through the impact of privatisation on incentives for profit maximisation. This has been particularly the case in network industries, such as energy, transport and communications, where this process was of paramount importance. In fact, large-scale privatisation of network industries since the early 1990s, while leading to strong

productivity enhancements, can also explain about 33% of the decline of the labour share in these industries. By contrast, there is no evidence that deregulation of inward foreign direct investment (FDI) had any negative impact on the labour share.

The reduction in the labour share associated with increased domestic and international competition and reduction in public ownership could be partly explained by their effect on workers *bargaining power*. There is evidence in the literature that increased competitive pressures not only reduce the size of the rent that employers and workers share, but also decrease the bargaining power of workers, particularly those who are low-skilled, and thus their ability to appropriate their share. Increased import flows raise the substitution between domestic and foreign workers, while the possibility of offshoring improves the position of employers in bargaining. Lifting entry barriers brings new workers into the industry, who tend to be less unionised and have less bargaining power than workers with long job tenures in incumbent firms.

By raising the pressures on employers to reduce costs and reducing the bargaining power of workers, increased domestic and international competition also appears to have shaped the *evolution of the coverage and structure of collective bargaining institutions*. Trade union membership has been falling in most countries and collective bargaining coverage declined significantly in many countries, implying that an increasing share of workers have their wage set individually. In countries with multi-employer bargaining systems, when co-ordination between social partners was not sufficient, centralised agreements have often been used to obtain the wage moderation required to preserve competitiveness. At the same time, significant decentralisation has taken place in most countries, as employers felt simultaneously the need to adjust more speedily to wage competition from domestic or international competitors and less need for collective protection from trade union pressure in bargaining. Compared with more centralised collective bargaining system, local wage bargaining tends to increase wage dispersion, so that decentralisation together with lower collective bargaining coverage probably explains part of the deterioration of low-skilled workers' position.

The role played by those *labour market policies* that typically have a strong impact on productivity growth, such as statutory minimum wages and employment protection, is also examined in the chapter. While the impact of the latter on the labour share is found to be negligible, minimum wages are estimated to depress the labour share in the long-run. A higher minimum wage is likely to induce greater investment in labour-saving innovations and firm-sponsored training, whose benefits, in imperfect labour markets, are not fully reaped by workers in terms of higher wages. However, the contribution of changes in minimum wages to the observed decline of the labour share appears minor.

Should policy respond to the declining labour share and if so how? Slowing down some of the key driving forces – technological progress and globalisation – is not a viable option insofar as these are the key drivers of economic growth that determines the size of the pie to be split between labour and capital. Governments can sometimes modify the direction of technical change towards labour-augmenting technologies through tax incentives and subsidies. But these interventions run risks insofar as they might distort the pace and efficiency of the allocation of resources and thus depress growth in the long-run. Alternatively and more promising, governments can equip workers to win the “race against the machine”. Further investment in human capital, in particular by curbing the number of school dropouts and ensuring a better match between skills taught in school

and those in demand in the market, can go a long way to tackling the decline in the labour share. Finally, the tax and transfer system can be used to minimise the impact of growing inequality in market incomes on inequality in household disposable income.

Introduction

In recent decades, the aggregate labour share – the ratio of labour compensation to domestic output – has been declining in almost all OECD countries. In times of economic recession, this decline has typically paused, but then subsequently resumed with a recovery. The recent economic and financial crisis and subsequent sluggish recovery have not deviated from this general pattern. This suggests that workers are receiving an increasingly smaller share of national income.¹

Should policy makers be concerned about these developments? In essentially all OECD countries, while the fraction of national income going to labour decreased, economic growth was still sufficiently rapid so that real labour compensation increased and, it has been argued,² the average worker is now better off. However, there is evidence that not all workers have fared the same. Recent work has shown that labour compensation of top income earners, both in private companies and government-controlled enterprises and organisations, has increased dramatically (e.g. Saez and Veall, 2005; Atkinson *et al.*, 2011), while the position of people at the bottom end of the distribution has been worsening. This has meant that the pre-tax distribution of income has become more unequal in most OECD countries (see, for example, OECD, 2008a, 2011a). There is a risk that this tendency, coupled with diverging trends between the average labour share and the average capital share, becomes a threat to social cohesion. Moreover, the shift of income away from labour (and, in particular, away from low-wage workers) towards capital (and top earners) might also have a negative impact on aggregate demand, to the extent that workers with below-average pay tend to have a higher consumption propensity than do top earners and capitalists (see, for example, Dynan *et al.*, 2004), which might result in a particularly adverse effect on the speed of the recovery.

The chapter examines the recent evolution of the labour share at the aggregate and industry level and links its observed decline with a number of possible determinants. In particular, several explanations for the decline in the labour share have been put forward by the literature. These include: structural transformations in the OECD economies involving the reallocation of resources away from high-labour-share industries, globalisation and outsourcing, increasingly faster labour-saving capital accumulation, skill-biased technical change, privatisation of state-owned enterprises, changes in collective bargaining systems, and the fall in workers' bargaining power. This chapter examines all of these explanations, identifies the key factors behind the decline in the labour share and discusses their policy implications. In order to do so, the analysis relies on comparable cross-country time-series of industry-level data, so that the impact of different factors on the labour share can be identified while taking care of potential endogeneity.

The chapter is organised as follows. Section 1 reviews the evolution of the aggregate and industry-level labour shares and assesses the different roles of within-industry changes and sectoral reallocation. It also considers the evolution of shares for different workers, in particular by looking at levels of education. Section 2 focuses on the determinants of within-industry changes in the labour share that are only indirectly

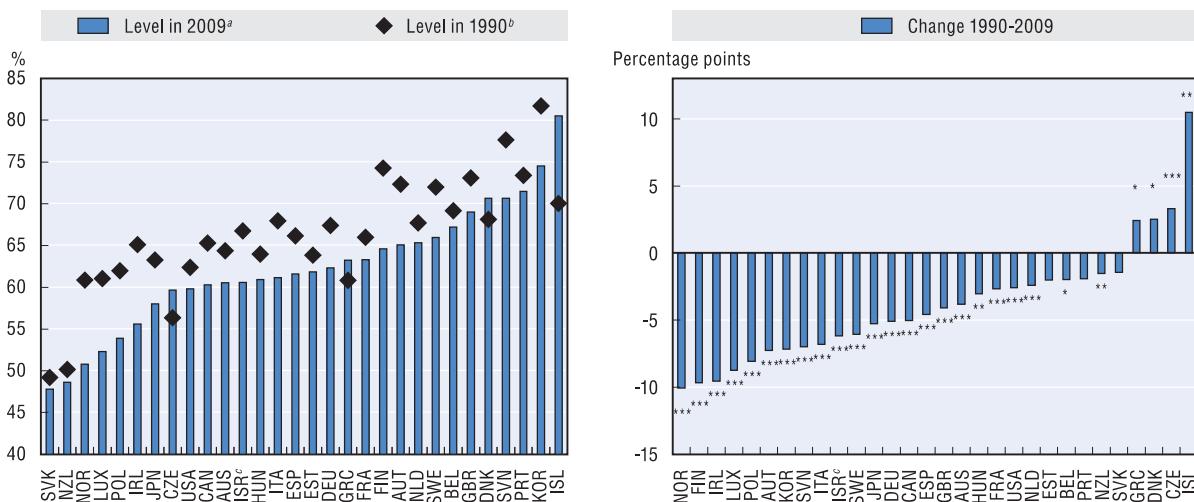
related to labour market institutions, namely capital accumulation and technology, globalisation, privatisation and product market liberalisation. The role of collective bargaining and changes in workers' bargaining power is examined in detail in Section 3, while Section 4 investigates the role of employment protection and the minimum wage. The key results of the chapter and their implications for policy are summarised in the concluding section.

1. Trends in the labour share

The evolution of the labour share in the past two decades

In most OECD countries the aggregate labour share has been declining.³ Indeed, the median labour share went down from 66.1% to 61.7% between the early 1990s and the late 2000s (Figure 3.1).⁴ Differences across countries are nonetheless large: the labour share went down by about 10 percentage points in Finland, Ireland and Norway, while it increased significantly in the Czech Republic and Iceland. Moreover these figures would be even more marked in the absence of the recent crisis in which the response of employment to GDP contraction in several countries was particularly moderate and labour hoarding substantial (see e.g. OECD, 2010, 2011b; and Chapters 1 and 2 in this volume), thereby temporarily raising the labour share.⁵ Interestingly, in many countries, the trend decline of the labour share started well before the early 1990s: in half of the countries for which long time-series are available, the labour share declined by 10 percentage points or more since the mid-1970s, although it increased or fluctuated without a clear trend in the 1970s and 1980s in others (Bassanini and Manfredi, 2012).

Figure 3.1. The decline of the labour share in OECD countries, 1990^a-2009^b



Note: Three-year averages, starting and ending with indicated years. ***, **, * significant at the 1%, 5% and 10% level respectively. Statistical significance refers to the coefficient of the time trend in a bivariate regression on annual data with the labour share as dependent variable. The wage of the self-employed is imputed assuming that their annual wage is the same as for the average employee of the whole economy.

a) Germany and Iceland: 1991; Estonia: 1993; Poland: 1994; Czech Republic, Greece, Hungary, Slovak Republic and Slovenia: 1995; Israel: 2000.

b) Portugal: 2005; Canada and New Zealand: 2006; Australia, Belgium, Ireland, Norway and Sweden: 2007; France, Iceland, Israel, Poland and the United Kingdom: 2008.

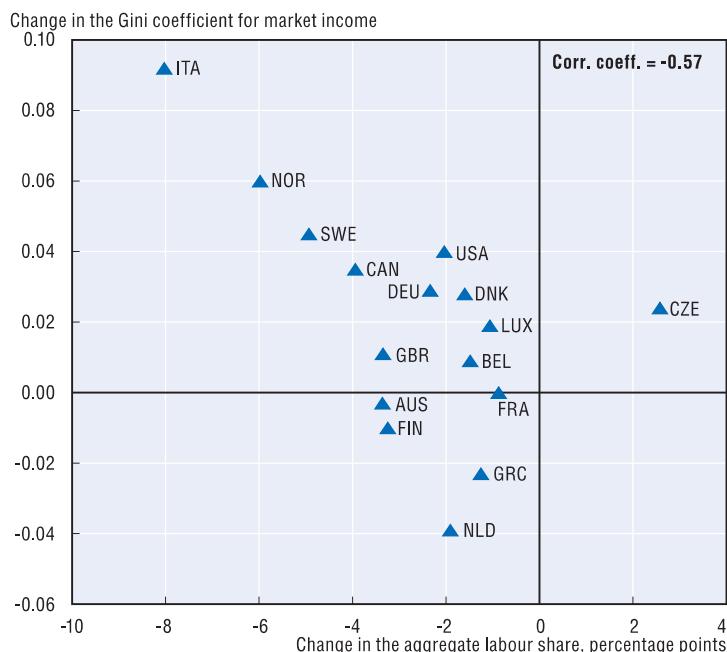
c) Information on data for Israel: <http://dx.doi.org/10.1787/888932315602>.

Source: OECD calculations based on OECD STAN and EUKLEMS.

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As discussed in OECD (2008a, 2011a), the distribution of pre-tax-and-transfer income (market income hereafter) has widened dramatically in many OECD countries in recent years. Has the decline of the labour share played an important role in this process of increasing inequality? It is difficult to establish with certainty a causal link between the evolution of the labour share and the evolution of the dispersion of market income, due to the lack of continuous time series for the latter. Nevertheless, in many countries, the income of the *average capital owner* tends to be higher than the income of the *average worker*. As a consequence, the decline of the labour share tended to evolve hand-in-hands with the widening of market-income inequalities (see Figure 3.2).

**Figure 3.2. Changes in the labour share and in income inequality,
1990s to mid-2000s^a**



Note: Labour share: three-year moving averages centred around start and end dates. The wage of the self-employed is imputed assuming that their annual wage is the same as for the average employee of the whole economy. The Gini coefficient is based on pre-tax and transfer income of the population aged 18 to 65 years.

a) 1990-2004 for Canada; 1990-2005 for Denmark, the Netherlands and the United States; 1991-2004 for Italy, Sweden and the United Kingdom; 1995-2004 for Australia, Belgium, Germany and Norway; 1995-2005 for Finland; 1996-2004 for the Czech Republic, France and Luxembourg; 1999-2004 for Greece.

Source: OECD calculations based on the OECD Income Distribution Database, OECD STAN and EUKLEMS.

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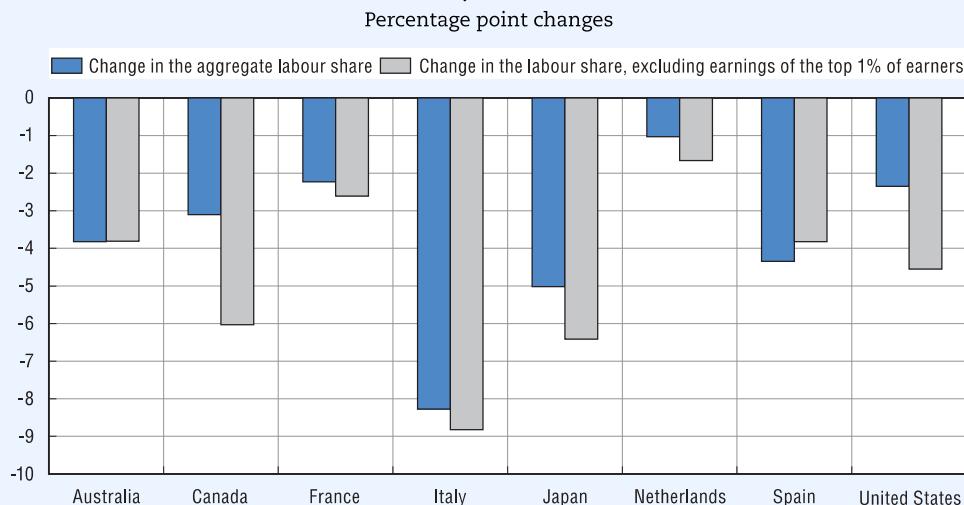
Standard labour share statistics, moreover, tend to underestimate the contraction of the share of national income that is received by the *typical worker*. Recent work (e.g. OECD, 2011a; Atkinson et al., 2011) shows that top income earners have seen their share of national income increase. Moreover, the wage income of top income earners has increased dramatically in a number of countries, particularly in North America, mostly driven by CEO and top executive's compensation (see Fernandes et al., 2009; Frydman and Jenker, 2010; and Frydman and Saks, 2010). The labour compensation of the top 1% of income earners, measured as a fraction of national income, has increased substantially in almost all countries for which data are available. By contrast, the labour share of the other earners has declined by much more than what Figure 3.1 suggests (see Box 3.1). In particular, in

Box 3.1. Trends in the labour share excluding top-income earners

In recent years, long time series on income of top earners have become available for many countries (see e.g. Atkinson et al., 2011). This evidence shows a general upward trend for the share of top income earners on total income. For example, in OECD countries for which data are available, the share of the top 1% of earners has increased on average from 6.7% to 10.3% between the mid-1970s and the mid-2000s. This stylised fact has fuelled much of the recent debate on inequality (see OECD, 2011a).

While, in general, the debate on income inequality focuses on trends in the overall share of income commanded by top-income earners, it is important to examine the evolution of their labour and capital income separately to understand better how national income is split between capital, top earners and other workers. Ideally, in order to have meaningful statistics on the fraction of national income that is appropriated by the average worker, it would be useful to adjust the evolution of the aggregate labour share by removing the top earners' contribution. However, long time series of comparable, detailed data on the share of top-income earners in total labour income are not available for many countries. For a few countries, these data can be retrieved from the *World Top Incomes Database* (Atkinson et al., 2011). This database reports, for a number of countries including many OECD members, information on the share of the top 1% of income earners in total income and the share of labour income in total income of the top 1% of earners. The product of these two shares gives the labour share of the top 1% of income earners (except for discrepancies between national income and GDP). Therefore, subtracting it from the aggregate labour share yields an estimate of the labour share of the bottom 99% of earners (see OECD, 2012, for more details). The results from this exercise are summarised in the chart below.

Labour share declines, excluding the top 1% of income earners in selected OECD countries, 1990 to mid-2000s



Note: Three-year averages, starting and ending with indicated initial and end years. Initial year is 1990 for all countries, except for Japan (1991); mid-2000s data refer to 2007 for Australia, 2000 for Canada, 2005 for France and Japan, 2004 for Italy, 1999 for the Netherlands, 2008 for Spain and the United States.

Source: OECD (2012), "Labour Losing to Capital", supporting material for Chapter 3 of the 2012 OECD Employment Outlook, OECD Publishing, Paris, available online at www.oecd.org/employment/outlook.

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Once top earners' income is excluded from the computation of the wage bill, the drop of the labour share appears somewhat greater, especially in Canada and the United States. In 1990s and 2000s, the decline in the adjusted labour share in these two countries (6 and 4.5 percentage points, respectively) was substantially greater than that of the unadjusted labour share, due to an increase in the share of wage income in total income of top earners (2.9 and 2.2 percentage points in Canada and the United States,

Box 3.1. Trends in the labour share excluding top-income earners (cont.)

respectively; see OECD, 2012). In most other countries, the difference is smaller: on average, the cumulated labour income of the bottom 99% of earners expressed as a fraction of national income decreased by 0.9 percentage points more than the unadjusted aggregate labour share. Conversely, the top 1% of earners saw their labour share increasing by the same amount.* The only exception is Spain, where the adjusted labour share fell less than the unadjusted one, mostly due to a minor decrease in the share of labour income in top earners' income.

* Note that, as the labour share of the top 1% of earners is about 5% on average, this implies that the labour income of the top 1% of earners as a percentage of national income has increased by about 20% on average.

Canada and the United States, the decline of the labour share of the bottom 99% of income earners in the past two decades was about 2.9 and 2.2 percentage points larger, respectively, than that of the aggregate labour share.

These trends in the aggregate labour share also need to be interpreted with caution because of a number of measurement issues (see Box 3.2). Moreover, the evolution of the labour share in the business sector is likely to be shaped by different forces than the corresponding aggregate for the public sector, where measurement of output and factor shares raises more complex issues.⁶ Therefore, the focus in the rest of this chapter is on the evolution of the labour share in the business sector, which represents a more consistent aggregate and where measurement issues are less problematic. Nevertheless the picture

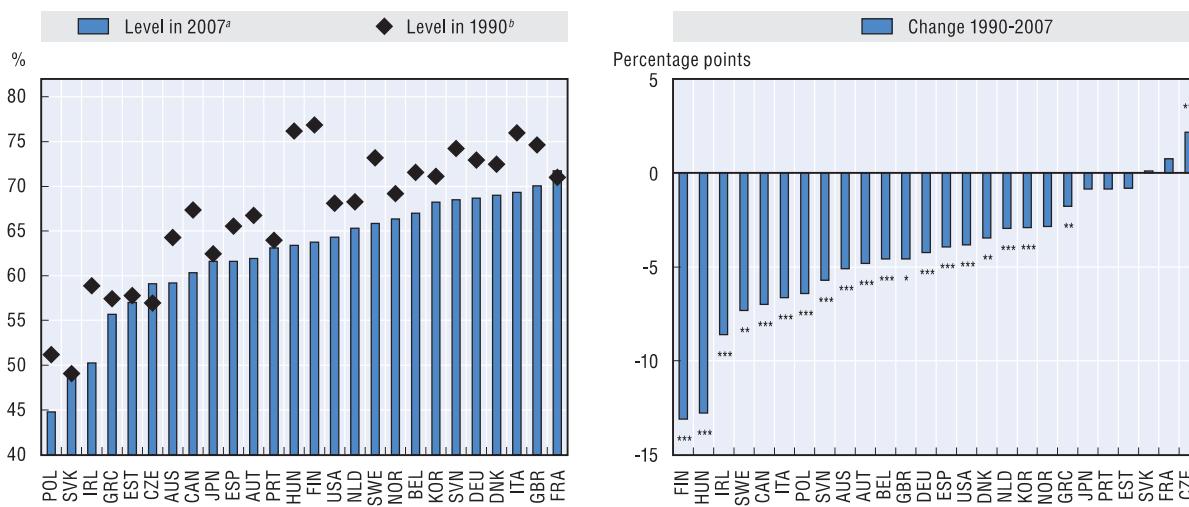
Box 3.2. The aggregate labour share: Measurement issues

The labour share is typically computed by dividing gross labour compensation by gross value added at current basic prices. In many industries outside the business sector, however, the measurement of value added is problematic. For example, the value added of the public administration, as measured in the national accounts is often equal to the sum of labour costs. As a consequence, the labour share is often dramatically inflated in the public sector. Conversely, in industries such as mining and fuel production, value added fluctuates quite a lot subject to changes in world demand for raw materials, while wages do not, thereby inducing large fluctuations in the labour share. Another source of measurement error is the imputation of owner-occupied housing in the national accounts, which is a significant proportion of value added in the real estate industry but is only reported as capital income (see e.g. OECD, 2009). Finally, the revenue of the self-employed is a mix of capital and labour income, which are typically not identified separately in the national accounts. There is a wide consensus that the remuneration of proprietors' labour should be assumed to be equal to the average compensation of wage earners (Gollin, 2002; Arpaia *et al.*, 2009). Typically, due to data availability, average annual wages of the whole economy are used for this calculation. However, the share of self-employed varies significantly across industries as does average compensation of employees, therefore imputation rules based on average compensation in the whole economy can be misleading both in terms of levels and trends.

In order to address these issues, in the remainder of this chapter the analysis focuses mainly on the labour share in the non-agricultural/non-mining/non-fuel/non-real-estate business sector – accounting for about two-thirds of the whole economy – where most of these problems are less important. In addition, the income of the self-employed is imputed on the basis of the average hourly wage of each industry. In other words, the labour share in the business sector is calculated in two steps: first, labour compensation for each industry is computed assuming that hourly compensation of proprietors' labour is the same as for employees in the same industry; then, industry labour compensation is aggregated at the level of the business sector and the labour share is computed by dividing this aggregate by business-sector's value added.

that emerges is rather similar to the results for the whole economy (Figure 3.3). The cross-country median labour share in the business sector, excluding agriculture, mining, fuel and real estate, was 68.2% in the OECD in 1990 and 63.6% in 2007. Among countries for which data are available, a significant trend increase is observed only in the Czech Republic (with a growth of 1.3 percentage points). By contrast, the labour share contracted significantly in almost three-quarters of the countries. Very large falls in the labour share were observed in some Scandinavian countries (Finland, and Sweden), a number of eastern European countries (Hungary, Poland and Slovenia), many English-speaking countries (Australia, Canada and Ireland) and Italy.⁷ In all these countries the decline in the business sector's labour share exceeded 5 percentage points. The implication is that, in these countries, labour is obtaining an increasingly smaller share of the business-sector's pre-tax revenue.

Figure 3.3. The decline of the business-sector labour share in OECD countries, 1990^a-2007^b



Note: Three-year averages, starting and ending with indicated years. ***, **, * significant at the 1%, 5% and 10% level, respectively. Statistical significance refers to the coefficient of the time trend in a bivariate regression on annual data with the labour share as dependent variable. The wage of the self-employed is imputed assuming that in each industry their hourly wage is the same as for the average employee of the industry. Estimates for Norway exclude the chemical industry and are based on average hours per employed person rather than average hours per employee.

a) Germany and Hungary: 1992; Czech Republic, Estonia, Greece, Poland, Slovak Republic and Slovenia: 1995.

b) Canada: 2004; Korea and Portugal: 2005; Japan, Poland and Slovenia: 2006.

Source: OECD calculations based on OECD STAN and EUKLEMS.

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A number of previous studies have suggested that trends in the aggregate labour share typically hide important compositional factors (e.g. de Serres et al., 2002). Indeed, since the 1960s, a number of low-labour-share service industries, such as financial intermediation, have gained importance in most countries⁸ while other labour-intensive industries, such as textiles, have shrunk, thereby depressing the aggregate labour share. Thus, a key question is whether the decline of the aggregate labour share has been the result of a structural shift away from labour-intensive activities or whether instead it has been the result of a decline in the labour share within each industry. This question can be answered using a standard shift-share analysis (see Box 3.3). Based on comparable data for 20 industries in the business sector, changes in the business-sector labour share can be decomposed into the contribution of within-industry changes in the labour share and the contribution of changes in the value-added share of industries with high labour shares versus those with low labour shares.

Box 3.3. Shift-share analyses

The shift-share methodology allows decomposing aggregate changes of an economic variable into the contribution due to changes of that variable within industries and structural changes in industry composition. Formally, in the case of the labour share, a shift-share decomposition can be written as:

$$F_t - F_{t-1} = \sum_i \bar{s}_i (f_{it} - f_{it-1}) + \sum_i (s_{it} - s_{it-1}) \bar{f}_i \quad [1]$$

where F and f represent the aggregate and industry labour shares, respectively, s is the share of industry i in nominal value added and a bar represents averages between the start and end dates. The first term on the right-hand side is a weighted average of within-industry changes in the labour share while the last term represents the contribution of sectoral reallocation across industries with different labour shares (the so-called *between-industry* component).

The evolution of the labour share in each industry can also be linked to the different evolution of real wages, labour productivity and relative prices (see e.g. De Serres et al., 2002; Torrini, 2005). In particular, using logarithmic approximations:

$$\log \frac{F_t}{F_{t-1}} = \log \frac{W_t}{W_{t-1}} - \log \frac{Y_t}{Y_{t-1}} + \log \frac{(P_t / D_t)}{(P_{t-1} / D_{t-1})}$$

that is, the percentage change in the aggregate labour share F can be decomposed into the percentage growth of the aggregate real gross hourly wage W (deflated with the consumption deflator P) minus the percentage growth in hourly productivity Y (in volumes, that is deflated with the aggregate value-added deflator D) and the percentage change in the relative price of consumption with respect to domestic output. As suggested by Böckerman and Maliranta (2012) one can make use of the above formula to extend the standard shift-share decomposition in order to shed light on the relative contributions of wages, productivity and prices to within-industry and between-industry variations of the labour share. As shown in OECD (2012), the percentage change in the aggregate labour share can be approximated by:

$$\begin{aligned} \log \frac{F_t}{F_{t-1}} \approx & \left[\sum_i \bar{h}_i \left(\log \frac{w_{it}}{w_{it-1}} - \log \frac{y_{it}}{y_{it-1}} \right) \right] + \\ & \left[\sum_i \bar{h}_i \log \frac{w_{it}}{w_{it-1}} \left(\frac{\bar{w}_i - \bar{W}}{\bar{W}} \right) - \sum_i \bar{h}_i \log \frac{y_{it}}{y_{it-1}} \left(\frac{\bar{v}_i - \bar{V}}{\bar{V}} \right) \right] + \\ & \left[\sum_i \bar{h}_i \log \frac{(P_t / d_{it})}{(P_{t-1} / d_{it-1})} + \sum_i \bar{h}_i \log \frac{(P_t / d_{it})}{(P_{t-1} / d_{it-1})} \left(\frac{\bar{v}_i - \bar{V}}{\bar{V}} \right) + o \right] + \\ & \left[\sum_i (h_{it} - h_{it-1}) \left(\frac{\bar{w}_i}{\bar{W}} - \frac{\bar{v}_i}{\bar{V}} \right) \right] \end{aligned} \quad [2]$$

where V is nominal (aggregate) value added per hour worked, h stands for the share of industry i in total hours worked, lowercase letters indicate industry-level variables, a bar represents averages between the start and end period, and o is a residual, which is typically very small. The term in the first bracket represents the contribution to the evolution of the

Box 3.3. Shift-share analyses (cont.)

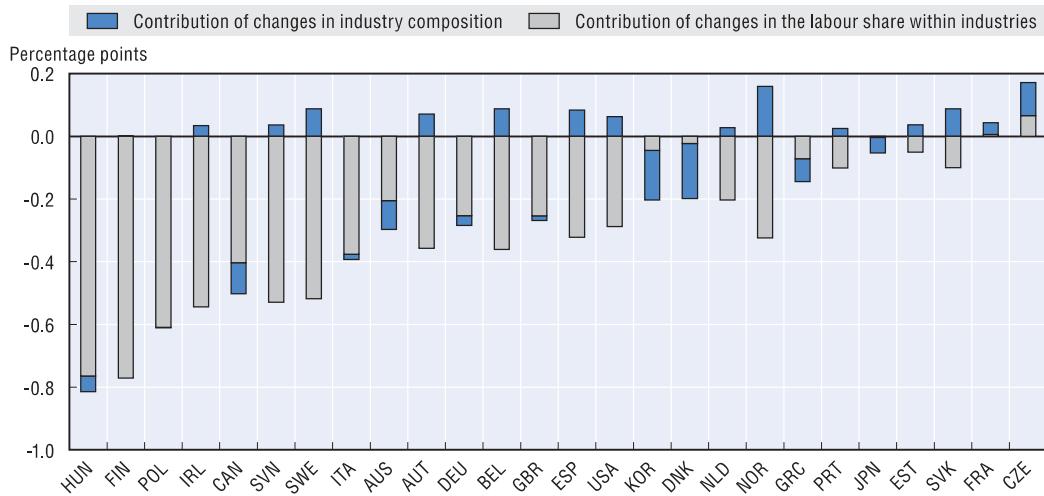
aggregate labour share of the average relative within-industry growth of real wages with respect to productivity. The terms in the second bracket capture the contribution of convergence/divergence patterns in real wages and productivity: real wages provide a greater contribution to the percentage change of the labour share when they grow faster in high-wage industries; conversely, when productivity grows faster in high-productivity industries, this compresses the labour share. The terms in the third bracket represent a relative price effect, which is positive if, on average, the consumption deflator grows faster than the output deflators. This relative price effect can be further decomposed into a within effect, a convergence effect and a small residual. However, in practice, most of the action occurs within industries and therefore, for simplicity, the three terms will be presented together in this chapter. Finally, the term in the fourth bracket (that approximately corresponds to the between component in [1]) captures the reallocation of labour from/to industries that are relatively more high-wage or high-productivity: it is positive if the difference between expanding industries and the average industry as regards wages is larger than their difference as regards productivity – or, in other words, expanding industries tend to be more high-wage than they are high-productivity industries.

In practice, the terms in the first, second and third brackets of [2] decompose within-industry changes in the labour share – as computed in [1], except that they are expressed in percentages instead of percentage points – into average within-industry growth of the ratio of real wages to productivity, convergence/divergence patterns and relative price growth. This approximation is precise – that is the sum of the terms in [2], except those in the fourth bracket, closely corresponds to the within component of [1] – if h and s are sufficiently close, which turns out to be the case in the data considered in this chapter. The interesting feature of this decomposition is that it allows to single out simultaneously three factors that, to a different extent in different countries, appear to be key in determining the within-industry evolution of the labour share in the business sector: the fact that, on average, within-industry real wage growth did not keep pace with productivity growth, the role of relative price effects, and the correlation between growth and levels of wages and productivity. The latter factor represents another, more dynamic, type of structural shift within an economy: if the growth rate of real wages is relatively homogeneous across industries while productivity grows faster in high-productivity industries, this inevitably depresses the labour share.

Within-industry falls in the labour share explain an overwhelming proportion of its aggregate decrease between 1990 and 2007 (Figure 3.4). Within industries, the labour share declined by as much as 0.7 percentage points per year in Finland, Hungary and Poland. Moreover, in most countries where a significant contraction of the aggregate labour share was observed, within-industry changes accounted for close to 100% of that decline, with the partial exception of Australia, where this proportion is only two-thirds. Large between-industry components, implying noteworthy reallocation away from high-labour-share industries, were observed only in Denmark and Korea.⁹ In these two countries, structural reallocation across industries accounted for a decrease of the business-sector labour share greater than 0.1 percentage points per year. By contrast, in a few other countries, and notably Austria, Belgium, Norway, Spain, Sweden and the United States, reallocation to high-wage share industries limited somewhat the aggregate consequences of sizeable within-industry falls in the labour share. Finally, in the Czech Republic, a similar shift in

Figure 3.4. Within- and between-industry changes in the business-sector labour share, 1990^a-2007^b

Average annual contributions in percentage points



Note: Shift-share decomposition of the percentage-point change of the labour share in the business sector, partitioned in 20 industries, excluding agriculture, mining, fuel manufacturing and real estate. The wage of the self-employed is imputed assuming that in each industry their hourly wage is the same as for the average employee of the industry. Estimates for Norway exclude the chemical industry and are based on average hours per employed person rather than average hours per employee.

a) Germany and Hungary: 1992; Czech Republic, Estonia, Greece, Slovak Republic, Poland and Slovenia: 1995.

b) Canada: 2004; Korea and Portugal: 2005; Japan, Poland and Slovenia: 2006.

Source: OECD calculations based on OECD STAN and EUKLEMS.

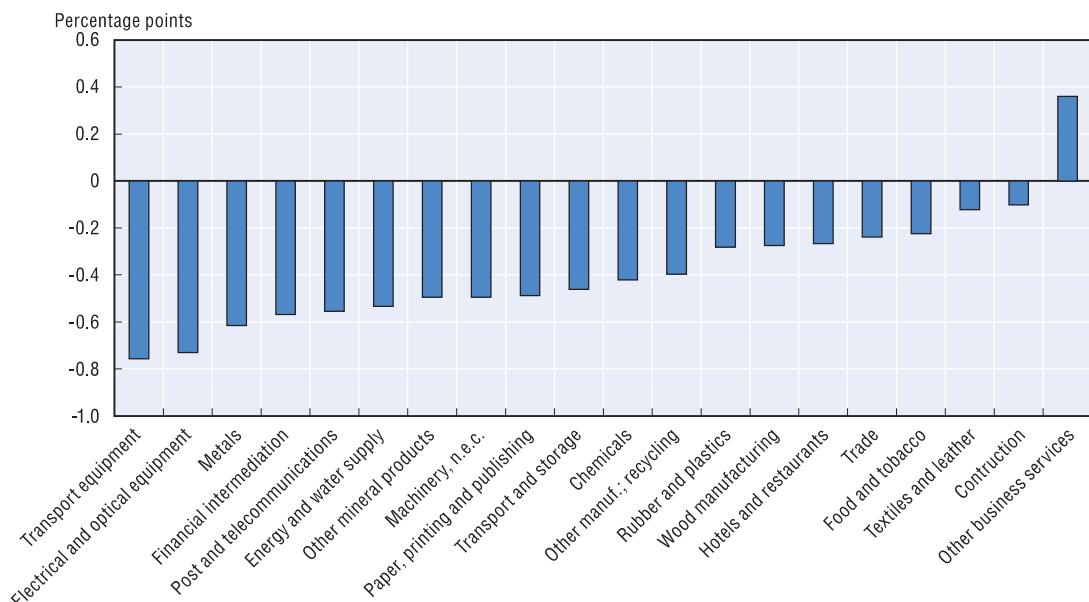
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industry composition is responsible for most of the significant increase in the labour share in that country. In all other countries that experienced a significant reduction in the labour share, reallocation across industries played a minor role.¹⁰

Another key question is whether the fall in the labour share has been homogeneous across industries or whether this phenomenon has been more important in specific industries. On average across the countries for which data are available, within-industry changes in the labour share declined in all business-sector industries except business services, where the labour share rose substantially by almost 0.4 percentage points per year (Figure 3.5). Business services is, however, a composite industry, which includes medium-skill sub-industries that are highly intensive in physical capital (such as renting of machinery and equipment) and sub-industries that are extremely intensive in high-skill labour, such as research and development, computer and related activities, as well as legal, technical and advertising services, which expanded dramatically in the past two decades.¹¹ The expansion of the labour share in this industry is therefore likely to reflect to a large extent within-industry changes in the composition of this industry.¹² By contrast, large contractions in the labour share (above 0.4 percentage points per year on average) occurred in financial intermediation, network industries as well as high- and medium-technology manufacturing, while declines were typically small in other service industries, construction and low-tech manufacturing.¹³

Changes in the labour share are the result of the differential evolution of real wages, productivity and relative, quality-adjusted prices of output and consumption. More precisely, the growth rate of the labour share can be written as the sum of the relative

Figure 3.5. Average within-industry changes in the labour share, by industry, 1990-2007
 Cross-country average of within-industry annual changes



Note: Average of within-industry annual percentage-point changes. The wage of self-employed is imputed assuming that in each industry their hourly wage is the same as for the average employee of the industry. Based on the countries reported in Figure 3.4, except Norway.

Source: OECD calculations based on EUKLEMS.

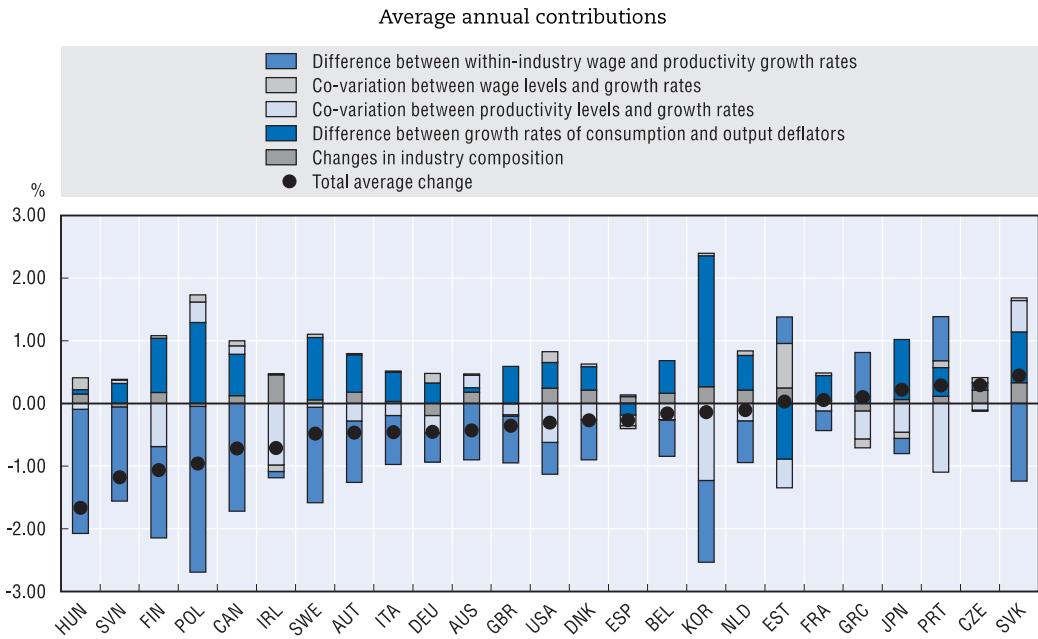
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growth of real hourly wages with respect to hourly productivity and their respective deflators (see Box 3.3). In Figure 3.6, percentage changes in the labour share are decomposed into the contributions of: i) within-industry average growth differences between real wages and productivity; ii) the differential growth of the consumption and value-added deflators; iii) the reallocation across industries (towards or away from high-labour-share industries);¹⁴ and iv) the correlations between *growth rates* and levels of real wages and productivity. The latter terms capture cross-industry convergence or divergence patterns of wages and productivity. In fact, if wages diverge – that is, larger growth rates occur in high-wage industries – aggregate wage growth will be faster and, *ceteris paribus*, the labour share will increase. By contrast, the converse holds for productivity.

In almost all countries, within-industries, hourly productivity grew faster than hourly wages between 1990 and 2007. Yet, in most of them, the price of domestic output – after deduction of the cost of inputs – increased less than the price of consumption goods and services, reflecting the fact that the quality of goods and services produced by the domestic business sector increased more, on average, than that of non-market services, fuel and imported goods.¹⁵ Nevertheless, in almost all countries for which sizeable within-industry falls in the labour share were observed during the period, the growth of real wages was significantly slower than that of productivity even taking into account the dynamics of relative prices (see Figure 3.4 above).

In a few of the many countries where the labour share declined (for example Germany, the United Kingdom and, especially, the United States), the slower growth of real wages was accompanied by greater growth of the consumption deflator than that of the value-added deflators. In other words, if measured using the same deflator, wages and

Figure 3.6. The role of real wage, productivity and prices in explaining trends in the business-sector labour share, 1990^a-2007^b



Note: Extended shift-share decomposition of the percentage change of the labour share in the business sector, partitioned in 20 industries, excluding agriculture, mining, fuel manufacturing and real estate. The wage of the self-employed is imputed assuming that in each industry their hourly wage is the same as for the average employee of the industry.

a) Germany and Hungary: 1992; Czech Republic, Estonia, Greece, Poland, Slovak Republic and Slovenia: 1995.

b) Canada: 2004; Korea and Portugal: 2005; Japan, Poland and Slovenia: 2006.

Source: OECD calculations based on EUKLEMS.

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productivity grew at the same rate, on average, in these countries. Yet, the labour share contracted in these countries because labour productivity grew faster in high-productivity industries while real wage growth was approximately homogeneous across industries (see Box 3.3). For example, in the case of the United States, productivity grew faster in financial intermediation and electrical and optical equipment, which have high nominal output per hour worked, while productivity growth was particularly small in construction. But wage growth differences were, on average, less striking. Even more impressive, this pattern of divergence of industry-level productivities explains the entire drop of the aggregate labour share in Ireland, where the average difference between within-industry growth rates of productivity and wages was small, on average, but the distribution of productivity growth was highly skewed towards industries with above-average productivity levels.

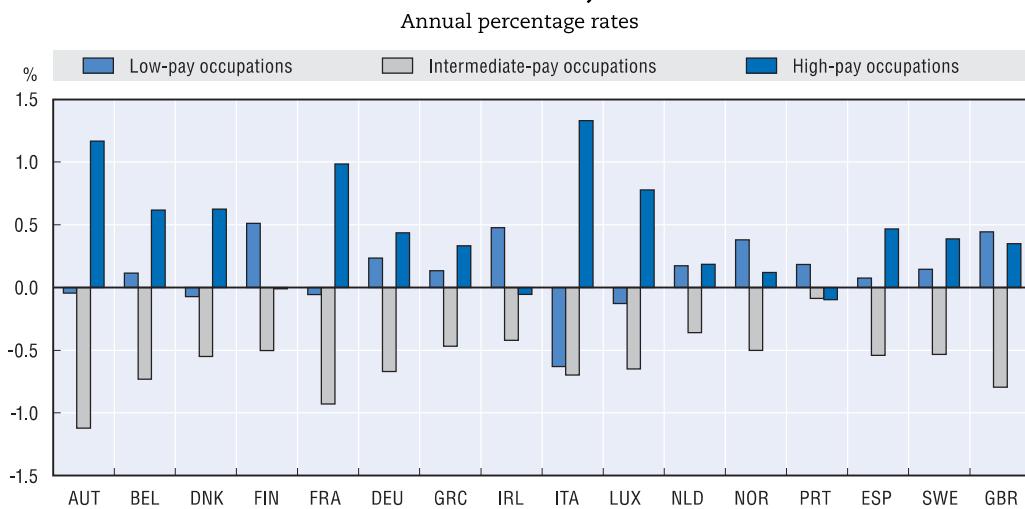
The deteriorating position of the low-educated

There is a substantial literature (starting with Berman et al., 1994) which suggests that skill-biased technological change has been exerting a downwards pressure on the share of the low-skilled in labour compensation during the past three to four decades. Recent contributions to this literature, however, qualify this statement and suggest that in some countries there has been a long-term polarisation of labour demand in terms of the skill content of jobs (see Autor et al., 2003; Spitz-Oener, 2006; Goos and Manning, 2007, for

extensive evidence concerning the United States, Germany and the United Kingdom, respectively). True, the share of the high-skilled in labour compensation, and notably that of managers and administrators as well as IT engineers, has increased enormously. But at the bottom of the wage distribution, employment has increased significantly in a number of elementary occupations, typically in low-paid jobs with precarious contracts in many countries. As a consequence, the share of those in low-skilled jobs has increased as well, while labour demand for medium-skilled occupations has fallen almost everywhere.

This tendency to job polarisation appears to have become the rule in most OECD countries at least since 1990. Figure 3.7 shows, on the basis of cross-country comparable data, that in most European countries employment in occupations that are typically characterised by an intermediate level of pay declined sharply between the early 1990s and the mid-2000s while, in other occupations, the number of jobs increased or decreased only mildly.¹⁶ A plausible explanation for job polarisation that is advanced in this literature is that technical change has essentially been biased towards non-routine tasks, while machines have increasingly replaced humans in routine tasks, whether manual or cognitive. Yet, another explanation for increasing job opportunities in low-skill jobs has to do with increasing labour market participation of women and the consequent substitution of low-skill market services for home production (Mazzolari and Ragusa, 2012).

Figure 3.7. Changes in the shares of different occupational groups in total hours worked, 1993-2006



Note: Annual growth of total hours worked in different occupations. Occupational groups are defined on the basis of their ranking in terms of average wages in each country over the period.

Source: Goos, M., A. Manning and A. Salomons (2009), "Job Polarization in Europe", *American Economic Review: Papers and Proceedings*, Vol. 99, No. 2, pp. 58-63.

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One striking fact that emerges from Figure 3.7 is that the growth rate of low-paying occupations was positive in most countries and even greater than that of high-paying occupations in almost one-third of the countries (Finland, Ireland, Norway, Portugal and the United Kingdom). Does this imply that the relative labour market position of the low-educated improved, at least in these countries? This conclusion would be hasty. As shown by Goos and Manning (2007), educational requirements in expanding low-pay occupations have increased substantially more than in any other occupation. Therefore, workers in

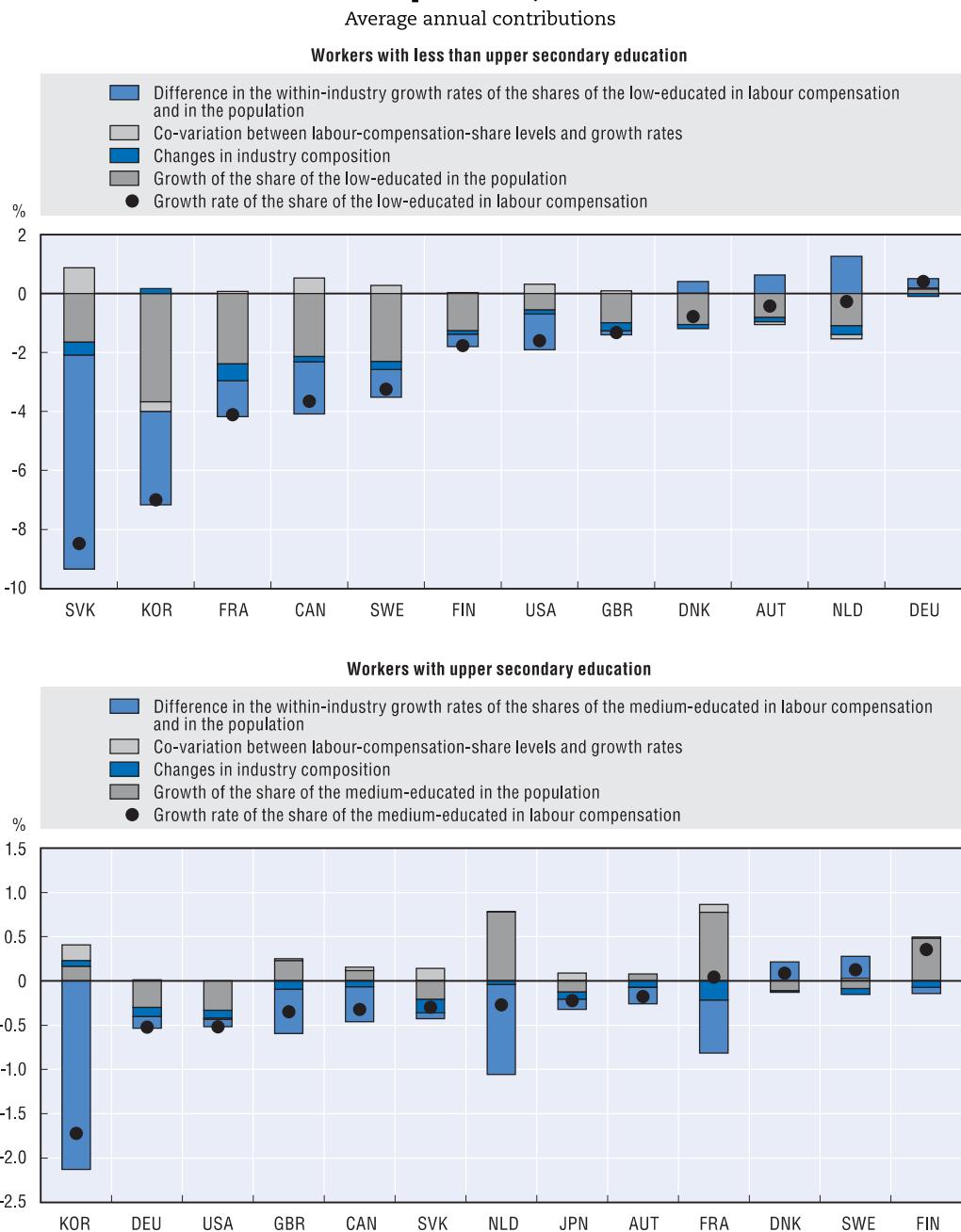
these jobs tend to be increasingly over-qualified, so that, more frequently, workers with intermediate level of educational attainment end up displacing workers with lower skills.

For the 13 countries for which comparable data are available, the share of those with low education¹⁷ in total labour compensation slumped between mid-1990s and mid-2000s (Figure 3.8). In that period, the share of the low-educated fell by 2.7% per year, while that of those with upper secondary education was approximately stable (decreasing on average by 0.3% per year).¹⁸ These changes are only partially matched by changes in the educational attainment of the working-age population.¹⁹ On average, the share of the low-educated in the working-age population fell by 1.5% per year while that of those with an intermediate level of education remained about stable. Particularly large declines in the share of the low-educated in labour compensation occurred in the Slovak Republic and Korea, with a fall greater than the decrease of the fraction of the low-educated in the population by 6.5% and 3% per year, respectively. By contrast, in countries with a dual-track vocational education system (Austria, Denmark, Germany and the Netherlands in Figure 3.8, see Mühlemann et al., 2009), the share of those with less than upper secondary education in labour compensation declined by less than the share of the same group in the working-age population. This confirms that at a level below upper secondary education, in these countries the vocational system delivers outcomes in terms of skill acquisition that appear to better equip workers to take advantage of changes in labour demand.

A shift-share analysis similar to that discussed in Box 3.3 (see OECD, 2012, for details on the methodology) reveals that the worsening position of the low-educated is due to the within-industry dynamics of their share in labour compensation (Figure 3.8).²⁰ This is true even if account is taken for the evolution of the share of each group in the population, except for countries with a dual track system and the United Kingdom. Reallocation across industries also contributes to explain the worsening position of the low-educated, but its role is modest except in France where reallocation away from industries with a high share of low-educated workers explains about 30% of the contraction that is not accounted for by changes in the population. Taken together, these pieces of evidence suggest that the labour market position of those with little or no education worsened significantly in OECD countries in the past two decades. This occurred in spite of job polarisation, because of greater competition for expanding low-skilled jobs from those with middle levels of educational attainment.

Overall, the evidence presented in this section suggests that reallocation across industries in recent decades has played only a minor role in explaining both the evolution of the labour share and its distribution. By contrast, the within-industry dynamics of the labour share appear to have been the main driver of aggregate trends in the past two decades. It is therefore essential to identify the determinants of within-industry variations in order to understand the evolution of the aggregate labour share. This is the objective of the next sections.

Figure 3.8. Decomposition of changes in the shares of different education groups in total compensation, 1997^a-2004^b



Note: Extended shift-share decomposition of the percentage change of the share of different education groups in total compensation in the business sector, partitioned in 20 industries, excluding agriculture, mining, fuel manufacturing and real estate.

a) Slovak Republic: 1999.

b) Japan: 2001; France and Netherlands: 2002; Austria, Denmark and United Kingdom: 2003; Korea: 2005.

Source: OECD calculations based on EUKLEMS.

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2. What explains the within-industry decline of the labour share?

Many different explanations have been suggested in the academic literature to account for the decline in the labour share in OECD countries. These explanations include an increase in capital intensity, enhancement of skill-biased capital-augmenting technical change, deregulation and privatisation, particularly in network industries, increased globalisation, and the decline of workers' bargaining power, whether related or not to the evolution of collective bargaining institutions and labour market policies and regulations. These different factors are analysed in this chapter within a unified framework adopting an industry-level approach (see Box 3.4).²¹ More precisely, this section quantifies the role of a number of factors that have been considered by the literature but are only indirectly related to labour market institutions. It discusses the main economic and quantitative implications of the econometric estimates concerning these factors, while the detailed estimates, sample definition and robustness checks are presented in Bassanini and Manfredi (2012). By contrast, the next sections focus more directly on the role of institutions and policies, and in particular on the role of the evolution of collective bargaining systems and workers' bargaining power.

The role of capital intensity and technical change

Recent academic work on the decline of the labour share has pointed to the role of capital accumulation and capital-augmenting technical change (see e.g. Bentolila and Saint-Paul, 2003; Arpaia et al., 2009; Driver and Muñoz-Bugarin, 2010; Raurich et al., 2012; Hutchinson and Persyn, 2012). Under standard assumptions, an increase in capital intensity – that is in the ratio of the volume of capital services to value added – is accompanied by an increase in both the capital-to-labour ratio and marginal productivity of labour, which results in greater wages. If capital and labour are complementary,²² the more than proportional rise in wages will compensate the decline in the ratio of labour to value added and the wage share will increase. However if capital and labour tend to be substitutable, the relative decline of labour with respect to value added will not be compensated by a sufficient increase in the wage rate. While, under standard assumptions and conditional on capital intensity, labour-augmenting technical change has no impact on the labour share,²³ capital-augmenting technical change would have the same effect as increasing capital accumulation, thereby reinforcing the effect of capital intensity (see Box 3.4). As a consequence, if capital and labour are gross substitutes and technical change is, at least partially, capital-augmenting, both growth in capital intensity and technical change will depress the labour share. Bentolila and Saint-Paul (2003) confirm this theoretical conjecture by estimating a specification derived from a standard production function, where a residual measure of efficiency – total factor productivity (TFP) – is included as a (noisy) proxy of technical change.²⁴ They find that the growth in capital intensity and TFP have both a negative impact on the labour share²⁵ and jointly over-predict its aggregate fall in OECD countries between 1972 and 1993.

The estimation of a similar model undertaken for this chapter (see Box 3.4) for a different period (1980-2007) yields qualitatively similar results, except for the somewhat smaller estimated effects (Figure 3.9). The estimates suggests that an increase of capital intensity by 1% would induce a within-industry reduction in the labour share by about 0.05 percentage points, while an increase in TFP by 1% would result in a contraction of the labour share of 0.14 percentage points. Taken at face value, they imply that between 1990

**Box 3.4. Explaining within-industry changes in the labour share:
Econometric methodology**

In a standard aggregative model of the economy – that is a model with an aggregate production function with labour and capital as factors of production, where technical change can be decomposed into neutral, labour-augmenting and capital-augmenting technical change, if labour and product markets are competitive, the labour share depends uniquely on capital intensity, the evolution of capital-augmenting technical change and the elasticity of substitution between capital and labour (e.g. Acemoglu, 2003; Bentolila and Saint-Paul, 2003). For instance, in the case of a CES production function, we have, in a closed economy, that the aggregate labour share F can be expressed as:

$$F_t = 1 - \alpha(B_t k_t)^\theta$$

where B represents capital-augmenting technical change, k the capital intensity – that is in the ratio of the volume of capital services to value added – and θ a function of the elasticity of substitution ρ ($\rho = 1 - 1/\theta$), which is negative when capital and labour are gross substitutes. It can be easily shown, by using a first-order Taylor approximation of $\log(1 - x)$, that this leads to:

$$F_t \approx \text{Const} + \theta \log B_t + \theta \log k_t \quad [1]$$

that can be used as a baseline to estimate the determinants of the labour share at the aggregate or industry-level.* Interestingly, [1] implies that the more capital is a gross substitute for labour, the more the increase in capital intensity and capital-augmenting technical change will depress the labour share. If labour and product markets are not competitive, then international and domestic product market competition and labour market institutions (including workers' bargaining power) will act as shifters of this relationship. In addition, cyclical fluctuations in union bargaining power, due for example to unemployment fluctuations, can cause additional departures from this relationship. This implies that the role of these factors can in principle be studied by including additional covariates.

The analysis of this chapter is based on [1], augmented by other explanatory and confounding factors and estimated using industry-level data. However, while k is observable in [1], although with some error, B is not. Nonetheless, as suggested by Bentolila and Saint-Paul (2003), one can approximate B with a measure of total or multi-factor productivity (TFP), which is supposed to capture both capital and labour-augmenting technical change. Indeed, insofar as the latter has no theoretical impact on F conditional on k , the estimated coefficient of TFP should give an indication of the direction and intensity of the impact of B . Obviously, the larger the proportion of neutral or labour-augmenting technical change, the less adequate is TFP as a proxy of capital augmenting technical change, and therefore the smaller its coefficient in estimated versions of [1]. The key difficulty with this approach, however, is that k and B are endogenous. For example, in the model of directed technical change by Acemoglu (2003), the incentives to innovate depend on the share of income paid to each factor, so that a decrease in the labour share encourages capital-augmenting technological change. Since, as in a standard growth model, there is no obvious instrument for k and B , a natural solution, adopted in this chapter when possible, is using GMM estimators (or lagged long differences when GMMs are not feasible). However, insofar as dynamic GMM estimators can be highly inefficient (and therefore strongly biased in small and medium samples), comparisons with standard fixed effects models are key, and fixed-effect estimates are preferred for inference when endogeneity biases appears negligible. Indeed, the consistency between different estimates is reassuring on their reliability. Finally, in order to keep the model tractable with GMM estimators, in order to control for all aggregate variables, country-by-time effects are systematically taken into account by de-meaning all variables, thereby avoiding the inclusion of a large number of co-variates in the specification. This implies that the estimated specifications would take the form (see Bassanini and Manfredi, 2012, for more details):

$$F_{ijt} = \beta \log TFP_{ijt} + \gamma \log k_{ijt} + X_{ijt} \delta + \eta_{ij} + \eta_{it} + \varepsilon \quad [2]$$

where TFP stands for a measure of level TFP whose changes can act as a noisy proxy for capital-augmenting technical change, X is a vector of other labour-share determinants and controls that vary by country i , industry j and time t , η are country-by-industry and country-by-time effects, ε is an error term and other

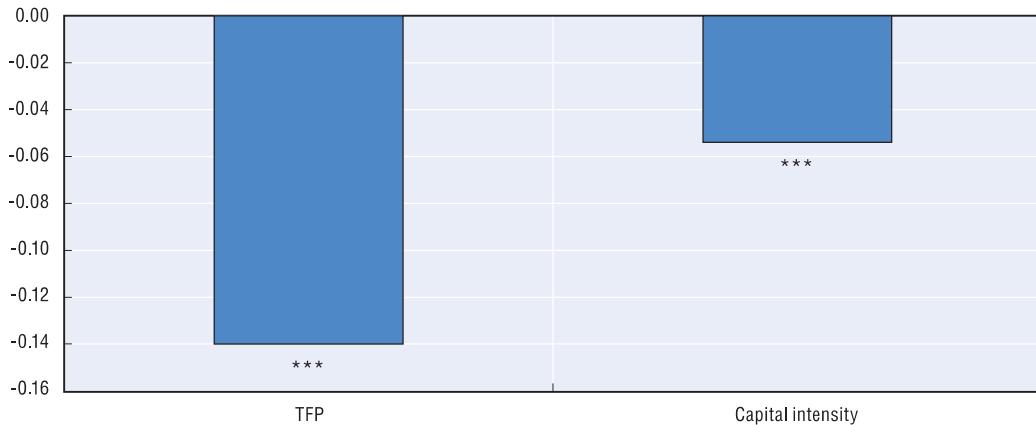
**Box 3.4. Explaining within-industry changes in the labour share:
Econometric methodology (cont.)**

Greek letters are parameters to be estimated. The disadvantage of this approach is that it does not allow identifying the effect of aggregate variables such as collective bargaining institutions, which in Section 3 are therefore explored in a more qualitative way. By contrast, following the approach pioneered by OECD (2007), the impact of certain labour market policies and institutions, such as dismissal regulations and the level of the minimum wage, can be analysed by looking at differences in their effects between industries in which they are more likely to be binding and other industries. For example, the industries where employment protection legislation concerning permanent contracts is more likely to be binding will be those where firms typically need to lay off workers to restructure their operations in response to changes in technologies or product demand and where, therefore, high firing costs are likely to slow the pace of reallocation of resources. In these industries, one can expect that dismissal regulations have the greatest impact on productivity and wages and, therefore, the wage share. By contrast, in industries where firms can restructure through internal adjustments or by relying on natural attrition of staff, changes in employment protection for open-ended contracts can be expected to have little impact. Similarly, the effect of the minimum wage can be identified by assuming that changes in minimum wages have a greater impact on wages and productivity in industries that are more heavily reliant on low-wage labour.

* [1] can be considered a reduced-form approximation if the aggregate production function is not CES.

**Figure 3.9. TFP growth, capital accumulation and within-industry decline
of the labour share**

Estimated percentage-point impact on the labour share of one-per cent increases in selected variables



Note: Estimated within-industry impact of a one-percent increase in total factor productivity (TFP) and the ratio of capital services to value added (capital intensity). ***: significant at the 1% level.

Source: Bassanini, A. and T. Manfredi (2012), "Capital's Grabbing Hand? A Cross-country/Cross-industry Analysis of the Decline of the Labour Share", OECD Social, Employment and Migration Working Paper, OECD Publishing, Paris, forthcoming.

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and 2007 the increase in capital intensity and TFP in OECD countries accounted, on average, for as much as 80% of the within-industry change of the labour share.²⁶

What explains this strong negative effect of technical change and capital accumulation on the labour share? One possible explanation has to do with the diffusion of information and communication technologies (ICTs) as a new general-purpose technology, which has created opportunities for unprecedented advances in innovation and invention of new (increasingly cheaper) capital goods and production processes. This

has boosted productivity but also allowed extensive automation of production and high substitution between capital and labour (see e.g. Greenwood and Jovanovic, 1999; Brynjolfsson and McAfee, 2011). This conclusion is confirmed by Arpaia et al. (2009) who, using a structural model, suggest that in the past twenty years, technical change was in fact *capital-augmenting*.²⁷ By contrast, they argue that the high degree of substitution between capital and labour was in fact due to high substitution between capital and low-skilled labour and complementarity between capital and high-skilled labour. Other scholars have advanced the possibility that, within this context, technical change could be *labour-replacing*, in the sense that technological progress takes the form of machines replacing tasks previously performed by labour. In turn, this would especially reduce job opportunities for low-educated workers and, in practice, dampen the aggregate productivity of low-skilled labour (see Zeira, 1998; Arthur, 2011; and the survey on machine-replacing-labour technical change in Acemoglu, 2011).

Both interpretations appear consistent with two additional pieces of empirical evidence. First, labour productivity growth has been associated with increases in the share of those with tertiary education in labour compensation and contractions of the shares of those with lower levels of education, and particularly those with less than upper secondary education. Second, decomposing further this association, ICT capital accumulation appears to have had an especially negative effect on the lowest educated, while TFP growth has affected particularly the share of those with intermediate education (see Bassanini and Manfredi, 2012). These two results taken together suggest that, in the period under analysis, technical change embodied in ICT capital was strongly biased against the low-educated, while disembodied technical change was strongly biased towards high-skilled labour. While the first result is fully consistent with the literature on skill-biased technical change, one possible explanation of the latter is that disembodied technical progress reflects embodiment in intangible capital (entrepreneurship, output from R&D departments, better management, high-performing human resource practices) – that is improvements that are essentially incorporated in highly-qualified personnel.

From a policy perspective, however, it is not possible with the available data to assess whether the negative relationship between technical progress and changes in the labour share is a long-lasting relationship or is specific to the past decades and will progressively disappear when the process of diffusion of ICT-based technologies slows down. On the one hand, the standard view in the theory of economic growth is that, in the long-run, capital and labour are complements and technical change augments the factor that cannot be accumulated (that is labour, see e.g. Acemoglu, 2002). Hence, capital-augmenting technical change and substitutability between capital and labour are likely to be only a temporary phenomenon due to the rapid diffusion of ICT-based technologies and related innovations. By contrast, within this view, to the extent that the skilled labour supply increases faster, thereby increasing incentives to create capital goods complementary to skilled labour, technical change would remain biased against the unskilled. On the other hand, a more pessimistic view considers that ICT has changed the nature of technological advances, making them more rapid but incorporated in machines whose main purpose is to replace jobs previously held by certain categories of workers (Brynjolfsson and McAfee, 2011; Acemoglu, 2011). If this were the case, most workers, and in particular the least educated, would find themselves in a “race against the machine”, thereby increasingly worsening their relative position.

The impact of international competition, offshoring and foreign direct investment

Another key factor shaping the OECD economies over the past decades has been the closer integration of labour and product markets. Technological changes and the progressive removal of cross-border restrictions to trade and capital flows have made it possible to locate production sites for both goods and services further away from the markets for final demand, while international migration has globalised labour supply. By allowing a fuller exploitation of economies of scale and comparative advantage through greater exports, this process of trade expansion has provided a boost to economic growth in OECD countries (see e.g. Felbermayr et al., 2011). Nevertheless, increased international competition has also raised competitive pressure on businesses located in the richest countries and reinforced the need for them to contain labour costs. Firms and activities unable to remain competitive either downsize and, eventually, disappear or delocalise to countries where relative labour costs appear more favourable. In the face of these pressures, workers might accept to contain their wage claims to save their jobs, while companies might increase the automation of the production process to remain competitive. There is indeed much evidence that increased import penetration from, and offshoring of production to, developing countries is associated with greater sensitivity of domestic labour demand to labour costs (see e.g. OECD, 2007; Hijzen and Swaim, 2010; Bloom et al., 2011).²⁸

The available but scant aggregate evidence suggests that declines in import prices have contributed to dampen the labour share in high-income countries, due to the fact that imports come increasingly from developing countries, and goods imported from these countries are typically labour intensive (e.g. Harrison, 2002; IMF, 2007).²⁹ To the extent that barriers to outward capital movements are limited and have decreased over time, greater import penetration is also likely to reflect delocalisation of production abroad while still serving domestic demand. For example ILO (2011) finds that the ratio of foreign assets and liabilities to GDP is negatively associated with the labour share in aggregate cross-country regressions. Aggregate analyses, however, do not allow taking into account potential endogeneity and controlling for a full list of confounding factors.³⁰ In this context, industry-level estimations performed for this chapter do not suggest any association between rising competition in domestic markets due to an increase in the penetration of goods produced abroad and the within-industry decline of the labour share. In fact, this decline is not found to be correlated with either changes in the relative price of imports with respect to domestic products or with measures of import penetration and trade exposure – defined as the sum of import penetration and export orientation³¹ – even when the possible endogeneity of the latter is taken into account (see Bassanini and Manfredi, 2012, for detailed estimates).³²

One needs to remain cautious, nevertheless, about drawing conclusions from these findings. Indeed, these estimates are likely to represent a lower bound on the true effect of fiercer import competition, if that effect is negative. In fact, competition for rich-country markets from firms producing in countries with low labour cost is likely to be particularly strong for domestic businesses whose production activity is intensive in low-skilled labour. If competition from low-cost foreign producers drives these businesses out of the market or forces them to relocate abroad, the industry will become relatively more skill-intensive. Conditional on capital intensity, this will probably push up the labour share in these industries, insofar as skilled labour's bargaining power is larger – as suggested by the empirical evidence (e.g. Cahuc et al., 2006).³³ By contrast, unskilled workers will be partially

re-employed in other industries – less affected by import competition – thereby driving down the labour share of these industries. As a consequence, to the extent that estimated effects are identified through cross-industry comparisons of within-industry differences, the estimated effects will tend to be upward-biased. Unfortunately, reliable data by skills or educational attainment are not available at a sufficiently disaggregated level to test for this hypothesis. Nonetheless, estimations performed for this chapter show that, in advanced economies, greater import penetration prompts reallocation of resources away from affected industries and towards either other domestic industries or countries with lower labour costs (see Bassanini and Manfredi, 2012). The finding that industry downsizing is more important in industries with the largest increase in import penetration is consistent with the above argument and, therefore, provides some confirmation of the likely upward-bias of within-industry estimates of the impact of import competition on the labour share.

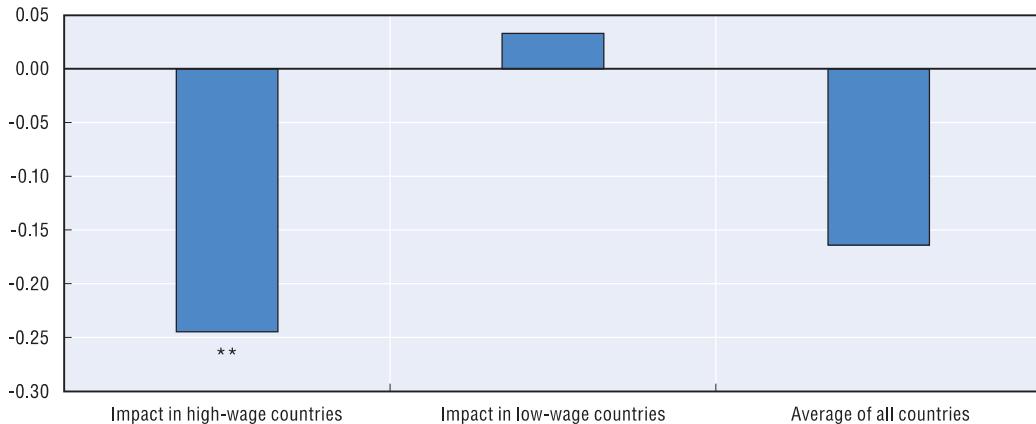
In addition, the growth of import penetration appears more important in industries that are typically characterised by a high labour share (see Bassanini and Manfredi, 2012). This implies that larger trade-induced reallocation away from these industries resulted in a fall in the share of these industries in aggregate value added, thereby contributing to a decline in the aggregate labour share. For example, between 1990 and 2007 the rise in the penetration of manufacturing imports and the induced pattern of cross-industry reallocation are estimated to explain a decline in the labour share in manufacturing of 0.1 percentage points, on average, in countries with real wages above one half of the US level (high-wage countries hereafter). This corresponds to about 3% of the whole contraction of the manufacturing labour share in high-wage countries. The effect is statistically significant although small.

Competition from abroad for the market of finished goods is not the only channel through which globalisation can exert influences on the labour share, however. For example, domestic companies can outsource abroad part of the production chain or threaten to do so – particularly the production of unskilled-labour-intensive intermediate inputs – as a strategy to cope with labour-cost pressures. Aggregate evidence suggests that offshoring of intermediate stages of production is negatively related to the labour share (Jaumotte and Tytell, 2007). At the industry-level, OECD (2007) and Hijzen and Swaim (2010) find that intra-industry offshoring (defined as the ratio of imported same-industry inputs to domestic output) is negatively associated with labour demand and positively associated with its wage elasticity. Industry-level estimates performed for this chapter suggests that delocalisation of intermediate stages of the production process, as measured by intra-industry offshoring (defined as in OECD, 2007), exerts a small but significant downward pressure on the wage bill relative to value added (Figure 3.10). Between 1995 and 2005, intra-industry offshoring in manufacturing increased by 0.8 percentage points on average in the high-wage countries for which data are available. This change is estimated to have induced the labour share to decline by about 0.2 percentage points. As the average decline in the labour share in these industries was about 3 percentage points during this period, this implies that the rise in intra-industry offshoring can account for about 7% of the within-industry reduction in the labour share.³⁴

If delocalisation of production activities abroad exerts a downward pressure on wages and labour demand, one could expect that inward foreign direct investment (FDI) would have a more positive impact on workers. Indeed, foreign takeovers are usually estimated to raise wage growth in the acquired firm. Moreover, there is evidence in the literature of wage spillovers from FDI to other domestic firms, even if less so for unskilled workers in

Figure 3.10. Intra-industry offshoring and within-industry decline of the labour share

Estimated percentage-point impact on the labour share of a 1-percentage-point increase in intra-industry offshoring



Note: Estimated within-industry impact of a 1-percentage-point increase in the ratio of imported same-industry inputs to domestic output. High-wage countries are those where the average gross hourly wage in purchasing power parity was equal or above 50% of the US wage rate in 1997. ** significant at the 5% level.

Source: Bassanini, A. and T. Manfredi (2012), "Capital's Grabbing Hand? A Cross-country/Cross-industry Analysis of the Decline of the Labour Share", OECD Social, Employment and Migration Working Paper, OECD Publishing, Paris, forthcoming.

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rich countries. However, in these countries, the impact of takeovers on employment levels in the acquired firm tends to be negative and there is evidence that job destruction is greater in subsidiaries that are geographically far from headquarters (see e.g. Driffeld and Girma, 2003; OECD, 2008b; Landier *et al.*, 2009; Hijzen *et al.*, 2010). The estimations performed for this chapter suggest that regulations making inward FDI more difficult tend to depress the labour share, even though the statistical significance of the effect depends on the countries included in the sample (see Bassanini and Manfredi, 2012, for detailed results).³⁵ This implies that deregulation of inward FDI might have helped to contain the decline in the labour share, although more research is needed on this issue.³⁶

Overall, globalisation plays a role in driving the contraction of the labour share. There is some evidence that within-industry increases in offshoring tend to reduce the labour share, while competition from foreign firms in domestic markets tends to induce structural changes that have an adverse effect on the aggregate labour share.³⁷ The sum of these two effects accounts for at least 10% of the observed decline of the fraction of national income appropriated by workers.

The influence of rising product market competition and privatisations

Pro-competition regulatory reform, involving privatisation of state-owned enterprises (SOEs) and reduction in barriers to entry was one of the most extensive policy-induced institutional changes that OECD countries experienced in the past decades. As these reforms have been shown to have a clear positive impact on growth and negative impact on prices (e.g. Nicoletti and Scarpetta, 2003), workers benefited from these reforms in the form of higher real wages.

Economic theory suggests, however, that the wage share is larger in government-controlled companies. There is indeed evidence that entrenched managers with low profit

stakeholders (and weak budget constraints) care about their company's level of employment either to minimise conflicts or to increase their influence on the society (see e.g. Bertrand and Mullainathan, 2003; Atanassov and Kim, 2009). Moreover, one can expect managers of SOEs to be influenced by political pressures to maintain inefficiently high employment levels (e.g. Bertrand et al., 2005). In both cases this leads to a larger wage share in SOEs, so that their privatisation is likely to result in a decline of the labour share (Azmat et al., 2012).³⁸

By contrast, in a standard theoretical model with homogenous firms and workers, deregulation of barriers to firm entry is expected to increase the labour share (see for example Blanchard and Giavazzi, 2003). This is because greater competition in the product markets decreases the rents accruing to the firm and, thus, the surplus that is shared with the workers. However, price mark-ups are typically estimated to be greater than wage mark-ups – that is the wedge between the bargained wage and the reservation wage, so that the nominal wage bill should decrease less than nominal value added and the wage share should increase.

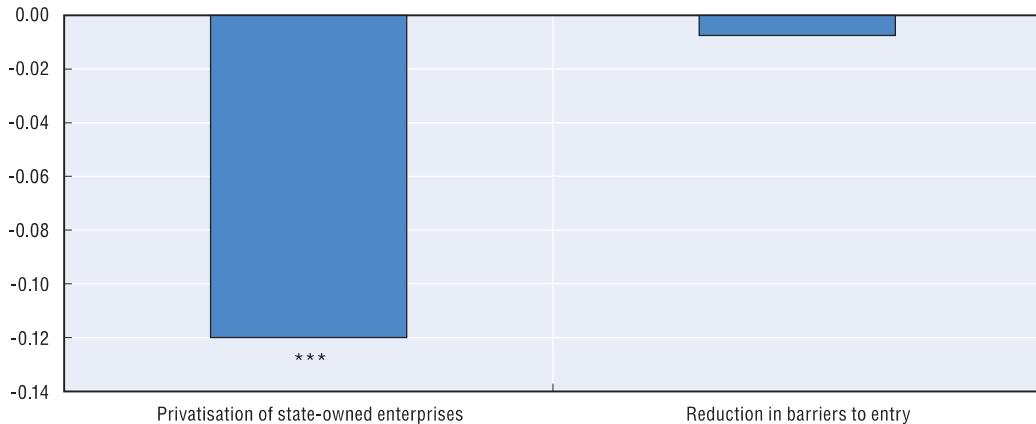
The impact of barriers to entry and public ownership on the labour share is analysed empirically in this chapter, by looking at the relationship among these three variables on a sample of network industries (such as energy, transport and communications) in 25 OECD countries between 1980 and 2007 (see Bassanini and Manfredi, 2012, for detailed estimation results). The restriction of the analysis to these industries is due to data availability, since long time series of OECD indicators on industry-specific regulations and public ownership are available only for these industries. Nevertheless, they are industries that were characterised by strict regulations and much government control in the 1980s and early 1990s, but underwent massive pro-competitive liberalisation thereafter (see Wölfl et al., 2009). They also are among the industries that experienced the greatest fall in the labour share (see Figure 3.5). Therefore, these industries provide an interesting “testing ground” to study the effect of deregulation and privatisation on the labour share.

The empirical analysis that has been carried out for the chapter confirms the theoretical prediction that public ownership is positively associated with the labour share (Figure 3.11).³⁹ Taking the most reliable estimates at face value, the results suggest that the average reduction in public ownership observed in network industries between 1990 and 2007 in OECD countries (about 0.1 points per year of the corresponding OECD indicator) yielded a within-industry decline in the labour share by about 0.12 percentage points per year.⁴⁰ Put it another way, these findings suggest that the large-scale privatisation of network industries can explain about 33% of the decline of the labour share in these industries.

How relevant is the impact of privatisations on the evolution of the labour share for the whole business sector? Network industries accounted on average for 15% of the business sector's value added in this period. Therefore, assuming that privatisations did not contribute to the decline of the labour share outside network industries, the measured reduction of public ownership in these industries already accounts for about 5% of the contraction of the labour share in the whole business sector. What is more, in many countries, sales of government shares in SOEs was not confined to network industries.⁴¹ Therefore, even if one needs to be cautious about extending the findings for network industries to other industries, the true impact of privatisations on the decline in the business sector's labour share may well have been larger than what the figures above

Figure 3.11. Privatisation, reduction in entry barriers and within-industry decline of the labour share

Estimated percentage-point impact on the labour share of a 0.1-point reduction of selected regulation indicators



Note: Estimated within-industry impact of privatisations and reductions in entry barriers in network industries on the labour share, based on estimated coefficients for the period 1990-2007. Changes in OECD indicators of public ownership and anti-competitive regulations are used to measure regulatory reform. These indicators vary between 0 (no public ownership or anti-competitive regulations) and 6 (maximum stringency of regulations). The average annual reduction in public ownership and barriers to entry were 0.10 and 0.22 points per year, respectively, in 1990-2007. ***: significant at the 1% level.

Source: Bassanini, A. and T. Manfredi (2012), "Capital's Grabbing Hand? A Cross-country/Cross-industry Analysis of the Decline of the Labour Share", *OECD Social, Employment and Migration Working Paper*, OECD Publishing, Paris, forthcoming.

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imply. However, to the extent that the scope of further shrinking of government control is now limited, as a result of earlier privatisations, one would expect some slowdown in the pace of the decline in the aggregate labour share through this channel.

By contrast, the empirical estimates do not suggest any impact of lessening barriers to entry on the labour share (see Figure 3.11). This might suggest that increased product market competition was accompanied by offsetting reductions in the bargaining power of the average worker. The evidence on the decline of workers' bargaining power will be discussed in the next section.

3. Collective bargaining, workers' bargaining power and the labour share

Due to the lack of appropriate data describing collective bargaining arrangements at the industry level, the type of quantitative analysis carried out in the previous sections cannot be undertaken on the role of collective bargaining institutions for the decline of the labour share. This section will thus provide a more qualitative assessment on this issue. First, have collective bargaining institutions evolved in a way that reduces the bargaining power of workers and thus their stake in rent-sharing with employers? The rationale for the formation of unions arises from the asymmetry in contracting between individual workers and employers regarding both access to information and bargaining power. Labour laws provide framework conditions for collective bargaining to emerge so as to rebalance the bargaining power between employers and workers. Hence, all else equal, compared with a situation in which only individual contracts prevail, the more developed collective bargaining is, the higher the bargaining power of workers is likely to be.⁴² Second, are there other factors, not directly related to collective bargaining institutions, which have

weakened the bargaining power of workers and thus affected the outcomes in terms of rent-sharing?

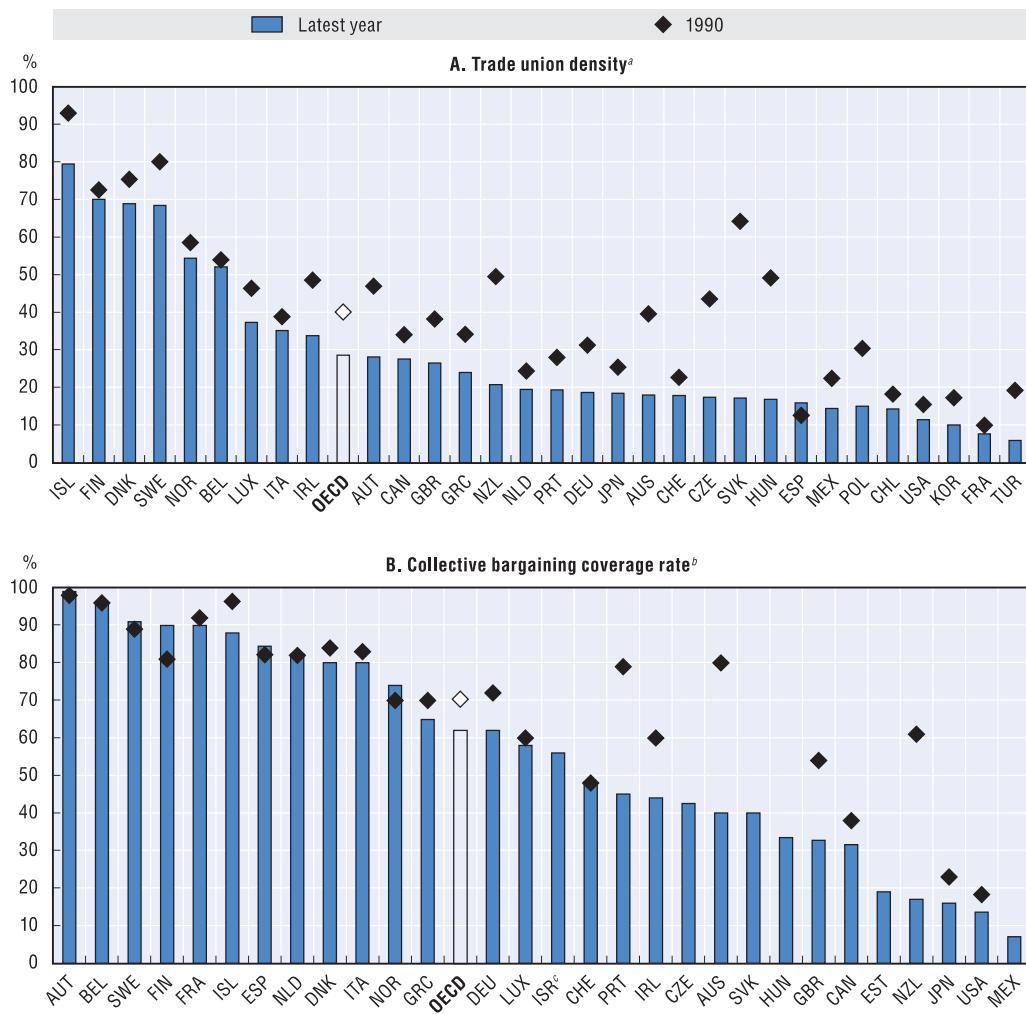
Trends in trade union density and bargaining coverage

Trade union density and collective bargaining coverage rates are two standard indicators used to assess the bargaining power of workers and the extent of collective bargaining. Trends in trade union density in OECD countries since 1990 are rather clear cut, as declines are observed in all OECD countries but Spain (Figure 3.12, Panel A). However, the size of the decline varies significantly across countries. The decline was relatively limited in Belgium, Finland, France, Italy, the Netherlands, and Norway. Overall, though, a majority of countries experienced significant declines. The largest reductions occurred in Central and Eastern European countries, which have had to build up new structures of industrial relations in a short period of time after the transition to a market economy, but also in Australia and New Zealand, which experienced significant deregulation of collective labour relations on which governments partially reversed course more recently (Hayter et al., 2011). Only in the Nordic countries and Belgium did more than half of all employees belong to a trade union at the end of the 2000s.

Apart from possible institutional reforms, a number of structural factors may also have contributed to the decline of trade union density to various extents across countries. High unemployment, relatively persistent in some countries, makes it more difficult for unions both to recruit members and to successfully conduct collective actions. Structural changes involving a reduction in the share of manufacturing and an increase in the share of services in total employment eroded the traditional membership base of trade unions in many countries (Hayter et al., 2011). Privatisation of public utilities/infrastructure and services tended to have the same effect, as trade union membership is generally significantly higher in the public than in the private sector.⁴³ The increase in the use of part-time, temporary and contract workers in most countries also changed the nature of employment relations in a way that makes it more difficult for trade unions to recruit members. Temporary workers are much less likely to be union members than those on open-ended contracts, and their organisation and representation in collective bargaining remain very difficult. Sub-contracted workers have no possibility to negotiate with those with the real power over the contracting process, and thus have no interest to join the establishment's trade unions (Wills, 2009).

In the case of collective bargaining coverage, the evolution since 1990 is more contrasted across countries (Figure 3.12, Panel B), and in many cases does not reflect the relatively strong decline observed in trade union membership (Figure 3.13). This is because the percentage of workers covered by collective agreements itself depends on the interaction between various institutions: the level of trade-union membership; the bargaining structure – in particular the importance of multi-employer bargaining and the density of employers' associations when multi-employer bargaining prevails; and the role the state plays in promoting collective bargaining and extending collective agreements to employers and employees not affiliated with the bargaining parties. Countries with widespread multi-employer bargaining and/or legal extension mechanisms, such as Austria, Belgium, France, Finland, Germany, Italy and Spain, all have relatively high collective bargaining coverage rates which are significantly higher than their union density rates. Changes in these various institutional features also explain the evolution of collective bargaining coverage rates.

Figure 3.12. Trade union density and collective bargaining coverage, 1990 and latest year



Note: Trade union density refers to the number of trade union members as a percentage of wage and salary earners; the collective bargaining coverage rate refers to the number of workers covered by wage bargaining agreements as a proportion of all wage and salary earners (employees excluded from bargaining rights have been removed from both the numerator and denominator).

a) Data for the latest year refer to 2010 for: Australia, Austria, Canada, Estonia, Finland, Germany, Italy, Japan, Mexico, New Zealand, Poland, Portugal, Sweden, United Kingdom and United States; 2009 for Belgium, Chile, Czech Republic, Denmark, Ireland, Norway, Spain, Switzerland and Turkey; and 2008 for France, Greece, Hungary, Luxembourg and Slovak Republic. Data refer to 1995 instead of 1990 for Czech Republic and Hungary; 1992 for Mexico; and 1994 for Slovak Republic.

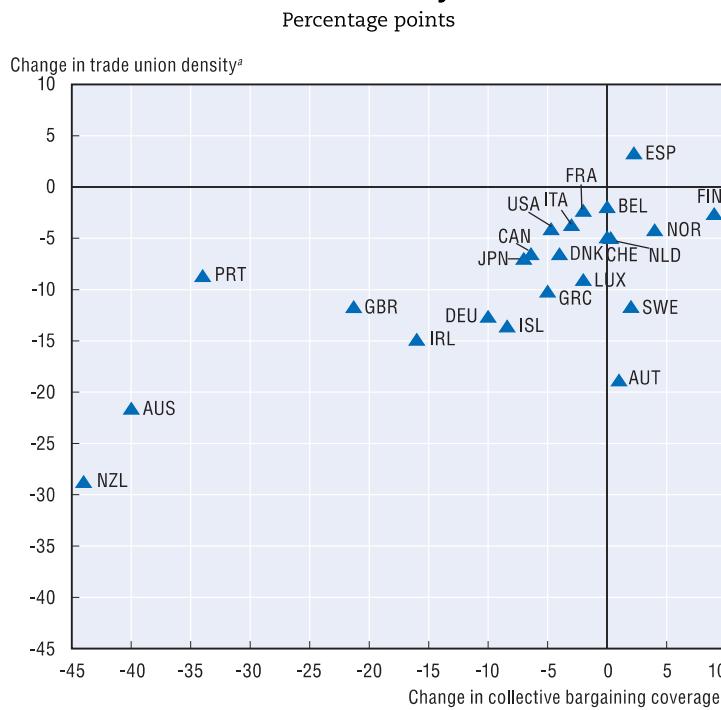
b) Data for the latest year refer to 2009 for Austria, Canada, Czech Republic, Estonia, Germany, Italy, Portugal, Slovak Republic, United Kingdom and United States; 2008 for Belgium, France, Greece, Iceland, Ireland, Japan, Luxembourg, Mexico, Netherland, Norway, Spain, Sweden and Switzerland; and 2007 for Australia, Denmark, Finland and New Zealand. Data refer to 1991 instead of 1990 for Sweden and Switzerland; 1989 for Iceland. As data for Czech Republic, Hungary, Israel, Mexico and Slovak Republic are available for the latest year only, these countries are not included in the OECD average.

c) Information on data for Israel: <http://dx.doi.org/10.1787/888932315602>.

Source: OECD Database on Trade Unions; Visser, J. (2011), "Database on Institutional Characteristics of Trade Unions, Wage Setting, State Intervention and Social Pacts", 1960-2010(CTWSS), Version 3.0, May, www.uva-aias.net/208.

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Figure 3.13. Change in trade union density and in collective bargaining coverage, 1990 and latest year^a



a) See Figure 3.12 for precise information on years.

Source: OECD Database on Trade Unions; Visser, J. (2011), "Database on Institutional Characteristics of Trade Unions, Wage Setting, State Intervention and Social Pacts", 1960-2010(CTWSS), Version 3.0, May, www.uva-aias.net/208.

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Since 1990, collective bargaining coverage has increased in two Nordic countries, Finland and Norway, and has been relatively stable in Sweden and in a majority of continental European countries (Figure 3.12, Panel B). In Austria and Sweden, these developments are in striking contrast with the strong decline in trade union density experienced over the same period (Figure 3.13). In all of these countries, multi-employer bargaining arrangements prevail and union and/or employees' rights to bargain are firmly established, and these institutional features experienced no significant change in that period.

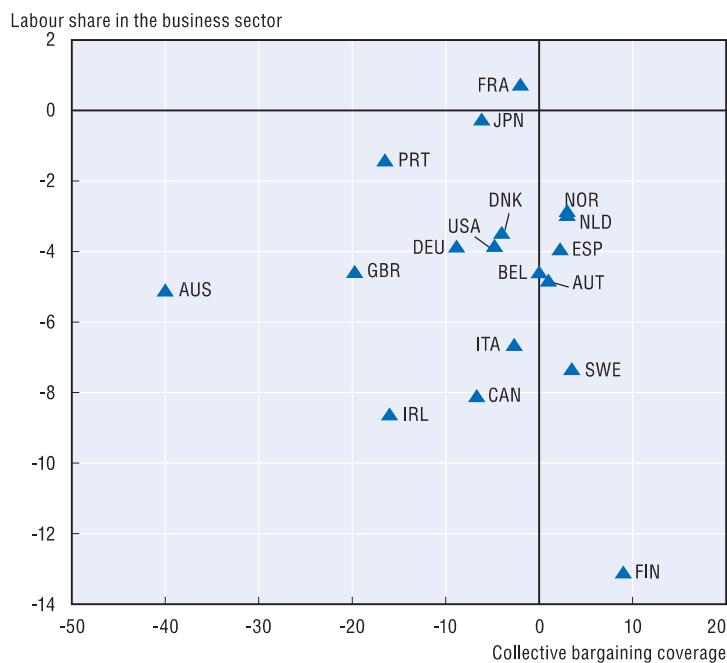
On the other hand, many countries experienced significant declines in collective bargaining coverage over that same period. The strongest declines were observed in countries which implemented radical reforms of their collective bargaining framework, such as New Zealand and Australia, where the systems switched from being dominated by sectoral agreements or awards – in the case of Australia – with common extension to one dominated by firm-level bargaining. The strong decline in collective bargaining coverage in the United Kingdom also results from a series of reforms which started in the 1980s and continued in the early 1990s.⁴⁴ In Portugal, the huge drop in collective bargaining coverage is due to the coming into force of a new labour code in 2009, which significantly increased the bargaining power of employers and facilitated their withdrawal from existing collective agreements (EIRO, 2011). Second, declines were also observed in countries in which collective bargaining at the firm level prevails and is applicable only to sites where unions have established their representativeness. Logically, these declines were in line with those

observed in trade union density, relatively small in the United States, Canada and Japan, and larger in Ireland.⁴⁵ Finally, collective bargaining coverage also decreased significantly in Germany, where multi-employer bargaining prevails and no reform of collective bargaining institutions was passed. This is due to the combination of an increasing share of employees under non-standard employment contracts such as mini-jobs, a reduction in the participation of employers to employers' associations, and a continuous decline in the extension of sectoral collective agreements.⁴⁶

To sum up, although collective bargaining coverage remains high in Nordic countries as well as in some continental European countries, there is a trend towards a decreasing number of workers covered by collective agreements in the OECD, and thus an increasing share of employees whose wage is fixed at the individual level. Nevertheless, a straightforward comparison of the trends in labour share in the business sector and those in collective bargaining coverage shows no clear correlation (Figure 3.14). Notably, some of the largest decreases in the business-sector labour share occurred in countries where collective bargaining coverage increased or decreased only slightly, such as Finland, Sweden and Italy.

Figure 3.14. Evolution of labour shares and bargaining coverage

Change between 1990-92 and 2005-07 in percentage points



Source: OECD calculations based on OECD STAN, EUKLEMS and Visser, J. (2011), "Database on Institutional Characteristics of Trade Unions, Wage Setting, State Intervention and Social Pacts", 1960-2010(CTWSS), Version 3.0, May, www.uva-aias.net/208.

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The evolution of bargaining structures

One reason for the absence of correlation between the labour share and the collective bargaining coverage, which can be taken as measuring the "quantity" of bargaining, may lie in the "quality" of bargaining and its evolution. Has the structure of collective bargaining

institutions evolved in a way that contributed to diminish the share of value-added accruing to workers between 1990 and the years preceding the global financial crisis?

As noted above, Australia and New Zealand are the only countries which experienced radical change in their type of collective bargaining systems since 1990. As a result, Australia and New Zealand now form part of the group of countries in which collective bargaining is very decentralised, taking place mostly at the firm/establishment level, and where there is no or little attempt or possibility to co-ordinate wage negotiations among the various actors. This group also includes Canada, Japan, Korea, Poland, the United Kingdom and the United States (Table 3.1). Sectoral agreements still exist in these countries, but mostly in the public sector or in a few specific business sectors. In the other OECD countries, changes in collective bargaining systems have taken place mostly within the existing institutions, through incremental reforms or changes, with various degrees of government involvement.

Central agreements to overcome co-ordination failures

In a number of European countries where sectoral bargaining was playing a major role, governments pushed in the 1990s for the (re-)emergence of agreements at the national level. The implementation of such agreements is very much linked to the European economic integration process. Although economic internationalisation and financial liberalisation was taking place in many countries and regions, market integration was particularly deep within the European Union, bringing workers in the various countries into competition with each other. In addition, monetary integration ruled out external adjustment via the exchange rate to compensate for losses in national competitiveness, and, starting from 1999 for EMU countries, the use of monetary policy instruments to adjust to asymmetric shocks. As a result, the burden of adjustment to economic imbalances and shocks shifted increasingly onto the labour market.⁴⁷ Some European countries had centralised and/or co-ordinated collective bargaining systems allowing for high responsiveness of wages to shocks. For example, in Austria, Denmark and Germany, wage negotiations in the exporting sectors set the rule for the rest of the economy, a form of co-ordination called pattern bargaining. In other European countries, however, the co-ordination of collective bargaining was not developed enough for wages to adjust in face of high inflation or external deficits, or high unemployment, thus prompting government intervention to reach agreements at the central level (Hassel, 2006; Traxler and Brandl, 2010).

Overall, since 1990, nine European countries implemented central-level collective agreements with wage provisions.⁴⁸ Wage restraints were sometimes obtained in these pacts in exchange for tax cuts (Finland and Ireland) and/or improved benefits to the workers (Finland). In Belgium, the Netherlands and Sweden, agreements were reached under the threat of government intervention to freeze wages in case of failure to agree. Compared with previous agreements at the central level, these agreements took less and less the form of formal contracts enforceable by law and relied more on guidelines and targets. By and large, they achieved their aim of shifting workers' wage expectations and delivering wage moderation.⁴⁹

Increased decentralisation to provide more flexibility

At the same time, in most OECD countries, the role played by collective negotiations at the firm/establishment level has increased, leading to a significant decentralisation of collective bargaining systems since 1990. While the process often started in the 1980s for

Table 3.1. Structure of collective bargaining systems: Bargaining levels and co-ordination
Second half of the 2000s, before the crisis

Dominant level*		Central (1)	Sectoral (2)	Extension	Derogations	Local (3)	Change in dominant level since 1990	Co-ordination type
Central	BEL	xxx	xx	xxx	x	x		xxx State-imposed
	IRL ^b	xxx	x	x	xx	xx		xxx Tripartite
Sectoral	AUT		xxx	x		x		xxx Pattern bargaining
	DEU		xxx	x	xxx	xx		xxx Pattern bargaining
	ESP	x	xxx	xx	x	x		xxx Inter-associational
	FIN		xxx	xx	x	x	2 → 1, 1 → 2, 3	xx Intra-associational
	GRC ^b	x**	xxx	xx		x		xx Inter-associational
	ITA ^b		xxx		x	x		xxx Inter-associational
	NLD		xxx	xx	xx	x		xxx Pattern bargaining
	NOR	x	xxx	x	x	x		xxx Pattern bargaining
	PRT		xxx	xx		x		xx Intra-associational
Company/établissement	AUS ^a		x			xxx	2 → 3	
	CAN		x			xxx		
	CZE	xx		xx		xxx		x Intra-associational
	DNK	xx				xxx	2 → 3	xx Pattern bargaining
	FRA	x	xx	xxx	x	xxx	2 → 3	x Intra-associational
	GBR		x			xxx		
	HUN	x	x	x	x	xxx		x Tripartite
	JPN					xxx		x Intra-associational
	KOR		x			xxx		
	POL	x**	x		x	xxx		
	SVK	xx		x		xxx	1, 2 → 3	x Intra-associational
	SWE	xx				xxx	2 → 3	xx Pattern bargaining
	USA		x			xxx		

Note: x = low ; xx = medium ; xxx = high, qualifying the relative importance for bargaining levels and the importance of co-ordination. The table should be read by line, as it describes the relative importance of the various bargaining levels and of the extension of, and derogation from, sectoral agreements within each countries. It is not meant to provide an assessment of the relative importance of a given bargaining level across countries.

* 1 refers to central level of bargaining, 2 to sectoral and 3 to local.

** In Greece and Poland, the central level of bargaining serves only to fix the minimum wage.

a) Collective bargaining systems incurred significant changes in Greece, Ireland and Italy after the start of the global financial crisis; they are not included here as they are not relevant for the period under study in this chapter.

b) In Australia, "awards" passed by Fair Work Australia prevail at the sectoral level, which are not real collective "agreement", as trade union and employer organisations are simply consulted. They apply to the whole sector. Company level agreements cannot be overall less favourable than sectoral ones, but the various elements can be traded against one another (e.g. wage for working time).

Source: OECD Secretariat based on various sources detailed in Annex 3.A1.

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bargaining over working-time reduction, it has since extended to matters of pay. Three main factors can explain this tendency towards decentralisation (Visser, 2004). First, due to increased international competition, the ability of sectoral agreements to promote the creation of a level-playing field and the prevention of low-wage competition – traditionally considered as one of their main advantage for both social partners – has vanished. Second, changes in the nature of firms' activities such as the growing importance of non-price developments favours company-specific human resource management, while the diversification of business activities leads to a growing mismatch between sectoral agreements and the activities of the firm. Finally, stronger international competition increases the importance for firms to be able to react speedily to wage competition from foreign firms, a flexibility that firm-level agreements allow (see Section 2 above).

Decentralisation has taken place at different degrees across countries and in different ways. The various institutions have mutated to increase flexibility and autonomy in the determination of pay and conditions at the firm level, but this has not necessarily meant institutional convergence (Howell and Colins Givan, 2011). The depth of decentralisation depends on the coverage of firm-level agreements as well as on the extent to which they matter in the determination of wages compared with higher level collective agreements. In Denmark, France and Sweden, firm-level agreements can now be considered to be the dominant level in wage determination (Table 3.1).⁵⁰ The decentralisation process has been organised by social partners in Denmark and Sweden, while it was initiated by the state in France.⁵¹ In the other European countries, while it did not imply a change in the dominant level of bargaining, firm-level bargaining also gained in importance in wage-setting.

Decentralisation has taken place in three main ways: i) sectoral agreements increasingly include derogation clauses, allowing firm-level agreements to depart from sectoral agreements in specified cases; ii) instead of setting standard wage increases, sectoral agreements increasingly provide a framework for firm-level agreements; and iii) the share of variable pay, by definition negotiated at the firm level, has been growing.

In general, firms covered by a multi-employer agreement should observe what is called the favourability principle, meaning that firm level agreements should be more favourable to employees than higher-level agreements. While this principle still held in 2009 in the Czech Republic, Finland, Greece, Portugal and the Slovak Republic, in the other European countries, the inclusion of derogation clauses in sectoral/central level collective agreements had become increasingly frequent, especially in Germany, Ireland and Spain. Derogation clauses are of two types: “hardship” or “inability-to-pay” clauses allow temporary deviations from these agreements for firms facing economic difficulties; more general “opening” or “opt-out” clauses can be invoked either by firms that cannot afford to meet the general standard, especially small and medium-sized enterprises, or by firms facing threats to future competitiveness and possible relocations of investment and production sites (Visser, 2004). Actual use of these clauses has increased significantly in Germany.⁵² Although to a lesser extent, the “inability-to-pay” clause included in the central agreements since 2003 has also been regularly used in Ireland (van Klaveren, 2011). In other countries, the use of derogation clauses remains more limited (Table 3.1).

Besides derogation clauses, the substance of sectoral agreements has also been changed in many cases, leaving much more room for firm-level bargaining on wages. In some cases, the determination of average wage increases still takes place at the sectoral level, but the decision on how to distribute wage increases among employees is left to firm-level bargaining. This is a very common practice in Denmark and Sweden, and exists in Austria, Belgium, Germany and Italy. In the Netherlands, a large share of employees is covered by sectoral agreements which leave the possibility to make choices at the firm level between pay and working time. In the Czech Republic, Denmark, and the Slovak Republic, industry-level agreements increasingly tend to set minima while actual wage increases for the rest of the pay scale are negotiated at the firm level. This is also occasionally the case in Spain.

What is the evidence concerning the possible effects of decentralisation on the labour share? A few empirical studies have looked at the effects of different bargaining regimes on wages, wage dispersion and rent-sharing, using matched employer-employee datasets. Exploiting transitions from one regime to another, wages negotiated at the firm level are

found to be higher in Denmark than those negotiated under sectoral agreements, but also significantly more dispersed, and returns to education significantly higher (Dahl et al., 2011). Decentralisation of wage bargaining would thus be one factor explaining the deterioration of low-skilled workers position noted above. Gürtzgen (2010) and Rusinek and Rycx (2008) looking respectively at Germany and Belgium, find that wages are much more responsive to firm-level profits under firm-level bargaining than under sectoral bargaining, and that rent-sharing is thus higher.

Overall, centralisation and co-ordination of wage bargaining appear to have contributed to contain wage increases when needed on the one hand, while decentralisation seems to have increased the link between wages and local performance on the other. However, the links between wage-bargaining regimes and their evolution and changes in labour share across countries are not straightforward. Countries where the labour share has dropped significantly, for example, had different bargaining regimes (centralised in Finland and Ireland; already fully decentralised in Canada, increasingly decentralised in Sweden; centralised and intermediate but co-ordinated in Italy).

A shift of bargaining power away from workers

One reason explaining why trends in the labour share cannot be strictly related to the type of collective bargaining structure nor to its evolution may be that other factors, in particular the increased domestic and international competitive pressures (see Section 2) and domestic and international financial liberalisation and the associated change in corporate management – often referred to as financialisation, in addition to having driven the changes in collective bargaining institutions described above, also reduced the bargaining power of workers across the board (i.e. whatever the collective bargaining regime). From a theoretical point of view, all other things equal, this reduction in workers' bargaining power implies a reduction in the labour share (see e.g. Bentolila and Saint-Paul, 2003).

While they tend to reduce the size of the rent that employers and workers share, by increasing the substitutability of employees, globalisation and increased international competition also affect bargaining in the workplace and thus the rent-sharing between employers and workers (see e.g. Rodrik, 1997): imports increase the substitution between domestic and foreign workers and hence reduce workers' bargaining power, while the increasingly credible threat to relocate activities abroad improves the position of employers in bargaining. In other words, the increasing mobility of goods and capital shifts the threat points in the bargaining game over the dwindling economic rents. A number of empirical studies using firm-level data confirm that imports and offshoring have tended to deteriorate the bargaining power of workers over the past two decades (Box 3.5).

The deregulation of product or service markets, often combined in practice with privatisation, is also affecting the bargaining power of workers. Privatisation shifts the objective function of the managers from one that includes the employment level to one that concentrates exclusively on profits. When combined with increased product market competition, privatisation reduces the size of the rent as well as the bargaining power of workers in the sector. It usually leads to a two-tier system with a relatively stable bargaining structure at the level of the incumbent firm and a rather decentralised and fragmented bargaining structure with low bargaining coverage at the level of the new competitors (Schulten et al., 2008; see Box 3.5 for some empirical evidence).

Box 3.5. Empirical evidence on globalisation and increased competition and workers' bargaining power

Globalisation

Looking at Belgium, France, Germany, Italy and the United-Kingdom over the 1990s, Dumont et al. (2005) find that increased globalisation with both low-wage and high-wage countries, as measured by imports and the importance of foreign affiliates, has reduced the bargaining power of workers. Boulhol et al. (2011) find that imports from developed countries have significantly contributed to their estimated decrease in both mark-ups and workers' bargaining power in the United Kingdom. Abraham et al. (2009) also find that import competition put significant pressure on mark ups and bargaining power in Belgium, but especially when coming from low-wage countries. However, considering workers as a homogeneous group might be misleading, because, as consistent with the findings of Section 1 above, low-skilled workers can be expected to be most affected by globalisation. Dumont et al. (2012) indeed find that the bargaining power of low-skilled workers in Belgium declined in the 2000s, while that of high-skilled workers increased. They establish a significant negative effect of import competition from low wage countries as well as from offshoring on the bargaining power of low-skilled workers.

Increased competition and privatisation

Brown et al. (2008) find that both trade union density and collective bargaining coverage declined more rapidly in UK privatised industries than in the rest of the private sector in the two decades following privatisation. There is also evidence that, when firm-entry increases due to lifting entry barriers, workers in entrant firms are typically less unionised and have less bargaining power than workers with long job tenure in incumbent firms (e.g. Hirsch, 1988; Bamber et al., 2009). Therefore, labour reallocation from the former to the latter might lead to a reduction of average bargaining power. This is confirmed empirically by Böckerman and Maliranta (2012). This mechanism may explain why no correlation is observed between reduction in entry barriers and the labour share in network industries (see Section 2 above): the reduction in bargaining power offsets the positive effect of the decline in mark-ups.

Although less studied, the role that financialisation played in lowering workers bargaining power should not be understated either. In addition to boosting the financial sector, the deregulation of formerly highly regulated financial markets has also had important consequences for the non-financial economy, mainly through the spread of the doctrine of shareholder value maximisation as a principle of corporate governance. Grounded in agency theory, the spread of the shareholder value thesis in the 1970s and 1980s in the United States and United Kingdom and the 1990s in most other OECD countries was fostered in practice by the rise of institutional investors⁵³ that benefited from the lifting of legal restrictions that previously limited the extent to which corporate equity could be added to their portfolios (Duenhaupt, 2011). The threat of takeover together with the development of stock options has aligned the interests of managers to that of shareholders. The time horizon of investors is generally short,⁵⁴ and that of managers has consequently shortened. Combined with the fact that acquisitions, such as for example leverage buyouts (LBOs),⁵⁵ are often financed with a significant amount of borrowed money, this forces cost reduction and divestments or outsourcing to be able to reduce debt while at the same time generating high short-term profits. Firms thus switch from the principle of “retain and invest” – retain earned income and employees and re-invest in

physical and human capital – to a “downsize and distribute” strategy which is significantly weakening workers’ bargaining power (Lazonick and O’Sullivan, 2000).⁵⁶

Social and labour market reforms, sometimes passed without the consent of or discussion with social partners, might also have contributed to a weakening of workers’ bargaining power. Increased competitiveness constraints have led a number of countries to facilitate the use of temporary-agency work or fixed-term contracts, and allow the development of atypical contracts, such as for example mini-jobs in Germany. In those cases where it contributes to increased labour market dualism, the development of such non-standard contract is likely to reduce workers’ bargaining power. At the same time, reforms in the welfare state to reduce access and levels of welfare benefits for those out of work (unemployment benefits, disability, social assistance, etc.), are likely to have lowered the reservation wage of workers.

All these pressures on workers bargaining power are likely to have contributed to the decline in trade union membership and collective bargaining coverage, and appear to have induced trade unions to change their objective function. Instead of negotiating wage increases reflecting productivity trends or the preservation of real pay or pay equality, trade unions may increasingly be internalising the competitive constraints and the likely effects of their wage claims on employment.⁵⁷ This is likely to be true in sectoral/national negotiations, and perhaps even more so at the local level, where concession bargaining has become frequent.⁵⁸

Increased competitive pressures and the associated decline in workers bargaining power may also help explain the trend towards decentralisation. As a result of the changing economic and political context, many of the benefits which employers traditionally perceived multi-employer bargaining to have offered may no longer appear as valuable. Employers are likely to feel less need of the protection from trade union pressure to shape the wage-effort bargain within the workplace. Besides, lower levels of unionisation and of bargaining coverage reduce the capacity of centralised agreements to deliver benefits in terms of the internalisation of external wage costs, thus probably reducing their interest for social partners (Visser, 2005). In turn, increased decentralisation may weaken the bargaining power of trade unions if it makes it more difficult for trade unions to hold centralised union structures together.⁵⁹ The fact that low-skilled workers have lost bargaining power while high-skilled workers may have improved theirs also increases the difficulty for trade unions to hold a united group of workers together and keep promoting wage compression (Acemoglu et al., 2001).

As the importance of collective bargaining institutions and their protective power for workers has eroded, legal protections for workers have become increasingly important. In many countries, such as Ireland, the UK, Denmark and Sweden, the dominant source of regulation has shifted away from voluntary self-regulation at the collective level to formal individual rights enforced through the courts (Visser, 2005). The combination of increased competitive pressures – especially on the low-skilled – and the decreasing role of collective bargaining institutions can also explain the introduction or increase of a legislated minimum wage in some OECD countries, such as Australia, Ireland, New Zealand and the United Kingdom. However, although statutory rights may be helpful for trade unions as they establish a floor on which collective bargaining can build, there are probably limits to what they can achieve in terms of protecting workers while preserving efficiency (see below).

4. Minimum wages, employment protection and the labour share

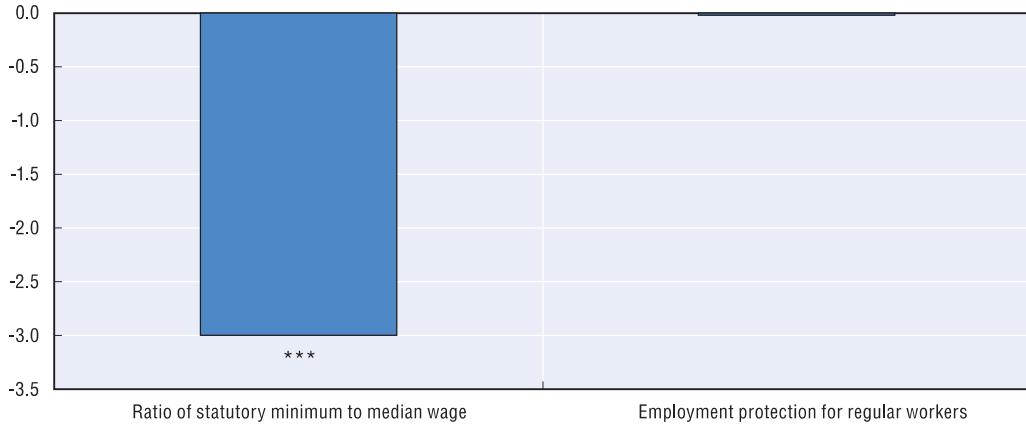
Evidence presented in the previous sections suggests that in the two decades preceding the crisis, rapid TFP growth and capital-deepening, reflecting capital-augmenting technical change, were among the most important factors explaining the within-industry decline of the labour share. Beyond collective bargaining institutions, discussed in the previous section, other labour market policies have affected the relative price of capital and labour, and are therefore also likely to have played a role in this process. For example, in the past ten years, the ratio of statutory minimum to median wages has increased by about 2 percentage points, in countries where statutory minima exist. In addition, in a number of countries where collective bargaining coverage declined significantly, statutory minimum wages were implemented or significantly raised as a means to fight in-work poverty (*e.g.* Australia, Ireland, New Zealand and the United Kingdom; see the previous section). In turn, however, this might have induced firms to overinvest in labour-saving innovation (see *e.g.* Boone, 2000), thereby lowering the labour share.

Exploiting the likely cross-industry differences in the impact of the minimum wage on productivity and wages, it is possible to identify the impact of statutory minimum wages on the labour share, using the same methodological framework adopted in Section 2 (see Box 3.4). Estimations performed for this chapter suggest that, in the short-run, an increase in the statutory minimum wage relative to median wages is reflected in a substantive increase of prices, wages and nominal value added, so that no significant short-run effect on the labour share is estimated. However, in the long-run, the evidence suggests that firms react by increasing efficiency levels and productivity beyond the wage increase, leading to a decline in the labour share (Figure 3.15; and OECD, 2012, for detailed methodology and estimates). These patterns are likely to result from the fact that higher minimum wages tend to induce greater investment in capital-augmenting innovations – prompted by the need to offset the increase in labour costs, as suggested by Boone (2000) – and firm-sponsored training – whose benefits, in imperfect labour markets, cannot be easily reaped by trained workers. In fact, by compressing the lower tail of the wage distribution without necessarily affecting individual productivity prior to training, minimum wages could increase employers' incentive to pay for training as they can reap the difference between productivity and wage growth after training (see *e.g.* Acemoglu and Pischke, 1999 and 2003; Arulampalam et al., 2004). Once the infrastructure for training is in place – that is, the fixed cost has been paid, it is likely to be used also for workers paid above the minimum, in particular if the quality of training can only be imperfectly signalled and valued on the external labour market, so that most of the productivity gains from training accrue to the firm.

The overall quantitative impact of minimum-wage increases on the wage share is, however, small. Taking estimates at face value, raising the ratio of the statutory minimum to median wages by 10 percentage points – roughly corresponding to one standard deviation of the cross-country distribution, would result in a 3% contraction of the labour share in the average industry in the subsequent ten years (Figure 3.15). But a 10-percentage point increase of this ratio is very large in historical perspective. Between 2000 and 2010, the ratio of minimum to median wages increased by barely 2 percentage points, on average, in the countries where statutory minima exist. The estimates would therefore imply that the cumulated impact of these increases has been responsible for an average contraction of the labour share by 0.2 percentage points.⁶⁰ Nevertheless, these results

Figure 3.15. Minimum wages, employment protection and the labour share

Estimated percentage impact on the labour share of the average industry of an increase of selected policy indicators by one standard deviation, cumulated effect over the subsequent ten years



Note: Estimated effect of an increase in the ratio of the statutory minimum to median wage by 10 percentage points and an increase in the indicator of stringency of employment protection for regular workers by 1 point. Both effects are cumulated over a ten-year period following the policy change. Effects are derived from difference-in-difference estimates and are computed, in the case of the minimum wage, with reference to an industry with an average incidence of low-educated labour (in the United Kingdom before the introduction of the statutory minimum wage) and, in the case of employment protection, with reference to an industry with an average rate of dismissals (in the United States) for the minimum wage and employment protection, respectively. *** significant at the 1% level.

Source: OECD (2012), "Labour Losing to Capital" – supporting material for Chapter 3 of the 2012 OECD Employment Outlook, OECD Publishing, Paris, available online at www.oecd.org/employment/outlook.

StatLink <http://dx.doi.org/10.1787/888932651769>

suggest that large increases in the minimum wage might have the unexpected effect of reducing the fraction of national income that is appropriated by the *average worker*, even though the position of the lowest paid might improve.

Employment protection regulations can also affect the labour share. Indeed, stringent dismissal regulations might worsen the employer's bargaining position, thereby improving bargaining outcomes for incumbent workers. There is clear evidence in the literature that employment protection for regular workers negatively affects productivity growth (see e.g. Autor et al., 2007; Bassanini et al., 2009). By contrast, evidence concerning the impact on wages is more mixed.⁶¹ The possible difference between the effects of dismissal regulations on productivity and wages suggests that their reform might have a negative impact on the labour share. However, there is little research on this issue. The main exception is Checchi and García-Péñalosa (2008), who estimate a standard aggregate cross-country/time-series model for OECD countries, and find no impact of employment protection on the labour share controlling for other institutions.

Following standard approaches in the literature, likely differences in the impact of firing restrictions across industries with different propensities to adjust on the external labour market can be used for identification of the effects of dismissal restrictions within the same industry-level approach used throughout this chapter (see Box 3.4). Estimations suggest that reforms relaxing employment protection do boost TFP growth and productivity (see OECD, 2012, for detailed results). It is also found that the impact on real wages is limited. However, the productivity effect of relaxing dismissal regulations is by and large reflected in lower growth of output prices, once adjustments for quality are made. This pattern is probably due to the fact that those industries in which dismissal regulations are more likely to be binding are downsizing manufacturing industries where

product market competition is typically high and dissipates rents arising from efficiency increases. By contrast, the impact on nominal value added growth is limited so that the overall effect on the labour share is close to zero (Figure 3.15).

Conclusions

This chapter has investigated the evolution of the labour share at the aggregate and industry level, with a special attention to the past twenty years. In most OECD countries, the labour share declined throughout this period, even though the recent economic crisis marked a temporary pause in this trend. The contraction of the labour share is common to most industries of the business sector and does not appear to be driven by structural shifts in the industry composition of the economy. However, not all workers experienced the same decline of labour compensation, measured as a fraction of national income. The wage share of top income earners increased in many countries for which data are available. At the same time, the position of the lowest educated worsened, in spite of rising employment at the bottom end of the skill ladder. In addition, those at the bottom of the earnings distribution are very unlikely to have much capital income, which reinforces the impact of this trend on the increasing dispersion of the income distribution (see OECD, 2008a, 2011a).

What explains these divergent patterns and, more generally, the decline of the labour share? The chapter shows that the pressure arising from delocalisations and increasing competition from firms producing in countries with low labour cost can account for at least 10% of the overall decline of the labour share. Privatisation of state-owned enterprises, albeit associated with significant productivity improvements, also led to a decline of the labour share. These developments are also likely to be linked to the weakening of collective bargaining institutions and of workers' bargaining power.

Labour-saving – or even labour-replacing – technical change, induced by continuous innovation in ICT-based technologies, was one of the most important forces behind the decline of the labour share. Even though the decline in the labour share was often associated with capital accumulation and stronger productivity growth, the average worker benefited from the faster economic growth induced by this process, which made average labour incomes grow in real terms, although at a less rapid pace than capital income. However, the unequal distribution of both labour and capital income growth that went hand-in-hand with the decline of the labour share suggests that these trends might jeopardise social cohesion. Moreover, to the extent that less wealthy people tend to have a higher consumption propensity, the shift of income away from low earners might also have a negative impact on aggregate demand, which might undermine the strength of the recovery.

Slowing down technical change and globalisation to achieve a more equal distribution of factor shares would not be a wise choice, however. Governments can sometimes intervene with effective industrial policies in order to modify the direction of technical change through tax incentives and subsidies. For example, Criscuolo et al. (2012) evaluate the UK Regional Selective Assistance programme, which was designed to co-finance labour-intensive investment projects of firms in depressed areas. According to their estimates, which take into account potential endogeneity, the programme has created many unskilled jobs in a cost-effective way with small deadweight losses. However, the scope of these interventions on a broader scale is limited insofar as they might distort

reallocation of resources and depress growth in the long-run. As a much more promising strategy on a large scale, governments can intervene by helping workers acquiring more skills in order to enable them to win the “race against the machine”. For example, countries could consider policies to increase their investment in education, particularly if targeted at the rate of school drop-out and better matching skill acquisition to firm demands.

In addition, the tax and transfer system can play an important redistributive role so as to contain the reflection into household disposable income of observed increases in market income inequality without necessarily interfering with economic growth (OECD, 2011a and 2011b). The growing share of income going to top earners suggests that this group now has a greater capacity to pay taxes than before. In this context governments may wish to reassess the redistributive role of taxation to ensure that wealthier individuals contribute their fair share of the tax burden. As suggested by OECD (2011a), this re-examination should not necessarily be confined to raising marginal tax rates on income, which might not be the most effective measure to raise tax revenues but should include efforts for better tax compliance; rationalising those tax exemptions that disproportionately benefit higher income groups; and reassessing the role of taxes on all forms of property and wealth, including their transfer.

Notes

1. As prominent news media put it, “the economic pie is growing, but [...] the share of income produced in the country that is flowing to workers’ bank accounts has been steadily shrinking” (*New York Times*, online edition, 2 February 2012); “pay for ordinary workers has not kept up with economic growth and rising company profits” (*BBC4, Analysis*, 20 February 2012), so that the general perception is that “capitalists are grabbing a rising share of national income at the expense of workers” (*The Economist*, 10 February 2005).
2. For example, *The Economist* contended just before the onset of the crisis: “Are workers getting smaller shares but larger slices? Yes” (*Economic Focus*, 4 April 2007).
3. The labour share is defined as the share of national income that is received by workers, be they employees or self-employed, in the form of labour compensation.
4. Three-year moving averages at the beginning and the end of the period are used to filter out short-term fluctuations.
5. See Bassanini and Manfredi (2012). This halt of the labour share’s decline during 2008-09 is likely to be temporary, however. In fact, there is evidence that, at least in European countries, the labour share in the non-financial business sector resumed its trend decline in 2010 (Eurostat, 2011). A decline was also observed in the United States in 2010 (Bureau of Economic Analysis, 2011).
6. Factor shares in the public sector are difficult to measure due to the often imprecise estimates of the value added of the public administration in national accounts.
7. Norway experienced a large decline in the labour share of the whole economy (see Figure 3.1), which is however largely due to the offshore expansion of the oil industry. In fact when mining and fuel are excluded, no significant variation appears (Figure 3.3).
8. The most striking example of expansion of low-wage-share industry is that of the real estate industry, which is however excluded from the analysis of the business-sector labour share presented in this chapter.
9. However, in these two countries, the magnitude of the between component is sensitive to the choice of weights (see Box 3.3 and Figure 3.6).
10. Results similar to those presented in this section are obtained if the analysis is repeated for a time window spanning from the early 1970s to the late 2000s for countries for which long time series are available.
11. This resulted in large growth of the share of this industry in business-sector output, which grew at about one quarter of a percentage point per year during that period.

12. Nevertheless, one needs to be cautious in interpreting these figures since value added is particularly difficult to measure in this industry.
13. The relative stability of the labour share in low-tech manufacturing appears to be essentially due to the large contraction of their value added and, therefore, should not be interpreted as evidence of stability of labour demand. In fact, being in addition typically labour-intensive, these industries appear to have contributed significantly to the between component of the shift-share decomposition (see also Section 2).
14. Discrepancies between Figure 3.6 and Figure 3.3 essentially come from the fact that hours worked rather than value-added shares are used in the decomposition of Figure 3.6. As a result, the large between components in Korea and Denmark disappear.
15. Nevertheless, quality-adjusted deflators for many non-market services (such as those of the public administration) are often of poor quality, and therefore the actual gap between the growth of price deflators might be smaller in many countries.
16. These statistics are based on an average ranking of occupations according to their average wage level in the countries reported in Figure 3.7. See Goos et al. (2009) for more details.
17. In this chapter low, medium and high education refer to less than upper secondary, upper secondary and more than upper secondary education, respectively.
18. These figures are likely to represent an underestimate of the true reductions, because compensation shares by educational level in EUKLEMS – the source of these data – are not computed on the basis of national accounts but rely on surveys, such as labour force surveys, in which wage data are typically top-coded. To the extent that the incidence of top-coding is likely to be greater for those with tertiary education, the shares of those with less than tertiary education end up being overestimated.
19. The greater the degree of substitutability of different types of workers, the greater is the effect of their relative supply in determining their shares in labour compensation. For example, if the elasticity of substitution across workers with different educational attainment is close to 1, the evolution of education shares is independent from the supply of different types of labour. However, if workers with different skills were perfectly substitutable and relative productivity were constant (with high-educated workers being more productive than low-educated workers by a constant factor), the evolution of the shares by educational attainment will simply match the trends in the relative size of each subpopulation. Adjusting labour shares by level of education for the relative supply of workers of different types represents therefore an interesting benchmark: if the share of one group falls by more than its reduction in the population, this suggests that the position of that group worsened, no matter what assumption is made on the substitutability across groups.
20. Due to data limitations, the analysis is based on a coarser partition of the business-sector.
21. The evolution of the demographic structure of the population can also affect the labour share to the extent that workers tend to be paid below their productivity when they are young. Due to lack of suitable data, this factor is left aside in the analysis. However, to the extent that the ageing of the workforce is widespread in OECD economies, this channel should rather serve to slow the decline of the labour share.
22. In terms of the aggregate production function discussed in Box 3.4, capital and labour are gross complements if their elasticity of substitution is smaller than 1 and gross substitutes if their elasticity of substitution is greater than 1.
23. For example, if returns to scale are constant and factors are remunerated at their marginal productivity, the labour share can be written as the product of the marginal productivity of labour and the amount of labour divided by output. This relationship holds also if labour is expressed in efficient units (that is employment multiplied by the parameter expressing labour-augmenting technical change). But if labour is expressed in efficiency units, the ratio of labour to output and the marginal product of labour can be written as a sole function of capital intensity. In other words, labour-augmenting technical change cannot shift the relationship between capital intensity and the labour share. It can be shown that departures from perfect competition in the labour market do not alter this conclusion (see Bentolila and Saint-Paul, 2003).
24. Their specification is close to that presented in Box 3.4, except that they do not control for any time or country-by-time effects.
25. This is consistent with capital and labour being gross substitutes as found in a number of studies based on aggregate data (see for example Masanjala and Papageorgiou, 2004). The seminal paper of Berndt (1976) also finds elasticities of substitution greater than 1, although insignificantly so.

More generally, however, estimated elasticities of substitution reported in the literature can vary from significantly smaller to significantly larger than 1 (see e.g. Antràs, 2004).

26. On average, the growth rates of TFP and capital intensity were 1.3% and 0.8% per year, respectively, between 1990 and 2007 in the countries for which data are available.
27. Similar conclusions are also drawn by Guscina (2006) and Hutchinson and Persyn (2012) on the basis of cross-country/time-series estimates.
28. By contrast, the impact on structural unemployment is more ambiguous (see e.g. Trefler, 2004; Felbermayr et al., 2011).
29. Inflows of immigrants and adverse shocks on export prices are also found to have a similar effect on the labour share in the literature (e.g. IMF, 2007; and Jaumotte and Tytell, 2007). Due to the identification strategy adopted here, however, the contribution of these two channels cannot be estimated.
30. IMF (2007) and Jaumotte and Tytell (2007) use lagged levels of endogenous covariates as instruments. However, to the extent that the effect of covariates might occur with some lags, there are reasons to suspect that the orthogonality condition required for instrument validity might not hold with lagged levels.
31. More precisely, import penetration is defined as the ratio of imports to apparent demand and export orientation as the ratio of exports to domestic output.
32. This result is consistent with findings of OECD (2011a), which using aggregate data finds that neither rising trade integration nor financial openness had a significant impact on either wage inequality or employment trends in OECD countries. Yet, problems of potential endogeneity are not addressed in that study.
33. There is also some evidence that the bargaining power of high-skilled workers might increase with import penetration while that of the low-skilled declines (see Section 3).
34. What is more, in contrast with the previous literature, these estimates take into account the possibility of reverse causality and are robust to a number of robustness checks (see Bassanini and Manfredi, 2012, for details). Again, however, as companies are more likely to offshore unskilled segments of the production chain (see Jaumotte and Tytell, 2007; and Antonietti and Antonioli, 2011, for some evidence), these estimates should be considered a lower bound to the true effect.
35. The effect of regulation of inward FDI is insignificant in the full sample of countries, but becomes significant at the 1% level upon the exclusion of France.
36. By contrast, as the literature suggests that benefits from FDI in advanced economies tend to be captured by skilled workers (see Drifford and Girma, 2003; OECD, 2008b), deregulation of inward FDI might contribute to explain the rising share of high-educated workers in total compensation. However, given the lack of available data, this issue cannot be further investigated here.
37. Although the effect of trade and, more generally, globalisation could be indirect (occurring through the effect of globalisation on productivity), the estimated effects of trade variables, offshoring or inward FDI are not sensitive to the inclusion of TFP, capital intensity or labour productivity in the regressions, which suggests that indirect effects are minor.
38. The fact that the company's value function is positively related to both profits and employment makes the labour demand curve shift outward: for any given level of the wage, employment is larger. At the firm level this implies a larger wage share and, in equilibrium, lower wages and greater employment than the combination that would maximise profits.
39. The estimated impact of privatisation is not affected by the inclusion of TFP, capital intensity or labour productivity in the regressions, which suggests that indirect effects (occurring through the effect of privatisation on technical change and capital accumulation) are small.
40. This estimated effect of public ownership appears almost twice as large in the 1980s. But in order to derive the implications for trends in the labour share in that period, one needs to take into account that the pace of privatisations was three times less rapid. The difference in estimated effects across the two periods is probably due to the evolution of governance rules for SOEs. In particular, while it is likely that in the 1980s different objectives from profit-maximisation were pursued by SOEs managers, this is probably much less the case for firms that were still under government control in the 2000s, when SOEs were often asked to behave more like private-for-profit firms.

41. For example, in the 1990s, the privatisation of Iri – the largest Italian holding – and its subsidiaries involved a reduction of public ownership in several industries including, financial intermediation, construction, real estate and food manufacturing.
42. In the standard theoretical literature, bargaining between employer and employees is typically represented as the maximisation of a surplus function, which is defined by the firm value added, the outside options or threat points of the two parties, and a parameter of division of the rent. The latter defines the share of the rent that will accrue to the worker. If employees negotiate individually with the employer, competition among workers will drive the division parameter to zero so that the employer becomes the residual claimant and workers are simply paid their reservation wage (Farber, 1986).
43. Cross-country data on trade union density in both the private and public sector are not available. Blanchflower (2006) finds that in Canada, the United Kingdom and the United States, union membership rates were three to four times higher for public sector workers than for private sector workers in the mid-2000s. In France, the same ratio amounted to three in the first half of the 2000s (DARES, 2008).
44. The reforms greatly restricted and controlled trade union activity and thus union's ability to conduct effective collective negotiations (Davies and Freedland, 2005).
45. Collective agreements at the central level have also played an important role in wage setting in Ireland, but collective bargaining coverage relates to the firm level. The decline of trade union density and bargaining coverage is partly associated with union avoidance practices of multinationals at new sites, in a country where attracting FDI has been a priority over the period studied (Lamare et al., 2009).
46. Unlike in other countries, extensions have to be approved by a committee where trade unions and employers are equally represented (Bispinck et al., 2010).
47. This was reinforced by the adoption by the European Central Bank of the German model of restrictive monetary policy, targeting low inflation. See Hassel (2006) and Keune (2008).
48. This is the case of Belgium, Finland, and Ireland over the past two decades, Italy, Portugal, the Netherlands, Norway and Sweden in the 1990s mainly, and Spain in the 2000s only.
49. This was accomplished through various modalities across countries: the elimination of automatic indexation mechanisms (Finland and Italy); wage freezes (Finland and Sweden); the introduction of ceilings on wage increases explicitly linked to cost competitiveness vis-à-vis the main trading partners (Belgium and Norway), sometimes under the form of a legislated formula based on pay developments in the main trading partner (Belgium); wage increases based on expected inflation (Italy and Spain); and/or recommendations to keep wage increases negotiated at lower levels in line with productivity developments (Ireland, Italy, the Netherlands and Spain).
50. Overall, in the private sector, wages were fully determined at the firm level for 16% of Swedish employees in 2010; for 55% of the employees, the distribution of the nationally-agreed wage increase among employees was bargained at the firm level; and 18% of the employees had their wage fixed at both levels, leaving only 11% of employees with their wage fully determined at the sectoral level (Annual Report 2010 of the National Mediation Office). In Denmark, 22% of private sector employees had their wages fully determined at the firm level and 62% had a minimum defined at the sectoral level and individual wages negotiated at the firm level in 2004 (Dahl et al., 2011). In France, 64% of the employees in firms with more than ten employees were covered by wage negotiation at the firm-level in 2008 (DARES quoted in www.worker-participation.eu/National-Industrial-Relations/Countries/France/Collective-Bargaining).
51. In Denmark and Sweden, where trade union membership is high, sectoral agreements established the rules governing bargaining at the firm level, so as to create a transparent wage bargaining system based on objectives criteria (Ahlberg and Bruun, 2005; Andersen and Navrjberg, 2008). By contrast, in France, where trade union membership is low, the process of decentralisation of collective bargaining was launched by the government in the early 1980s by obliging employers and trade unions to negotiate on working time and wages at the firm level; a 2004 law further extended the possibilities for firm level agreements to deviate from sectoral agreements or labour laws. The co-ordination between the two levels of bargaining is very limited, but sectoral agreements remain influential, as they still often provide the job classification used for wage negotiation at the firm level; this is, however, less and less the case (Barrat et al., 2007). Besides, the statutory minimum wage, determined by the government, defines a wage floor for the entire labour market, thus limiting the effective margins for negotiations at both levels.

52. Increased use of derogation clauses resulted in cuts in basic pay, reductions in agreed wage increases, lower wage rates for job starters or reduction/suspension of bonuses (Keune, 2010; Haipeter and Lehndorff, 2009).
53. Leading institutional investors include mutual funds, pension funds, hedge funds, life insurance, and investment companies such as private equity funds.
54. Fund managers typically aim to sell-on acquisitions within a five year time frame (Clark, 2009).
55. LBOs have undergone an explosive growth since the early 2000s (ILO, 2009).
56. Amess and Wright (2007) find that LBOs have negatively affected wages in the United Kingdom over the 1999-2004 period. In the United Kingdom also, collective agreements have often been revised downwards after acquisitions, while straight de-recognition of trade unions and collective agreements occurred more rarely (Clark, 2009). Chambost *et al.* (2008) note that, in France, pay individualisation and increased work pressure tend to fragment staff in LBO firms and that the role of trade unions thus becomes more limited.
57. Dumont *et al.* (2005) find evidence that the objective functions of trade unions increasingly include employment in the five European countries they study.
58. See Freyssinet and Seifert (2001), Raess and Burgoon (2006), Haipeter and Lehndorff (2009).
59. In more decentralised bargaining systems the bargaining coverage depends much more on the unions' organisational power (Bispinck *et al.*, 2010).
60. These estimates take into account that minimum-wage increases were distributed over time. An estimation of the effect in the 1990s is more difficult since arbitrary assumptions would have to be made to allow for the change in wage floors induced by the introduction of the minimum wage in Ireland and the United Kingdom. Excluding these two countries, changes in the ratio of minimum to median wages were negative, on average, in that decade.
61. Leonardi and Pica (2010) analyse the effect of monetary compensation for unfair dismissal on male wages by exploiting an Italian reform that introduced this type of compensation for establishments with less than 15 employees. They find that the reform had no impact on entry wages, although returns to tenure decreased, as suggested by Lazear (1990). OECD (2010) shows that the wage premium to voluntary job changes is smaller where dismissal legislation is more stringent. However, that report also finds evidence that involuntary job loss is less frequent in that case, so that the overall impact of these regulations on wage premia to job changes is ambiguous. By contrast, van der Wiel (2010) identifies intra-firm effects of employment protection by exploiting a 1999 Dutch reform, which eliminated age-based terms-of-notice rules but implied the coexistence within the same firm of workers under different rules for a transitory period. She finds that those covered by more stringent rules received higher wages.

References

- Abraham, F., J. Konings and S. Vanormelingen (2009), "The Effect of Globalization on Union Bargaining and Price-Cost Margins of Firms", *Review of World Economics*, Vol. 145, No. 1, pp. 13-63.
- Acemoglu, D. (2002), "Directed Technical Change", *Review of Economic Studies*, Vol. 69, pp. 781-810.
- Acemoglu, D. (2003), "Labor- and Capital-Augmenting Technical Change", *Journal of the European Economic Association*, Vol. 1, No. 1, pp. 1-37.
- Acemoglu, D. (2011), "When Does Labor Scarcity Encourage Innovation?", *Journal of Political Economy*, Vol. 118, No. 6, pp. 1037-1078.
- Acemoglu, D. and J.S. Pischke (1999), "Beyond Becker: Training in Imperfect Labour Markets", *Economic Journal*, Vol. 109, No. 453, pp. F112-F142.
- Acemoglu, D. and J.S. Pischke (2003), "Minimum Wages and On-The-Job Training", *Research in Labor Economics*, Vol. 22, pp. 159-202.
- Acemoglu, D., P. Aghion and G.L. Violante (2001), "Deunionization, Technical Change and Inequality", *Carnegie-Rochester Conference Series on Public Policy*, Vol. 55, No. 1, pp. 229-264, Elsevier, December.
- Ahlberg, K. and N. Bruun (2005), "Sweden: Transition through collective bargaining", in T. Blanke and E. Rose (eds.), *Collective Bargaining Wages in Comparative Perspective: Germany, France, the Netherlands, Sweden and the United Kingdom*, Kluwer Law International, The Hague.

- Amess, K. and M. Wright (2007), "The Wage and Employment Effects of Leveraged Buyouts in the UK", *International Journal of the Economics of Business*, Vol. 14, No. 2, pp. 179-195.
- Andersen, S.K. and S.E. Navrjberg (2008), "Collective Bargaining on Wages in Denmark", in M. Keune and B. Galgóczi (eds.), *Wages and Wage Bargaining in Europe – Developments Since the Mid-1990s*, ETUI-REHS, Brussels.
- Antonietti, R. and D. Antonioli (2011), "The Impact of Production Offshoring on the Skill Composition of Manufacturing Firms: Evidence from Italy", *International Review of Applied Economics*, Vol. 25, No. 1, pp. 87-105.
- Antràs, P. (2004), "Is the US Aggregate Production Function Cobb-Douglas? New Estimates of the Elasticity of Substitution", *Contributions to Macroeconomics*, Vol. 4, No. 1.
- Arpaia, A., E. Prez and K. Pichelmann (2009), "Understanding Labour Income Share Dynamics in Europe", *European Economy Economic Papers* No. 379, European Commission, Brussels, May.
- Arthur, W.B. (2011), "The Second Economy", *McKinsey Quarterly*, October.
- Arulampalam, W., A.L. Booth and M.L. Bryan (2004), "Training and the New Minimum Wage", *Economic Journal*, Vol. 114, No. 494, pp. C87-C94.
- Atanassov, J. and E. Kim (2009), "Labor and Corporate Governance: International Evidence from Restructuring Decisions", *Journal of Finance*, Vol. 64, No. 1, pp. 341-374.
- Atkinson, A.B., T. Piketty and E. Saez (2011), "Top Incomes in the Long Run of History", *Journal of Economic Literature*, Vol. 49, No. 1, pp. 3-71.
- Autor, D., W.R. Kerr and A.D. Kugler (2007), "Do Employment Protections Reduce Productivity? Evidence from US States", *Economic Journal*, Vol. 117, pp. F189-F217.
- Autor, D.H., F. Levy and R.J. Murnane (2003), "The Skill-Content of Recent Technological Change: An Empirical Investigation", *Quarterly Journal of Economics*, Vol. 118, No. 4, pp. 1279-1333.
- Azmat, G., A. Manning and J. van Reenen (2012), "Privatization and the Decline of Labour's Share: International Evidence from Network Industries", *Economica*, forthcoming.
- Bamber, G., J.H. Gittell, T.A. Kochan and A. von Nordenflycht (2009), *Up In The Air: How Airlines Can Improve Performance by Engaging Their Employees*, Cornell University Press, Ithaca, NY.
- Barrat, O., H. Chaput, A. Naboulet and L. Wolff (2007), "Wage Bargaining and Compensation Practices in France: An Overview", www.banque-france.fr/fileadmin/user_upload/banque_de_france/Economie-et-Statistiques/La_recherche/Wage-Bargaining-and-Compensation-Practices-in-France-wolff.pdf.
- Bassanini, A. and A. Garnero (2012), "Dismissal Protection and Worker Flows in OECD Countries: Evidence from Cross-Country/Cross-Industry Data", *IZA Discussion Paper* No. 6535, Bonn, May.
- Bassanini, A. and T. Manfredi (2012), "Capital's Grabbing Hand? A Cross-country/Cross-industry Analysis of the Decline of the Labour Share", *OECD Social, Employment and Migration Working Paper*, OECD Publishing, Paris, forthcoming.
- Bassanini, A., L. Nunziata and D. Venn (2009), "Job Protection Legislation and Productivity Growth in OECD Countries", *Economic Policy*, Vol. 58, pp. 349-402.
- Bentolila, S. and G. Saint-Paul (2003), "Explaining Movements in the Labor Share", *Contributions to Macroeconomics*, Vol. 3, No. 1.
- Berman, E., J. Bound and Z. Griliches (1994), "Changes in the Demand for Skilled Labor within US Manufacturing: Evidence from the Annual Survey of Manufactures", *Quarterly Journal of Economics*, Vol. 109, pp. 367-397.
- Berndt, E. (1976), "Reconciling Alternative Estimates of the Elasticity of Substitution", *Review of Economics and Statistics*, Vol. 58, No. 1, pp. 59-68.
- Bertrand, M. and S. Mullainathan (2003), "Enjoying the Quiet Life? Corporate Governance and Managerial Preferences", *Journal of Political Economy*, Vol. 111, No. 5, pp. 1043-1075.
- Bertrand, M., F. Kramarz, A. Schoar and D. Thesmar (2005), "Politically Connected CEOs and Corporate Outcomes: Evidence from France", *Crest Working Paper*.
- Bispinck, R., H. Dribbusch and T. Schulten (2010), "German Collective Bargaining in a European Perspective, Continuous Erosion or Re-Stabilisation of Multi-Employer Agreements", *WSI Discussion Paper* No. 171, Hans Böckler Stiftung, Dusseldorf, August.

- Blanchard, O. and F. Giavazzi (2003), "Macroeconomic Effects of Regulation and Deregulation in Goods and Labor Markets", *Quarterly Journal of Economics*, Vol. 115, pp. 879-907.
- Blanchflower, D.G. (2006), "A Cross-Country Study of Union Membership", IZA Discussion Paper No. 2016, Bonn, March.
- Bloom, N., M. Draca and J. van Reenen (2011), "Trade Induced Technical Change? The Impact of Chinese Imports on Innovation and Information Technology", CEP Discussion Paper No. 1000.
- Böckerman, P. and M. Maliranta (2012), "Globalization, Creative Destruction and Labour Share Change: Evidence on the Determinants and Mechanisms from Longitudinal Plant-Level Data", *Oxford Economic Papers*, forthcoming.
- Boone, J. (2000), "Technological Progress, Downsizing and Unemployment", *Economic Journal*, Vol. 110, No. 465, pp. 581-590.
- Boulhol, H., S. Dobbelaere and S. Maioli (2011), "Import as Product and Labour Market Discipline", *British Journal of Industrial Relations*, Vol. 49, No. 2, pp. 331-361.
- Brown, W., A. Bryson and J. Forth (2008), "Competition and Retreat from Collective Bargaining", NIESR Discussion Paper No. 318, August.
- Brynjolfsson, E. and A. McAfee (2011), *Race Against the Machine*, Digital Frontier Press, Lexington, Mass.
- Bureau of Economic Analysis (2011), *National Income and Product Accounts Tables*, Last Revised on 8 August 2011, Washington, DC.
- Cahuc, P., F. Postel-Vinay and J.M. Robin (2006), "Wage Bargaining with On-The-Job Search: A Structural Econometric Model", *Econometrica*, Vol. 74, No. 2, pp. 323-64.
- Calmfors, L. and A. Larsson (2011), "Pattern Bargaining and Wage Leadership in a Small Open Economy", CESIFO Working Paper No. 3510, July.
- Chambost, I., C. Hoarau, P. Pons, P. Roturier and E. Tarrière (2008), "Financiarisation des entreprises et dialogue social", Cabinet Syndex, Paris, November.
- Checchi, D. and C. García-Péñalosa (2008), "Labour Market Institutions and Income Inequality", *Economic Policy*, Vol. 56, pp. 601-649.
- Clark, I. (2009), "Private Equity in the UK: Job Regulation and Trade Unions", *Journal of Industrial Relations*, Vol. 51, No. 4, pp. 489-500.
- Criscuolo, C., R. Martin, H. Overman and J. van Reenen (2012), "The Causal Effects of an Industrial Policy", IZA Discussion Paper, No. 6323, Bonn.
- Dahl, C.M., D. le Maire and J.R. Munch (2011), "Wage Dispersion and Decentralization of Wage Bargaining", IZA Discussion Paper No. 6176, Bonn, November.
- DARES (2008), "Le paradoxe du syndicalisme français : un faible nombre d'adhérents mais des syndicats bien implantés", *Premières Informations et Premières Synthèses*, No. 16.1, April, www.travail-emploi-sante.gouv.fr/IMG/pdf/2008.04-16.1.pdf.
- Davies, P. and M. Freedland (2005), "The Evolving Structure of Collective Bargaining in Europe 1990-2004, National Report for the United Kingdom", Report for a research project Co-financed by the European Commission and the University of Florence, http://eprints.unifi.it/archive/00001178/01/Regno_Units.pdf.
- de Serres, A., Scarpetta, S. and C. de la Maisonneuve (2002), "Sectoral Shifts in Europe and the United States: How they Affect Aggregate Labour Shares and the Properties of Wage Equations", OECD Economics Department Working Paper No.326, OECD Publishing, Paris.
- Dølvik, J.E., (2008), "The Negotiated Nordic Labor Markets: From Bust to Boom", Center for European Studies Working Paper Series, No. 162.
- Driffield, N. and S. Girma (2003), "Regional Foreign Direct Investment and Wage Spillovers: Plant Level Evidence from the Electronics Industry", *Oxford Bulletin of Economics and Statistics*, Vol. 65, No. 4, pp. 453-474.
- Driver, C. and J. Muñoz-Bugarín (2010), "Capital Investment and Unemployment in Europe: Neutrality or Not?", *Journal of Macroeconomics*, Vol. 32, pp. 492-496.
- Du Caju, P., E. Gautier, D. Momferatou and M. Ward-Warmedinger (2008), "Institutional Features of Wage Bargaining in 23 European Countries, the US and Japan", *National Bank of Belgium Working Paper Research* No. 154, December.

- Duenhaupt, P. (2011), "Financialization and the Rentier Income Share – Evidence from the USA and Germany", *International Review of Applied Economics*, DOI:10.1080/02692171.2011.595705.
- Dumont, M., G. Rayp and P. Willemé (2005), "Does Internationalization Affect Union Bargaining Power? An Empirical Study for Five EU Countries", *Oxford Economic Papers*, Vol. 58, pp. 77-102.
- Dumont, M., G. Rayp and P. Willemé (2012), "The Bargaining Position of Low-skilled and High-skilled Workers in a Globalizing World", *Labour Economics*, Vol. 19, pp. 312-319.
- Dynan, K.E., J. Skinner and S. Zeldes (2004), "Do the Rich Save More?", *Journal of Political Economy*, Vol. 112, No. 2, pp. 397-444.
- EIRO (2011), "Portugal: EIRO Annual Review-2009", European Industrial Relations Observatory, Dublin, www.eurofound.europa.eu/eiro/studies/tn1004019s/pt1004019q.htm.
- Eurofound (2005), "Changes in National Collective Bargaining Systems Since 1990", European Foundation for the Improvement of Living and Working Conditions, Dublin, www.eurofound.europa.eu/eiro/2005/03/study/TN0503102S.htm.
- Eurofound (2010), "Derogation Clauses on Wages in Sectoral Collective Agreements in Seven European Countries", European Foundation for the Improvement of Living and Working Conditions, Dublin, www.eurofound.europa.eu/pubdocs/2010/87/en/1/EF1087EN.pdf.
- Eurofound (2011), "Extension of Collective Bargaining in the EU", European Foundation for the Improvement of Living and Working Conditions, Dublin, www.eurofound.europa.eu/pubdocs/2011/54/en/1/EF1154EN.pdf.
- European Commission (2011), "Wage Setting: Institutional Features", Commission Note, ADHOC/11/030511/EN, European Commission, Brussels, <http://gesd.free.fr/wagescom11.pdf>.
- Eurostat (2011), *GDP – Statistics Explained*, Eurostat, Luxembourg.
- Farber, H.S. (1986), "Analysis of Union Behaviour", in O. Ashenfelter and R. Layard (eds.), *Handbook of Labor Economics*, Amsterdam.
- Felbermayr, G., J. Prat, H.J. Schmerer (2011), "Trade and Unemployment: What do the Data Say?", *European Economic Review*, Vol. 55, No. 6, pp. 741-758.
- Fernandes, N., M.A. Ferreira, P. Matos and K.J. Jenter (2009), "The Pay Divide: (Why) Are US Top Executives Paid More?", *ECGI Working Paper* No. 255/2009.
- Freyssinet, J. and H. Seifert (2001), "Negotiating Collective Agreements on Employment and Competitiveness", European Foundation for the Improvement of Living and Working Conditions, Dublin, www.uni-mannheim.de/edz/pdf/ef/01/ef0124en.pdf.
- Frydman, C. and D. Jenter (2010), "CEO Compensation", *Annual Review of Financial Economics*, Vol. 2, No. 1, pp. 75-102.
- Frydman, C. and R.E. Saks (2010), "Executive Compensation: A New View from a Long-Term Perspective, 1936-2005", *Review of Financial Studies*, Vol. 23, No. 5, pp. 2099-2138.
- Gollin, D. (2002), "Getting Income Shares Right", *Journal of Political Economy*, Vol. 110, No. 2, pp. 458-474.
- Goos, M. and A. Manning (2007), "Lousy and Lovely Jobs: The Rising Polarization of Work in Britain", *Review of Economics and Statistics*, Vol. 89, No. 1, pp. 118-33.
- Goos, M., A. Manning and A. Salomons (2009), "Job Polarization in Europe", *American Economic Review: Papers and Proceedings*, Vol. 99, No. 2, pp. 58-63.
- Greenwood, J. and B.J. Jovanovic (1999), "Accounting for Growth", in: C. Hulten (ed.), *Studies in Income and Wealth: New Directions in Productivity Analysis*, University of Chicago Press for NBER, Chicago.
- Gürtzgen, N. (2010), "Rent-Sharing and Collective Wage Contracts—Evidence from German Establishment-Level Data", *Applied Economics*, Vol. 42, No. 22, pp. 2835-2854.
- Guscina, A. (2006), "Effects of Globalization on Labor's Share in National Income", *IMF Working Paper*, No. 06/294.
- Haipeter, T. and S. Lehndorff (2009), "Collective Bargaining on Employment", *Industrial and Employment Relations Department Working Paper* No. 3, ILO, May.
- Harrison, A. (2002), "Has Globalization Eroded Labor's Share? Some Cross-Country Evidence", Paper presented at the Joint Conference of the IDB and the World Bank: The FDI Race: Who Gets the Prize? Is it Worth the Effort?, October.

- Hassel, A. (2006), *Wage Setting, Social Pacts and the Euro – A New Role for the State*, Amsterdam University Press, Amsterdam, <http://dare.uva.nl/document/133275>.
- Hayter, S., T. Fashoyin and T.A. Kochan (2011), "Collective Bargaining for the 21st Century", *Journal of Industrial Relations*, Vol. 53, No. 2, pp. 225-247.
- Hijzen, A. and P. Swaim (2010), "Offshoring, Labour Market Institutions and the Elasticity of Labour Demand", *European Economic Review*, Vol. 54, No. 8, pp. 1016-1034.
- Hijzen, A., P. Martins, T. Schank and R. Upward (2010) "Do Foreign-Owned Firms Provide better Working Conditions than their Domestic Counterparts? A Comparative Analysis", *IZA Discussion Papers* No. 5259, Bonn.
- Hirsch, B. (1988), "Trucking Regulation, Unionization and Labor Earnings: 1973-85", *Journal of Human Resources*, Vol. 23, No. 3, pp. 296-319.
- Howell, C. (2009), "The Transformation of French Industrial Relations: Labor Representation and the State in a Post-Dirigiste Era", *Politics and Society*, Vol. 37, No. 2, pp. 229-256.
- Howell, C. and R. Koilns Givan (2011), "Rethinking Institutions and Industrial Change in European Industrial Relations", *British Journal of Industrial Relations*, Vol. 49, No. 2, pp. 231-255.
- Hutchinson, J. and D. Persyn (2012), "Globalisation, Concentration and Footloose Firms: in Search of the Main Cause of the Declining Labour Share", *Review of World Economics*, forthcoming.
- ILO (2009), *World of Work Report 2009*, International Institute for Labour Studies, Geneva.
- ILO (2011), *World of Work Report 2011*, International Institute for Labour Studies, Geneva.
- IMF (2007), *World Economic Outlook*, IMF, Washington, DC.
- Jaumotte, F. and I. Tytell (2007), "How Has The Globalization of Labor Affected the Labor Income Share in Advanced Countries?", *IMF Working Paper*, No. 07/298.
- Kalinova, B., A. Palerm and S. Thomsen (2010), "OECD's FDI Restrictiveness Index: 2010 Update", *OECD Working Papers on International Investment*, No. 2010/03, OECD Publishing, Paris.
- Keune, M. (2008), "Wage Moderation, Decentralisation of Collective Bargaining and Low Pay", in M. Keune and B. Galgóczi (eds.), *Wages and Wage Bargaining in Europe – Developments Since the Mid-1990s*, ETUI-REHS, Brussels.
- Keune, M. (2010), "Derogation Clauses on Wages in Sectoral Collective Agreements in Seven European Countries", Eurofound, www.eurofound.europa.eu/pubdocs/2010/87/en/2/EF1087EN.pdf.
- Lamare, J.R., P. Gunnigle, P. Marginson and G. Murray (2009), "Multinationals' Union Avoidance Practices at New Sites: Transatlantic Variations", Paper for MNCs Symposium, IIRA World Congress, Sydney, August.
- Landier, A., V. Nair and J. Wulf (2009), "Trade-offs in Staying Close: Corporate Decision Making and Geographic Dispersion", *Review of Financial Studies*, Vol. 22, No. 3, pp. 1119-1148.
- Lazear, E. (1990), "Job Security Provisions and Unemployment", *Quarterly Journal of Economics*, Vol. 55, pp. 699-726.
- Lazonick, W. and M. O'Sullivan (2000), "Maximising Shareholder Value: a New Ideology for Corporate Governance", *Economy and Society*, Vol. 29, No. 1, pp. 13-35.
- Leonardi, M. and G. Pica (2010), "Who Pays for It? The Heterogeneous Wage Effects of Employment Protection Legislation", *IZA Discussion Paper*, No. 5335, Bonn.
- Masanjala, W. and C. Papageorgiou (2004), "The Solow Model with CES Technology: Nonlinearities and Parameter Heterogeneity", *Journal of Applied Econometrics*, Vol. 19, pp. 171-201.
- Mazzolari, F. and G. Ragusa (2012), "Spillovers from High-Skill Consumption to Low-Skill Labor Markets", *Review of Economics and Statistics*, forthcoming.
- Mühlemann, S., S. Wolter and A. Wüest (2009), "Apprenticeship Training and the Business Cycle", *Empirical Research in Vocational Education and Training*, Vol. 1, No. 2.
- Nicoletti, G. and S. Scarpetta (2003), "Regulation, Productivity and Growth: OECD Evidence", *Economic Policy*, Vol. 18, No. 36, pp. 9-72.
- OECD (2007), *OECD Employment Outlook*, OECD Publishing, Paris.
- OECD (2008a), *Growing Unequal – Income Distribution and Poverty in OECD Countries*, OECD Publishing, Paris.

- OECD (2008b), *OECD Employment Outlook*, OECD Publishing, Paris.
- OECD (2009), "Real Wages, Productivity and the Determinants of the Labour Share: A Structural Approach", ECO/CPE/WP1(2009)6, Official document from the OECD Economics Department.
- OECD (2010), *OECD Employment Outlook*, OECD Publishing, Paris.
- OECD (2011a), *Divided We Stand – Why Inequality Keeps Rising*, OECD Publishing, Paris.
- OECD (2011b), *OECD Employment Outlook*, OECD Publishing, Paris.
- OECD (2012), "Labour Losing to Capital", Supporting Material for Chapter 3 of the 2012 OECD Employment Outlook, OECD Publishing, Paris, available online at www.oecd.org/employment/outlook.
- Raess, D. and B. Burgoon (2006), "The Dogs that Sometimes Bark: Globalization and Works Council Bargaining in Germany", *European Journal of Industrial Relations*, Vol. 12., No. 3, pp. 287-309.
- Raurich, X., H. Sala and V. Sorolla (2012), "Factor Shares, the Price Markup and the Elasticity of Substitution between Capital and Labor", *Journal of Macroeconomics*, forthcoming.
- Romo, O.M. (2008), "Wages and Wage Bargaining in Ireland", in M. Keune and B. Galgóczi (eds.), *Wages and Wage Bargaining in Europe*, ETUI-REHS, Brussels.
- Rodrik, D. (1997), *Has Globalization Gone Too Far?*, Institute for International Economics, Washington, DC.
- Rusinek, M. and F. Rycx (2008), "Rent-Sharing under Different Bargaining Regimes: Evidence from Linked Employer-Employee Data", IZA Discussion Paper No. 3406, Bonn, March.
- Saez, E. and M.R. Veall (2005), "The Evolution of High Incomes in Northern America: Lessons from Canadian Evidence", *American Economic Review*, Vol. 95, No. 3, pp. 831-849.
- Schulzen, T., T. Brandt and C. Hermann (2008), "Liberalisation and Privatisation of Public Services and Strategic Options for European Trade Unions", *European Review of Labour and Research*, Vol. 14, No. 285, pp. 295-311.
- Spitz-Oener, A. (2006), "Technical Change, Job Tasks and Rising Educational Demand: Looking Outside the Wage Structure", *Journal of Labor Economics*, Vol. 24, No. 2, pp. 235-270.
- Torrini, R. (2005), "Profit Share and the Returns on Capital Stock in Italy: The Role of Privatization behind the Rise in the 1990s", CEP Discussion Paper No. 671.
- Traxler, F. and B. Brandl (2010), "Preconditions for Pacts on Incomes Policy: Bringing Structures back in", *European Journal of Industrial Relations*, Vol. 16, No. 1, pp. 73-90.
- Trefler, D. (2004), "The Long and Short of Canada US Free Trade Agreement", *American Economic Review*, Vol. 94, No. 4, pp. 870-895.
- van der Wiel, K. (2010), "Better Protected, Better Paid: Evidence on How Employment Protection Affects Wages", *Labour Economics*, Vol. 17, pp. 16-26.
- van Klaveren, M. (2011), "Sector-level bargaining and possibilities for deviations at company level – Ireland", Eurofound, www.eurofound.europa.eu/pubdocs/2010/875/en/1/EF10875EN.pdf.
- Visser, J. (2004), "Recent Trends and Persistent Variations in Europe's Industrial Relations", www.csmb.unimore.it/on-line/Home/Prova/documento36007711.html.
- Visser, J. (2005), "Beneath the Surface of Stability: New and Old Modes of Governance in European Industrial Relations", *European Journal of Industrial Relations*, Vol. 11, pp. 287-306.
- Visser, J. (2011), "Data Base on Institutional Characteristics of Trade Unions, Wage Setting, State Intervention and Social Pacts", 1960-2010(CTWSS), Version 3.0, May, www.uva-aias.net/208.
- Wills, J. (2009), "Subcontracted Employment and its Challenge to Labor", *Labor Studies Journal*, Vol. 34, No. 4, December.
- Wölfel, A., I. Wanner, T. Kozluk and G. Nicoletti (2009), "Ten Years of Product Market Reforms in OECD Countries, Insights from a Revised PMR indicator", OECD Economics Department Working Paper No. 695, OECD Publishing, Paris.
- Zeira, J. (1998), "Workers, Machines and Economic Growth", *Quarterly Journal of Economics*, Vol. 113, No. 4, pp. 1091-1113.

ANNEX 3.A1

Data Construction and Sources

Industry-level data

Earnings and hourly wage data refer to total gross annual earnings and average hourly wages, respectively of wage and salary employees. Employment and hours worked refer to annual averages for wage and salary employees. Real value added is obtained by deflating nominal value added in each industry with the industry-specific double deflator. Data are from the EUKLEMS Database except for Norway, where they come from the OECD STAN Database and refer to total employment. Capital services and TFP data are also from the EUKLEMS Database and are constructed using double-deflated value added. EUKLEMS data obtained through interpolation and/or estimated on the basis of conjectures were removed from the sample, following the criteria detailed in the 2011 OECD Employment Outlook. For the computation of the labour share in each industry, average hourly compensation of self-employed is assumed to be equal to the average hourly wage of the industry.

The distributions by educational attainment of earnings, wage and hours also come from the EUKLEMS Database. Education is divided into three categories: low-education (less than upper secondary); medium education (upper secondary); and high education (more than upper secondary). The business sector, in this case, is partitioned in 9 industries for reasons of data reliability (as in the 2011 OECD Employment Outlook).

The industry-specific US dismissal rate is from Bassanini and Garnero (2012). The data are available at <https://sites.google.com/site/bassaxsite/home/files/BGdata.zip>. It is derived from various waves of the CPS Displaced Workers Supplement (2000-06, even years). An individual is considered to have been dismissed if he/she lost his/her job in the most recent year covered by each survey, because of plant closing or moved, insufficient work, or position or shift abolished. Only wage and salary employees in the private-for-profit sector are considered.

The share of workers in the United Kingdom with less than secondary education prior to the introduction of the minimum wage in 1999 is the average share in each industry over all available quarters between 1994 and 1998. The source is the UK Labour Force Survey.

The indexes of anti-competitive product market regulation, including public ownership and barriers to entry, come from the OECD Regulatory Database (www.oecd.org/document/1/0,3746,en_2649_%2037421_2367297_1_1_1_37421,00.html). They vary from 0 to 6 from the least to the most restrictive. Time-varying aggregate data are available for three industries (Energy, Transport and Communications) from 1975 to 2008.

Import-weighted real exchange rates are defined as follows:

$$x_{ikt} = \sum_{i=1}^I \sum_{l=1}^L m_{iklt_0} e_{kl} p_{lt} / p_{kt}$$

where x stands for the import-weighted real exchange rate, m is to the import share from country l in industry i of country k at a fixed time period t_0 (early 1980s in these data) – the import weights thus vary across industries and countries but are constant over time – e is the nominal bilateral exchange rate between countries k and l at time t – which varies across partner countries and time, but not across industries – the p variables refer to price levels, as approximated by the GDP deflator, in countries l and k respectively. An increase in the industry-specific exchange rate represents a real depreciation in the price of output produced in industry i of country k relative to its trading partners (weighted by import shares). Put differently, an increase in the industry-specific exchange rate represents an improvement in the terms of trade in industry i for country k . The source is the 2007 OECD Employment Outlook.

Import penetration is defined as the ratio of imports to apparent demand (imports plus output minus exports). Trade exposure is the sum of import penetration and export propensity, the latter defined as the ratio of exports to domestic output. The source of both variables is the OECD STAN Database. For industry i in country k , intra-industry offshoring is defined as the ratio of imported intermediate purchases from the same industry to that industry's domestic output:

$$o_{ikt} = \frac{M_{ikt}}{Y_{ikt}}$$

where M refers to the imports of intermediates from industry i by industry i and Y refers to domestic output in industry i . This indicator is computed using OECD Input-Output tables, available for 1995, 2000 and 2005.

OECD industry-specific indicators on regulatory barriers to inward FDI concern foreign equity limits, screening and approval, restrictions on top foreign personnel, and other restrictions concerning notably reciprocity rules and profit/capital repatriation. For each of these components the indicator vary between 0 and 1 from the least to the most restrictive. They are available between 1997 and 2006 at approximately five year intervals. Missing data were interpolated. In the regressions, missing 2007 data are replaced with 2006 data. All components, except restrictions on top foreign personnel, were lumped together by simple addition. The source is Kalinova et al. (2010).

Aggregate data

Earnings data are deflated using the private consumption deflator, drawn from the OECD Economic Outlook (EO) Database. When comparisons of deflators are made, the difference between aggregate value added deflators in the EO and EUKLEMS Databases is netted out, in order to purge the comparison from different degrees of quality-adjustment across deflators. For the computation of the aggregate labour share, average annual compensation of self-employed is assumed to be equal to the average annual wage of the industry. 1997 USD purchasing power parities data, used for the definition of high-wage countries, are from EUKLEMS. Data on earnings inequality are from the OECD Income Distribution Database (www.oecd.org/els/social/inequality).

EP indicators come from the OECD *Indicators of Employment Protection* (www.oecd.org/employment/protection). All indicators vary from 0 to 6 from the least to the most stringent.

Minimum wages are measured as the ratio of the statutory minimum wage to median earnings of full-time workers. The deviation of the logarithm of the real minimum wage in 2000 USD purchasing power parities from the OECD average of each year is used as instrument. The source of all these variables is the *OECD Employment Database* (www.oecd.org/els/employment/database).

Collective bargaining coverage is the share of workers covered by a collective agreement, in percentage. The source is the *ICTWSS Database* (www.uva-aias.net/207). Data were averaged or interpolated when information is not available at the annual level.

The degree of corporatism is proxied with the *ICTWSS index of bargaining co-ordination*, which takes values from 1 to 5 from the least to the most co-ordinated. The source of this variable is the *ICTWSS Database* (www.uva-aias.net/207).

Unemployment benefit generosity is measured on the basis of gross average replacement rates (in percentage of pre-displacement wage), defined as average unemployment benefit replacement rate across two income situations (100% and 67% of average worker earnings), three family situations (single, with dependent spouse, with spouse in work) and three different unemployment durations (first year, second and third years, and fourth and fifth years of unemployment). The source is the *OECD Benefits and Wages Database* (www.oecd.org/els/social/workincentives).

The tax wedge considered in this chapter is the wedge between the labour cost for the employer and the corresponding net take-home pay of the employee for single-earner couples with two children earning 100% of average worker earnings. It is expressed as the sum of personal income tax and all social security contributions as a percentage of total labour cost. The source of all these variables is the *OECD Taxing Wages Database* (www.oecd.org/ctp/taxingwages).

Sources for Table 3.1

The table was constructed by compiling various sources.

Importance of the various levels of bargaining

Eurofound (2005); European Commission (2011); country notes on national industrial relations from the website “Worker participation” from ETUI, www.worker-participation.eu/National-Industrial-Relations; EIRO’s industrial relations country profiles, www.eurofound.europa.eu/eiro/country_index.htm; various country readings: Dølvik (2008), for Denmark, Finland, Norway and Sweden; Howell (2009) and Barrat et al. (2007) for France; Romo (2008); Ahlberg and Bruun (2005) for Sweden.

Extension of sectoral agreements

Eurofound (2011); ETUI’s Worker participation country notes on industrial relations for Ireland and the Netherlands (www.worker-participation.eu/National-Industrial-Relations); Bispinck et al. (2010) for Spain.

Use of derogation clauses

Eurofound (2010) for Austria, Belgium, France, Germany, Ireland, Italy and Spain; Haipeter and Lehndorf (2009) for Denmark and Hungary; Eurofound (2005) for Sweden.

Change in the dominant bargaining level since 1990

For Denmark: Andersen, and Navrbjerg (2008) and Dølvik (2008); for Finland and Sweden, Dølvik (2008); for France, ETUI's workers participation country note on national industrial relations (www.worker-participation.eu/National-Industrial-Relations) and Barrat et al. (2007); for Slovak Republic, ETUI's workers participation country note on national industrial relations (www.worker-participation.eu/National-Industrial-Relations).

Type and intensity of co-ordination between the various bargaining actors and levels

Du Caju et al. (2008); ETUI's worker participation country notes on national industrial relations (www.worker-participation.eu/National-Industrial-Relations); Traxler and Brandl (2010); EIRO's industrial relations country profiles; Calmfors and Larsson (2011); Barrat et al. (2007).