Chapter 2

Sharing the pain equally? Wage adjustments during the crisis and recovery

This chapter documents how wages have evolved during the global financial and economic crisis and recovery in OECD countries. It contributes to a better understanding of the role of wage adjustment for the strength of the labour market recovery and the way the social costs of the crisis have been shared across the labour force. A persistent increase in unemployment in many OECD countries has exerted considerable downward pressure on real wage growth, including among low-wage workers. Significant wage moderation has already contributed to curb unit labour costs and thus promote external competitiveness in a number of countries, particularly in the euro area. In a context of low inflation, where further wage adjustments would require difficult and painful cuts in nominal wages, other policy measures are needed to address persistently high unemployment rates. In addition to the role of macroeconomic policies, this includes better assistance in developing skills necessary for displaced workers to shift to new areas of employment, and more effective product market competition. While wage adjustment costs have been shared quite evenly across workforce groups, declines in real earnings are likely to hurt the low-paid more and may require appropriately designed measures such as in-work benefits and statutory minimum wages to tackle in-work poverty.

The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

Key findings

Much attention has been paid to the effects of the crisis on employment and unemployment. However, many of those who have retained their jobs have also been affected, as they have seen their wages grow more slowly, or even fall. This chapter shows that half of all workers saw the real value of their earnings fall in 2010 on average across a range of OECD countries. In half of these cases, the cause was earnings going up more slowly than inflation, but in the other half it was because nominal earnings actually fell, either as a result of wage cuts or, more likely, reduced hours of overtime and lower bonuses.

Wage adjustments have a key role to play in helping the labour market weather cyclical downturns and in promoting stronger employment growth during the recovery. However, wages also provide the dominant source of income for households and stagnant or falling real wages tend to be associated with economic hardship, especially for the most disadvantaged. Reductions in earnings also reduce consumer spending and dampen aggregate demand. This chapter documents how wages have evolved since the start of the global financial and economic crisis. The analysis sheds light on the role of wage adjustment for the persistence of unemployment and the strength of the labour market recovery. In doing so, it also provides evidence on the extent to which wage adjustment has helped to share the social costs of the crisis more equally between the employed and the unemployed. The chapter further examines how the wages of individual workers have been affected and how wage adjustments have been distributed across the workforce.

For the OECD as a whole, real wage growth has been essentially flat during the period 2010-13, and in a number of countries, including Greece, Ireland, Portugal and Spain, real wages have fallen by between 2% and 5% a year on average. A more detailed analysis of wage developments based on microdata from 2010 for 19 OECD countries shows that:

- One in two workers experienced real cuts in wage compensation. This proportion was lowest in Finland at just one third of the population, but approached two-thirds of the workforce in Estonia, Portugal and the United Kingdom.
- Over two-thirds of those who experienced such cuts saw their nominal wage compensation fall. This does not necessarily mean that wage *rates* fell; nominal adjustments in basic pay are very uncommon in certain countries, and much of the fall was almost certainly due to reduced hours of overtime and lower bonuses.

Wages and earnings respond to the labour market environment – higher unemployment is associated with lower growth in earnings. There is evidence, however, that the relationship between hourly wage growth and unemployment – the Phillips curve – was stronger in euro area countries during the crisis than before. Real wages have fallen by more than would have been predicted given the rise in unemployment.

However, as the crisis has persisted in some countries and recovery in others has been slow, there is some evidence that the downwards adjustment in earnings may not continue

at the same pace as before 2010. In particular, at the aggregate level, wage growth appears to have become somewhat less responsive to changes in unemployment in the more recent period. This is the case in the OECD as a whole, the euro area and the United States, but not in Japan. There are two reasons for this:

● An increasing portion of unemployed people are no longer effectively competing for jobs. Long-term unemployment can lead to loss of skills, self-confidence and motivation, and can lead to increased social and health problems which reduce people's ability to work and efforts to find jobs.

● Inflation is so low in some countries that the only way for reductions in real wages to occur is when nominal wages are cut. Both workers and employers are generally reluctant to countenance such reductions, leading to "nominal downward wage rigidity". Nominal downward wage rigidity has become more binding since the start of the crisis in countries such as Estonia, Greece, the Netherlands, Spain and the United Kingdom. Administrative data for Spain and the United Kingdom suggest that while at the onset of the crisis in 2008 cuts in nominal wages would have been about 10% more prevalent were it not for this reluctance by employers and workers, this ratio increased to over one in four in the United Kingdom and one in two in Spain by 2012. For low-wage workers in Spain, the incidence of nominal downward wage rigidity is particularly important, affecting over two-thirds of the low-wage workforce.

The evidence presented in this chapter, based on selected OECD countries, also suggests that part of the widespread wage moderation that has occurred since the start of the crisis is the result of the greater responsiveness of the wages of new hires to economic conditions than those of incumbent workers. In the absence of a minimum wage, it is estimated that the earnings of new hires fall by nearly 3% for every percentage point increase in the regional unemployment rate, whereas the earnings of those who stay in the same job fall by just over 0.5%.

Greater wage moderation has resulted in the cost of labour falling relative to productivity. Consequently, on average in the OECD area, growth in unit labour costs has tended to slow since the start of the global financial crisis. The adjustment has been most pronounced in the euro area countries hardest hit by the crisis (e.g. Greece, Ireland, Portugal, and Spain).

Thus, while cuts in earnings have contributed to hardship and social distress in a number of countries, they have also played an important role in restoring external competitiveness, rebalancing current accounts and promoting external demand (even if potentially at the cost of curbing domestic demand). While the gap in unit labour costs accumulated in countries such as Greece, Portugal, Ireland and Spain with respect to Germany since the introduction of the euro in 1999 has been partially closed during the crisis, further adjustments based on wage cuts may be difficult to achieve. Instead, policy attention needs to focus elsewhere. Macroeconomic policies have an important role to play but need to be supported by structural policy reforms, including:

● *Enhancing competition in product markets*. One of the difficulties of further wage adjustment is that its potential effects do not automatically translate into more jobs for workers because some of the reduction in wage costs is effectively used to restore the profitability of troubled firms. While *some* of this may be necessary, this may also reflect the lack of effective competition in product markets.

● *Promoting labour market policies that facilitate transitions between sectors*. New jobs being created as a result of enhanced cost competitiveness may be in different firms and

sectors and involve different skills than the jobs which have been lost. Programmes facilitating labour mobility and providing training and work-experience are essential to allow countries with persistently large labour market slack to foster job creation while also not unduly depressing domestic demand and contributing to further widening in income inequality and risks of poverty.

However, policy must address not only the *level* of wage adjustment, but also its *distribution*. Low-skilled workers have been the most likely to lose their jobs during the crisis. Consequently, real wage growth has been even weaker for workers remaining in their jobs than indicated by the aggregate figures. Moreover, low-paid workers who kept their jobs experienced a slowdown in real earnings growth following the crisis as did higher paid workers, and in some countries they experienced a fall in their real earnings. Comparing 2007-12 with 2000-07, real wage growth of full-time employees declined by 1.0 percentage points per year on average across OECD countries at the bottom decile of the earnings distribution. The decline was somewhat greater at 1.1 and 1.5 percentage points, respectively, at the median and the last decile of the distribution. The slowdown in real earnings growth for low-paid workers was particularly large in the Czech Republic, Hungary, Korea, Spain and the United Kingdom. This reflected the importance of widespread wage moderation rather than the importance of reductions among low-paid workers in particular. Nevertheless, slower real wage growth, and cuts in real wages in some cases, may result in severe hardship for low-paid workers.

There are a number of policy instruments available to limit the impact of economic adjustment on low-wage workers:

- *Minimum wages can prevent nominal wages at the lower end of the distribution from bearing the brunt of the adjustment.* The empirical evidence suggests that if set at an appropriate level, the adverse employment effects of minimum wages tend to be small. Sensible minimum-wage design includes taking account of regional differences in economic conditions and differences by age in experience and productivity, ensuring that the level is determined by independent advice, and adjusting employer social security contributions to lower non-wage labour costs at the minimum wage.

- *In-work benefits for low-paid workers living in low-income households can also help prevent the risk of rising levels of in-work poverty.* These types of benefits or tax credits exist in several OECD countries and together with minimum wages can provide an effective guarantee of a minimum income.

Introduction

Wage adjustments have a key role to play in helping the labour market weather cyclical downturns and thus promote labour market resilience (OECD, 2012a). Consequently, the extent of wage adjustment may have played an important role in shaping the initial increase in unemployment as a result of the decline in aggregate demand that was triggered by the global financial crisis, but also in determining the persistence of unemployment during the ongoing economic recovery. However, wages also provide an important source of income for households. Stagnant or falling real wages not only can lead to severe economic hardship for households but also reduce consumer spending and lower aggregate demand if not offset by rising employment.

This chapter documents how wages have responded to the rise in unemployment since the start of the crisis. More specifically, the chapter examines how flexible wage adjustments

have been since the start of the global financial crisis and what sort of wage flexibility is most relevant for mitigating cyclical fluctuations in unemployment. This analysis also provides an indication of the extent to which wage adjustment has helped to reduce the impact of the crisis on job losses and thus share the social costs between the employed and the unemployed. The chapter further examines how the wages of individual workers have been affected and how wage adjustments have been distributed across the workforce.[1]

The chapter is structured in two parts. In Section 1, the degree of wage flexibility as well as its role for the persistence of cyclical unemployment is analysed using a variety of different methods. Section 2 analyses how the burden of wage adjustment as a result of the global financial crisis has been distributed across the workforce.

## 1. Wage adjustment during the crisis and recovery

This section sheds new light on the role of wage adjustment for *cyclical* unemployment by documenting how wages have evolved in the aftermath of the global financial crisis and analysing how they have responded to changes in unemployment. Wage adjustment may affect the extent and persistence of cyclical unemployment through various channels. First, real wage adjustments can help to clear the labour market in response to shocks, thereby mitigating cyclical fluctuations in unemployment and spreading the social costs of the shortfall in aggregate demand more evenly across the labour force ("internal rebalancing").[2] Importantly, by mitigating cyclical fluctuations, wage adjustments also reduce the risk that the increase in cyclical unemployment becomes structural (see Chapter 1 for a detailed discussion). Second, wage flexibility may affect aggregate demand, although this will depend on each country's circumstances. In countries characterised by sizeable current-account deficits but without flexible exchange rates, such as in some countries of the euro area, downward wage adjustments have the potential to promote aggregate demand by enhancing external competitiveness ("external rebalancing"). However, there is also a risk, particularly in low-inflation environments, that downward wage adjustment induces price deflation, which may depress private spending, and, hence, aggregate demand (Gali, 2013; Gali and Monacelli, 2013).[3] While wage flexibility is also important for understanding *structural* unemployment through its impact on allocative efficiency, this has been discussed in some detail in previous OECD work (see OECD, 2006, for an overview).

The persistence of labour market slack has exerted considerable downward pressure on aggregate wage growth

Figure 2.1 documents average annualised, real wage growth during the period immediately after the start of the crisis (Q4 2007 to Q1 2009) and subsequently (Q1 2009 to Q4 2013). In order to understand better the evolution of real hourly wage growth, information for both periods is also provided on: growth in labour productivity, growth in unit labour costs and price inflation. More detailed information on the evolution of each of these variables in each year since the start of the global financial crisis can be found in Annex Table 2.A1.1 at the end of this chapter:

● Real wage growth (Panel A), a measure of the growth in the purchasing power of wages, has come to a virtual standstill. Average real wage growth in the OECD area slowed from 0.7% during the initial crisis period period following the onset of the crisis to 0.2% during the subsequent period. The slowdown in real wage growth was particularly pronounced in the euro area where it declined from an average growth rate of 2.1% to - 0.1%. However, similar trends are also observed in the United States (0.5% to 0.2%) and

Figure 2.1. **Real wage growth has fallen**

Average annualised percentage growth rate
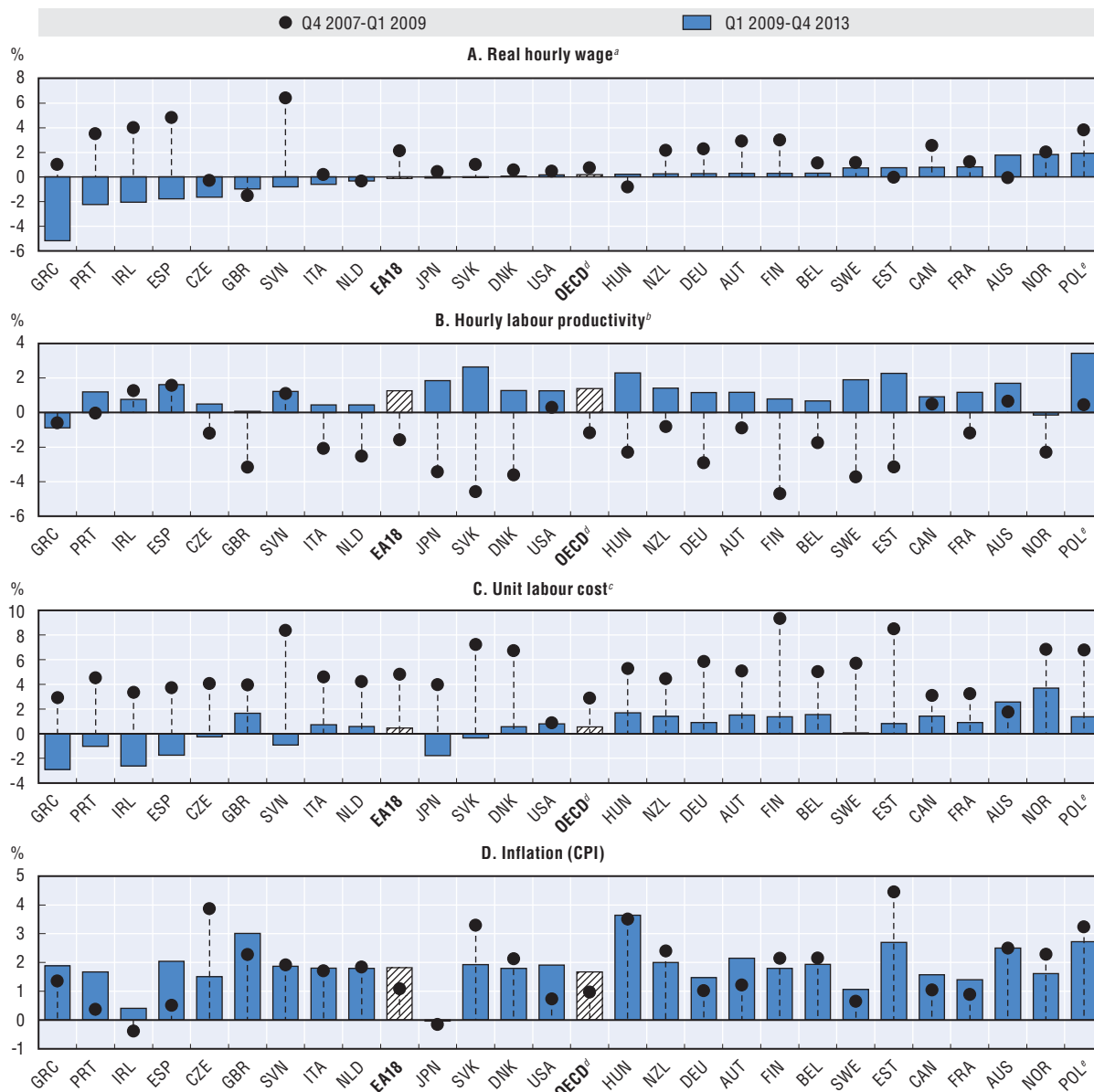
Note: Countries are ordered by ascending order of the average annualised growth rate in real hourly wages since the first quarter of 2009.
a) Total compensation of employees (total wages for New Zealand) divided by total hours worked of employees in real terms (deflated using the consumer price index).
b) Real GDP divided by total hours worked.
c) Total compensation of employees divided by real GDP.
d) OECD is the weighted average of the 26 OECD countries shown.
e) Q1 2009 to Q3 2013 for Poland.
Source: OECD calculations based on quarterly national accounts.

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Japan (0.4% to -0.1%). Since the first quarter of 2009, average real wage growth has been negative in 11 OECD countries. The largest falls in real wages occurred in Greece, where they declined by more than 5% per year on average, and in Ireland, Portugal and Spain, where they declined by roughly 2% on average per year. Real wage cuts of this magnitude

could cause considerable financial hardship among workers and their families. This is analysed in detail in OECD (2013d).

- Labour productivity growth has started to recover (Panel B). While it had initially turned negative in the large majority of OECD countries, it has since turned positive due to the gradual recovery in aggregate demand. In the large majority of OECD countries, average labour productivity growth exceeds average real wage growth, implying that real unit labour costs have declined. This has resulted in higher profits for firms and a lower share of overall income going to workers. This is a typical pattern observed in economic recoveries and reflects the gradual return to pre-crisis conditions after a period of intense labour hoarding in the context of a recession. More recently, growth in labour productivity has tended to slow somewhat as employment has started to recover.

- The decline in real wage growth has been associated with a decline in the growth of nominal unit labour costs, which measures nominal wage growth relative to productivity, from 2.9% per annum on average at the start of crisis to 0.6% subsequently (Panel C). In large part, this reflects the mechanical relationship between labour productivity and unit labour costs: when nominal wages are constant, an increase in labour productivity implies a reduction in nominal unit labour costs. However, in countries, such as Greece, Ireland, Portugal, Slovenia and Spain, it also reflects declining nominal wage growth. The decline in the growth of nominal unit labour costs has played an important role in helping these countries restore competitiveness and their often large current account deficits. This has helped the rebalancing process in the euro area as is discussed in more detail in Box 2.1.

- Falling wage inflation has only had a limited impact on slowing down price inflation (Panel D). The absence of an obvious relationship between wage and price inflation in the short-term may, in part, reflect the role of well-anchored inflation expectations in countries that are not part of a monetary union nor maintain a fixed exchange rate (IMF, 2013). In countries where nominal wage growth has tended to fall short of inflation, this has resulted in lower real wages and may have helped to limit the persistence of unemployment. However, the relationship between wage growth and price inflation has also been weak in individual euro area countries without an independent monetary policy, particularly in countries where nominal wage adjustments have been large. While the resulting reduction in real wages may help internal rebalancing, adjustment in prices is also needed to restore competiveness and spur structural adjustment (see Box 2.1). The weak relationship between wage growth and price inflation in the euro area periphery reflects, in part, the greater need for internal financing of firms as credit has dried up, but also points to the weakness of product market competition and, in turn, the importance of further pro-competitive product market reforms.[4]

There is also some indication that the responsiveness of wage growth has slowed…

One way of analysing the degree of wage flexibility is by means of short-term Phillips curves which relate nominal wage growth to the unemployment gap, defined as the change in unemployment since the start of the global financial crisis.[5] Nominal wage growth and the unemployment gap are expected to be negatively related since higher unemployment increases the competition for jobs among jobseekers and, as a result, has a tendency to drive wages down. The strength of the negative relationship gives a first indication of the degree of wage flexibility, but should be interpreted with caution since the aggregate relationship between nominal wage growth and the unemployment gap is not necessarily causal and may be subject to important composition effects (see Box 2.5).

Box 2.1. **Rebalancing in the euro area and the role of labour market policies**

In the period since the introduction of the euro in 1999 and the start of the global financial crisis, a number of euro area economies accumulated significant losses in international competitiveness, as illustrated by widening current account deficits, substantial increases in nominal unit labour costs and growing levels of external debt. These include Greece, Ireland, Portugal, Slovenia, Spain, and to a lesser extent, Italy. As a result of the global financial crisis, external credit to these countries suddenly dried up, triggering large reductions in aggregate demand and large increases in unemployment. In the absence of monetary union, the optimal response would probably have been to devalue the exchange rate to regain competitiveness. However, external devaluations are not feasible in the context of a monetary union. In this case, rebalancing needs to come from either higher productivity growth and/or lower nominal wage growth. While the former is clearly preferable, fostering productivity growth requires in-depth structural reforms and thus takes time. In the short-run, the adjustment has largely taken place via a reduction in nominal wage growth, even in countries which have undertaken important pro-competitive reforms (Blanchard et al., 2013).
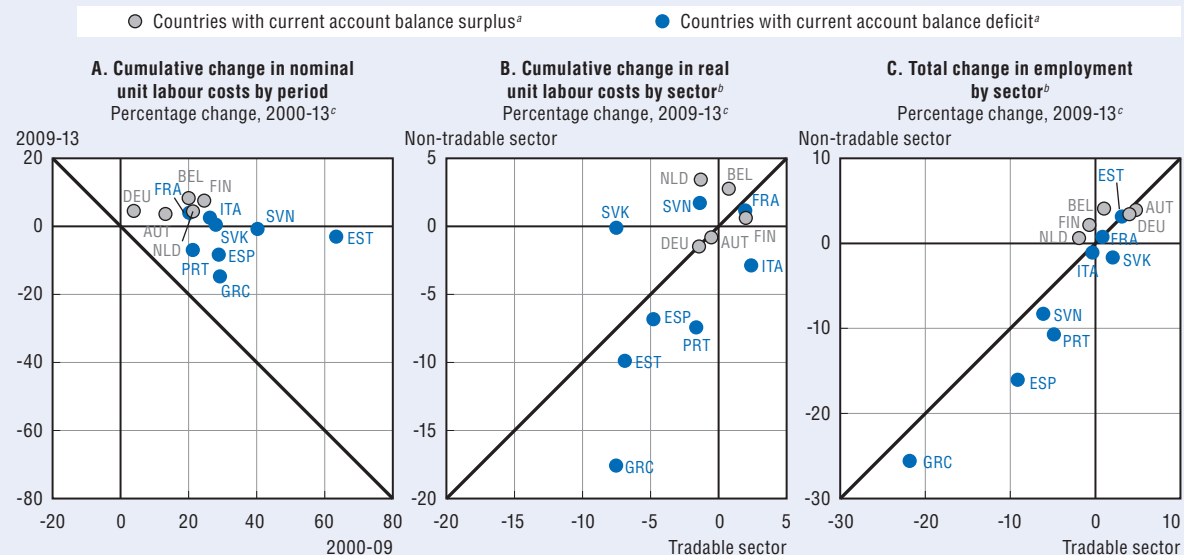
The extent to which internal devaluations are successful in reducing unemployment and restoring competiveness hinges crucially on the way labour, product and financial markets operate:

- Nominal wages have to be sufficiently responsive to changes in cyclical conditions, and in particular, to rises in unemployment. Fiscally balanced reductions in the tax wedge that reduce labour costs, but increase consumer taxes, may also have a role to play (Blanchard, 2007). Panel A of the figure below compares the cumulative change in nominal unit labour costs over the period 2000 to 2009 with the cumulative change during the period 2009 to 2013. It shows that nominal unit labour costs have tended to increase more rapidly in the euro area periphery than in the euro area core during the pre-crisis period, resulting in a loss of cost competitiveness and growing current account deficits in the former group of countries. However, since the start of the crisis, nominal unit labour costs have risen more slowly in the deficit countries than in the surplus countries, and declined significantly in absolute terms in Greece, Portugal and Spain. As a result of the decline in nominal unit labour costs in these three countries, cost competitiveness, measured in terms of unit labour costs, is now broadly in line with that of several surplus countries, although still considerably higher than in Germany.

- Output prices have to adjust in response to changes in nominal unit labour costs so as to trigger an internal devaluation, i.e. a reduction in the price of the non-tradable sector relative to that of the tradable sector. Panel B compares the cumulative change since 2009 to 2013 in real unit labour costs in the tradable sector with that in the non-tradable sector (the change in nominal unit labour costs to output prices). It shows that in the surplus countries real unit labour costs have been relatively stable in both sectors. By contrast, in the deficit countries real unit labour costs have tended to decline, and this decline tended to be largely concentrated in the non-tradable sector. This suggests that nominal reductions in wage growth, and particularly those in the non-tradable sector, were not fully passed onto lower prices, reducing the labour share in overall income. In part, this is likely to reflect the effect of the credit crunch on the scope for external financing and the greater need for internal saving. However, it is also likely to reflect limited product market competition in the non-tradable sector.

- Successful rebalancing also requires that workers are mobile across sectors and, particularly, between the non-tradable and the tradable sectors. Panel C compares the evolution of employment since 2009 in the tradable and non-tradable sectors. It shows that in most periphery countries employment has fallen in both sectors, albeit somewhat more strongly in the non-tradable sector. There is little indication yet that the tradable sector has started to absorb the increase in labour market slack and that export capacity has substantially increased. The slow pace of labour reallocation across sectors may to some extent reflect the role of differences in skill requirements and the inability of workers to take up new jobs due to skill mismatch. This suggests that policies that encourage wage adjustment need to be complemented with active labour market policies that help workers that were previously employed in the non-tradable sector to move into newly created jobs in the tradable sectors. Such policies can focus on training, work-experience programmes and targeted hiring subsidies on the unemployed (OECD, 2013b). Policies to foster greater geographic mobility would also help.

Box 2.1. **Rebalancing in the euro area and the role of labour market policies** *(cont.)*

In sum, successful rebalancing through an internal devaluation not only requires wages to adjust, but also adjustments in prices and the reallocation of resources across sectors. While nominal unit labour costs have already adjusted substantially in the countries that have been most affected by the crisis, the adjustment of output prices and the reallocation of resources to the tradable sector have been comparatively slow, implying that the effect of wage adjustment in terms of reducing unemployment may take a long time to materialise. Both labour and product market policies are crucially important for ensuring that the substantial degree of wage adjustment that has taken place so far promotes the effective reallocation of resources and translates into the creation of new jobs.

Adjustments in nominal unit labour costs, real unit labour costs and employment in the euro area

○ Countries with current account balance surplus[a]   ● Countries with current account balance deficit[a]

A. Cumulative change in nominal unit labour costs by period
Percentage change, 2000-13[c]

B. Cumulative change in real unit labour costs by sector[b]
Percentage change, 2009-13[c]

C. Total change in employment by sector[b]
Percentage change, 2009-13[c]

a) Countries are classified according to their structural current account balance at the onset of the global financial crisis in 2007.
b) "Tradable sector" refers to manufacturing; trade sector; transport and communication; financial and business activities; and real estate activities. "Non-tradable sector" refers to construction; accommodation and food services; education; personal services; and public administration.
c) 2012 for Austria, Estonia, France, Italy, Portugal and the Slovak Republic.
Source: OECD calculations based on annual national accounts.

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Figure 2.2 traces out the short-term relationship between nominal wage growth and the change in the unemployment rate since the start of the crisis to Q4 2013 for the OECD as a whole as well as for the euro area, Japan and the United States, while Box 2.2 reports regression-based estimates of wage-Phillips curves that control for the role of price inflation and labour productivity using data for the period Q1 1985 to Q4 2013. Both Figure 2.2 and the regression-based estimates confirm the existence of a negative relationship between nominal wage growth and the unemployment gap in the short-term. On average across OECD countries and time, a one percentage-point increase in the unemployment gap is associated with a -0.1 percentage-point reduction in aggregate wage growth. However, the average relationship across the OECD hides considerable heterogeneity across countries: the responsiveness of nominal wages to the unemployment gap appears to be considerably stronger in Japan (-0.4) than in the euro area and the United States where in both cases it is close to the OECD average. The relatively high degree of wage flexibility in Japan is consistent

Figure 2.2. **Nominal wage growth has tended to become less responsive to unemployment**

Wage-Phillips curves: the relationship between nominal wage growth and the change
in the unemployment rate since the start of the crisis Q4 2007-Q4 2013[a]
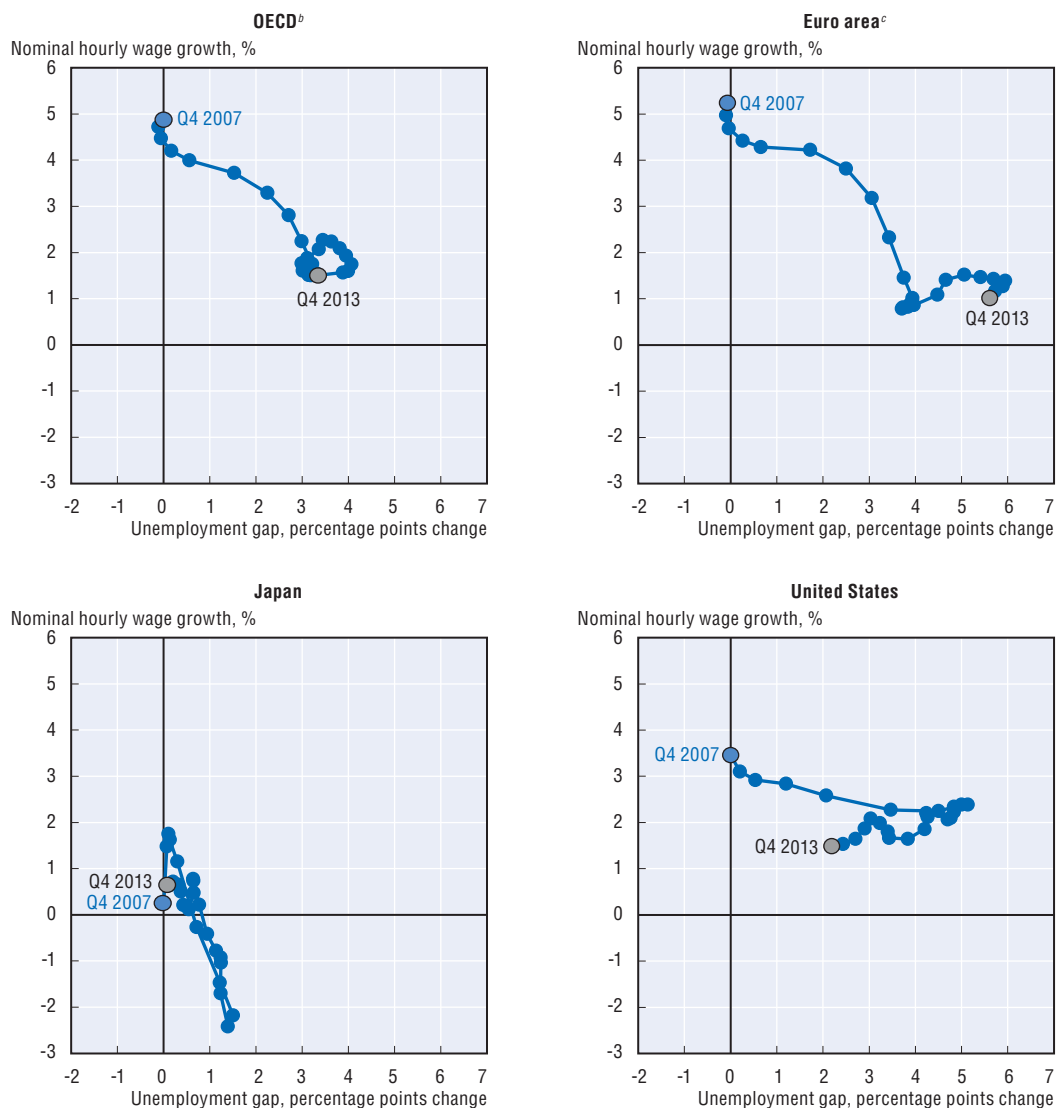
a) Nominal wage growth: year-on-year percentage change in nominal hourly wage (defined as total compensation divided by hours worked of employees); unemployment gap: percentage-points change in the unemployment rate since the start of the crisis in Q4 2007.

b) Unweighted average of 26 OECD countries (excluding Chile, Iceland, Israel, Korea, Luxembourg, Mexico, Switzerland and Turkey).

c) Unweighted average of 14 euro area countries (including Austria, Belgium, Estonia, France, Finland, Germany, Greece, Ireland, Italy, the Netherlands, Portugal, the Slovak Republic, Slovenia and Spain).

Source: OECD calculations based on quarterly national accounts and the *OECD Short-Term Labour Market Statistics* (database), *http://dx.doi.org/10.1787/data-00046-en.*

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with country studies that suggest that downward nominal wage rigidity has essentially disappeared since the late nineties (Kuroda and Yamamoto, 2013). The regression-based estimates of the Philips curve further suggest that the degree of wage flexibility in the euro area was higher during the global financial crisis than in the period before, whereas that in in the United States and Japan has remained unchanged.

Box 2.2. **Estimating wage-Phillips curves**

In order to assess the sensitivity of wages to unemployment more formally, Philips curves are estimated using the following dynamic wage model:

$$\Delta lnw_{it} = \alpha_i + \beta_0 \Delta lnw_{it\text{-}1} + \beta_1 u_{it} + \beta_2 \Delta ln\pi_{it} + \beta_3 \Delta lnx_{it} + \varepsilon_{it} \qquad (1)$$

where Δlnw refers to the quarterly growth rate in nominal hourly wages, u to the unemployment gap defined as the difference between the unemployment rate and the country mean over the sample period, $\Delta ln\pi$ to the quarterly inflation rate and Δlnx to the quarterly growth rate in hourly labour productivity. Subscript i and t refer to country and time respectively. The model is similar to that used by ECB (2012). Allowing for additional lags does not change the qualitative results. The table below presents the regression results of the specification presented in equation (1) above (Model 1 in the table) which is estimated using quarterly data for 26 OECD countries for the period Q1 1985 to Q4 2013. In an extension (Model 2), a dummy that equals one from the start of the global financial crisis onwards and an interaction of the crisis dummy and the unemployment gap are added to the baseline model to test for a change in the relationship between nominal wage growth and the unemployment gap since the start of the crisis. In another extension (Model 3), a dummy for a positive unemployment gap along with an interaction term of the dummy with the unemployment gap are added to the baseline model to test whether the responsiveness of nominal wage growth depends on the unemployment gap being positive or negative. The table below reports the estimates for β_1 which captures the responsiveness of nominal wage growth to the unemployment gap as well as the interaction terms of the crisis and gap dummies with the unemployment gap.

Regression estimates of wage-Phillips curves

	Total	Euro area	Japan	United States
Model 1				
Average effect of unemployment	-0.146***	-0.146***	-0.411***	-0.138***
	(0.015)	(0.019)	(0.085)	(0.048)
Model 2				
Effect of unemployment before the crisis	-0.107***	-0.084***	-0.430***	-0.120
	(0.020)	(0.031)	(0.092)	(0.093)
Additional effect since the start of the crisis	-0.047**	-0.069**	0.146	0.029
	(0.019)	(0.028)	(0.197)	(0.125)
Model 3				
Effect of unemployment when unemployment gap is negative	-0.250***	-0.294***	-0.781***	-0.268*
	(0.036)	(0.048)	(0.262)	(0.144)
Additional effect when the unemployment gap is positive	0.100***	0.147***	0.509	0.144
	(0.025)	(0.035)	(0.311)	(0.174)
Number of countries	**26**	**14**	**1**	**1**
Observations	**1 631**	**756**	**94**	**94**

Standard errors in brackets. *, **, *** indicate statistically significance at 10%, 5% and 1% levels, respectively. See notes below Figure 2.2 for details on country coverage and variable definitions.
Source: OECD calculations based on quarterly national accounts and the *OECD Short-Term Labour Market Statistics* (database), *http://dx.doi.org/10.1787/data-00046-en.*

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... possibly due to the increasing importance of downward wage rigidities or rising structural unemployment

There is some indication that the slope of the Phillips curve has flattened during the course of the global financial crisis as nominal wage growth has slowed. This appears to be the case in the OECD as a whole, the euro area and the United States, but not in Japan. Furthermore, regression-based estimates of Phillips curves indicate that the responsiveness of nominal wage growth to the unemployment gap tends to be considerably larger in good times than in bad times.[6] The degree of asymmetry in wage adjustment over the cycle is similar in the euro area and the United States, but considerably stronger in Japan. However, even in bad times, wages remain relatively flexible in Japan. The flattening of the Phillips curve and the asymmetry of wage adjustment over the cycle may reflect workers' resistance to nominal wage cuts or that of employers to make use of them (Bewley, 1999) or the possibility that an increasing portion of the unemployed is no longer effectively competing for jobs. These factors are likely to become more important the longer unemployment remains high since, in such an environment, inflation tends to be low and it becomes increasingly difficult to lower real wages without reducing nominal wages and the risk that the cyclical increase in unemployment becomes structural increases (see the discussion in Chapter 1). The remainder of this section focuses on the role of nominal downward wage rigidities and the process of wage adjustment more generally.

Before the global financial crisis, downward adjustments in both real and nominal wages were limited

The aggregate analysis already provided a first indication that downward wage rigidities (DWR) play a potentially important role in shaping dynamics of wage growth and unemployment during the global financial crisis and subsequent recovery. This sub-section documents the nature of downward real and nominal wage rigidity in more detail using microdata in OECD countries. In order to do so, it focuses on full-time workers who remain in the same firm for one year to the next. The sensitivity of wages among new hires is analysed separately below.

Nominal DWR refers to the reluctance of employees to accept nominal wage cuts or that of employers to make use of nominal wage cuts.[7] Real DWR refers to the difficulty of reducing wages in real terms, that is, to set nominal wage increases that fall short of the rate of inflation.[8] The presence of nominal and real DWR tends to be associated with wage freezes, reflected by a spike in the nominal/real wage-change distribution around zero and a missing mass just below zero.[9] A simple way of characterising the degree of DWR is to focus on the share of notional wage cuts – the number of desired wage cuts that would have occurred in the absence of DWR – that have been prevented by DWR. A useful approximation of this can be obtained by calculating the share of wage freezes over the sum of actual wage cuts and wage freezes. This involves implicitly assuming that no wage freezes would occur in the absence of wage rigidity. Both nominal and real DWR can have important implications for the adjustment of real wages and, hence, the evolution of unemployment over the business cycle.[10] However, the underlying mechanisms are rather different with potentially important implications for policies. Nominal DWR is more of an issue in the context of low inflation, and, hence, sometimes has been used as an argument for adopting higher inflation targets for the conduct of monetary policy (Schmitt-Grohé and Uribe, 2013). Real DWR is more likely to reflect the role of wage-setting institutions, such as collective wage bargaining, automatic wage indexation and minimum wage floors.

Empirical evidence on DWR is largely confined to the period before the global financial crisis. Using microdata for 16 OECD countries from before the global financial crisis, Dickens et al. (2007) show that both nominal and real DWR are potentially important. They estimate that, on average across countries, the shares of notional wage reductions prevented by, respectively, nominal and real DWR to be somewhat below 30%. However, they also report large differences in the incidence of DWR across countries which are difficult to interpret.[11] Using a semi-aggregate approach based on industry-level for 19 OECD countries for the period 1971-2006, Holden and Wulfsberg (2008, 2009, 2014) confirm the importance of nominal DWR, while the evidence for real DWR is more limited. Since they use industry-level data, their wage measures not only relate to job stayers, but also capture potentially important composition effects as workers enter or leave employment in an industry. To the extent that downward wage rigidities survive at the industry level and, thus, are not fully offset by increased flexibility at the margin, the presence of DWR is likely to have important implications for the cyclicality of employment and unemployment (see also the discussion below on the sensitivity of wages for new hires to the business cycle). Interestingly, they find that nominal DWR has significantly declined since the 1970s. The most likely explanation for this is the gradual reduction in inflation and the corresponding shift of the nominal wage-change distribution to the left. This increases the typical size of notional wage cuts and reduces the likelihood that such cuts are prevented by nominal DWR. This does not mean, however, that nominal DWR has become less important for aggregate employment fluctuations. While notional wage cuts may be less likely to be prevented by nominal DWR, the share of the workforce exposed to such wage cuts is likely to have increased.[12]
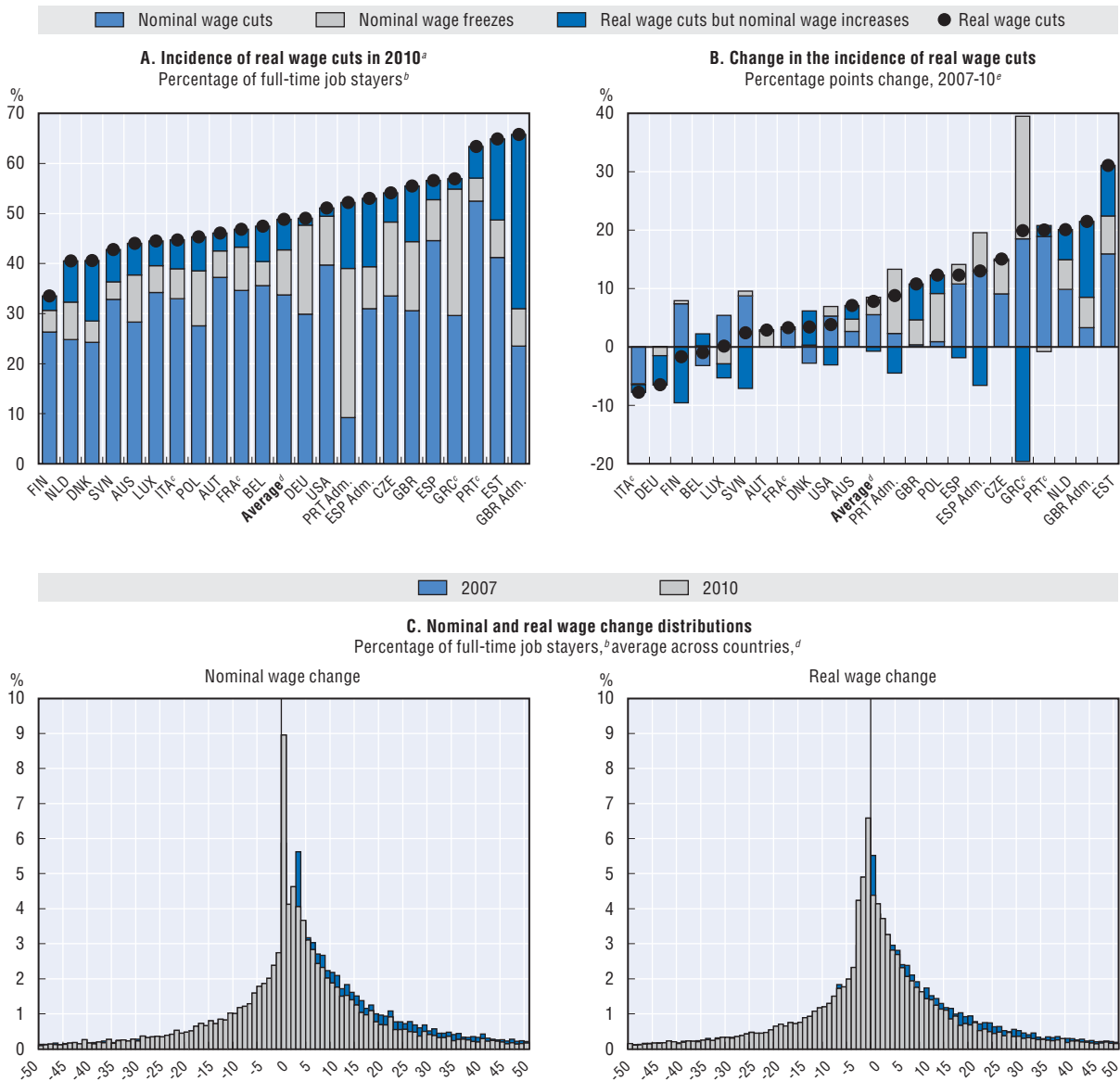
Since the crisis, downward adjustments in real wages have become more frequent while nominal wage floors have tended to become more binding

Comprehensive cross-country evidence on how the incidence of downward wage rigidities has evolved since the start of the global financial crisis is lacking. This is unfortunate since the number of persons potentially exposed to DWR may have increased as inflation and real wage growth have slowed. Up-to-date information on the exposure and incidence of DWR, therefore, would be very useful for understanding the evolution of unemployment since the start of the global financial crisis as well as its persistence. Daly et al. (2013) show, using labour force survey data for the United States, that the incidence of nominal wage freezes has increased markedly since the start of the global financial crisis and suggest that this may explain why aggregate wage growth has become less responsive to labour market slack, and thereby slowed down the labour market recovery.[13] Elsby et al. (2013) use administrative data for the United Kingdom to analyse how nominal DWR has evolved since the late 1970s up to 2011. In contrast to the US results, they find that a much larger number of workers appear to have accepted nominal wage cuts in the period following the global financial crisis than was generally expected and conclude that nominal DWR did not play a major role in shaping the evolution of unemployment since the start of the crisis in the United Kingdom.[14] Doris et al. (2013) use recent data from administrative records and household data to analyse nominal DWR in Ireland. Similar to the evidence for the United Kingdom, they find substantial evidence of wage flexibility, with nominal wage cuts being much more common than nominal wage freezes, but also that both increased substantially since the start of the crisis.

Figure 2.3 presents a number of new stylised facts on downward wage rigidity based on comprehensive household or labour force surveys for 19 OECD countries. Panel A provides information by country on the incidence of nominal earnings cuts, the incidence of nominal earnings freezes[15] and the incidence of real earnings cuts in conjunction with nominal earnings rises using data for 2010. Panel B displays how each of these categories has changed since the start of the global financial crisis in each country. Finally, Panel C shows the entire distribution of nominal and real earnings changes in 2007 and 2010 on average across countries. The analysis in the figures is based on monthly earnings for full-time workers who stay in the same job from one year to the next. Portugal, Spain and the United Kingdom are included twice in Panels A and B, once using the household data from EU SILC and once using administrative data. The results from the two sources may differ because of the greater importance of measurement error in household data, differences in the concept of earnings (base pay in the administrative data for Portugal and the United Kingdom or all forms of wage compensation otherwise) and dissimilarities in sample coverage (the private sector in the administrative data for Portugal and Spain and the entire economy otherwise). The averages in Figure 2.3 only take account of the household data. The following insights emerge:

- *Panel A*. Real cuts in earnings were widespread. On average across countries, 49% of workers experienced a reduction in real earnings in 2010. The lowest incidence of real earnings cuts was observed in Finland where it amounted to one third of the workforce, while the highest incidences were observed in Estonia, Portugal and the United Kingdom (using administrative data) where it affected almost two-thirds of the workforce. On average across countries, two-thirds of these cuts in real earnings took the form of nominal earnings reductions (69%). This corresponds to about one in three workers (34%). The high incidence of nominal earnings reductions is likely to reflect the role of flexible forms of pay such as overtime and bonuses, but may also capture temporary reductions in actual working time related to the decline in business activity.[16] The incidence of nominal earnings freezes tended to be comparatively small, affecting about 9% of workers.[17] Given the incidence of nominal earnings cuts and earnings freezes, this suggests that, on average across countries, about one in five notional earnings cuts were prevented as a result of DWR (21%). Countries with very high levels of DWR are Greece and Portugal (using administrative data) where it is estimated that, respectively, one half and three quarters of notional wage cuts were prevented by nominal DWR in 2010.[18] Comparing the two sets of results for Portugal, Spain and the United Kingdom based on household and administrative data suggests that the incidence of real wage cuts tends be broadly similar, but that the incidence of nominal wage cuts tends to be substantially less pronounced in the administrative data.[19] To an important extent, this reflects the more narrow focus on hourly base pay when using administrative data. Adjustments in real hourly base pay appear to disproportionately take place through inflation, particularly in Portugal, while nominal wage cuts become more important when taking account of more flexible forms of pay.[20]

- *Panel B*. Between 2007 and 2010, the incidence of real earnings reductions increased by 8 percentage points as the earnings growth distribution shifted to the left. The largest increases in the incidence of real earnings reductions occurred in Estonia, Greece, the Netherlands, Portugal and the United Kingdom (using administrative data). On average across the countries shown in Figure 2.3, an increase of 6 percentage points in the incidence of nominal earnings cuts accounted for the bulk of higher incidence of

Figure 2.3. **Nominal downward wage rigidities have tended to become more binding since the start of the crisis**

Legend: Nominal wage cuts | Nominal wage freezes | Real wage cuts but nominal wage increases | ● Real wage cuts

A. Incidence of real wage cuts in 2010[a]
Percentage of full-time job stayers[b]

B. Change in the incidence of real wage cuts
Percentage points change, 2007-10[e]

2007 | 2010

C. Nominal and real wage change distributions
Percentage of full-time job stayers,[b] average across countries,[d]

Adm.: Administrative data.

a) 2009 for Greece.

b) The sample refers to full-time wage and salary workers (aged 15-64) who have been with the same employer for at least one year.

c) Net earnings.

d) Unweighted average (excluding results from administrative data).

e) 2006-10 for the United States, 2008-10 for Spain (administrative data) and 2007-09 for Greece.

Source: OECD calculations for household or labour force data: the European Union Statistics on Income and Living Conditions (EU-SILC) for European countries, Household, Income and Labour Dynamics (HILDA) for Australia, German Socio-Economic Panel (GSOEP) for Germany, and national labour force surveys for France, the United Kingdom and the United States; calculations using administrative data: for Portugal provided by Pedro Portugal based on the *Quadros de Pessoal* (2003-09) and *Inquérito Único* (2010-12), for Spain provided by Marcel Jansen, Sergi Jimenez and Jose Ignacio Garcia Pérez based on the *Muestra Continua de Vidas Laborales*, and for the United Kingdom provided by Michael Elsby, Donggyun Shin and Gary Solon (2013) based on the New Earnings Survey.

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reductions in real earnings. The incidence of nominal earnings freezes has increased modestly in absolute terms by almost 3 percentage points, but over 50% in proportional terms. The increase in the incidence of nominal earnings freezes appears to be particularly large in Greece, where it increased by 26 percentage points and in Portugal where it increased by 11 percentage points (using administrative data). In most countries, the degree of nominal DWR has been relatively stable except in Estonia, Greece, the Netherlands, Poland, Spain (administrative data) and the United Kingdom (administrative data), where it increased considerably.[21] The incidence of employees experiencing real earnings cuts despite receiving higher nominal earnings generally declined as the earnings-growth distribution shifted to the left. Comparing the two sets of results based on household or labour force surveys, on the one hand, and administrative data, on the other, for Portugal, Spain and the United Kingdom suggests that the proportional increase in nominal wage freezes is considerably stronger in the administrative data than in the household data. As a result, the increase in the estimated share of notional wage cuts that is prevented by nominal DWR also tends to be much stronger in the administrative data.

- *Panel C.* Before the crisis in 2007, both nominal and real DWR played a role, although real DWR appears to have been somewhat more important on average across countries. This is indicated by the higher spike at zero in the distribution of real earnings changes (right panel) than in the distribution of nominal earnings changes (left panel) in both absolute terms and relative to the frequency of either small increases or declines in earnings. However, by 2010 the picture had changed dramatically. The importance of nominal DWR appears to have risen substantially, with the incidence of nominal wage freezes increasing substantially both in absolute and relative terms. This is consistent with the flattening of the Philips curve documented in Figure 2.2. By contrast, there is no longer evidence of a spike at zero in the distribution of real earnings changes, suggesting that real DWR has effectively disappeared. The importance of both sources of DWR before the start of the crisis and the increase in the relative importance of nominal DWR during the crisis is consistent with evidence presented in Box 2.3 using administrative data for Spain for the period 2007 to 2012.[22] Moreover, these data also show that nominal DWR has increased substantially in Spain since 2010, with approximately one in two notional wage cuts being prevented by nominal DWR in 2012. For low-wage workers, the incidence of nominal DWR is even more important, affecting over two-thirds of the workforce. This may well have contributed to the importance of job losses among low-wage workers.

Wage-setting institutions play an important role in shaping wage adjustments

The role of policies and institutions for nominal DWR may have become increasingly important since the start of the crisis. Whereas before the crisis, nominal wage freezes may have largely reflected concerns by employers about the adverse effects of nominal wage cuts on motivation and productivity, such concerns may have been overridden by the scale of the crisis. Not only may nominal wage cuts in bad times be less easy to avoid as the survival of the firm may be at stake, but concerns about the potential adverse productivity effects of nominal wage cuts may also become less relevant. For example, Smith (2013) shows, using data for the United Kingdom, that job satisfaction declines sharply following nominal wage cuts, but that this effect disappears if they are widely shared across peers.[23] Consequently, it is plausible that the increase in the importance of nominal DWR since the start of the crisis reflects the reluctance of workers to accept nominal wage cuts and the role of wage-setting institutions.

Box 2.3. **Analysing downward wage rigidity: An application using administrative data for Spain**[*]

This box analyses downward nominal and real wage rigidity using administrative data for Spain from the start of the global financial crisis in 2007 to 2012. Spain is of particular interest since unemployment has increased to over 25% as a result of the global financial crisis, while the incidence of long-term unemployment more than doubled. The high quality nature of the administrative data not only help to draw reliable inferences about the debate on wage rigidity for Spain, but can also be used to test the robustness of results based on household data for Spain. The latter is done in the main text.

In order to analyse downward wage rigidity, the main challenge is to construct a notional distribution of wage changes that is not affected by downward wage rigidity. Notional distributions have been identified in the literature either by assuming that the wage-change distribution is symmetric and the right-hand side of the wage-growth distribution is not affected by wage rigidity (Card and Hyslop, 1997) or by assuming that in specific episodes characterised by high nominal and real wage growth downward wage rigidities are not binding and the resulting notional wage-change distribution is time invariant (Kahn, 1997). Unfortunately, neither of these approaches works in the present context as the data do not contain any episodes with very high wage growth and neither is it reasonable to assume that the wage-change distribution from the median to the right is unaffected by downward wage rigidities (as will become clear below). The present analysis, therefore, does not attempt to identify notional wage-change distributions, but instead proceeds descriptively.

The figure below assesses how the wage-growth distribution since the start of the global financial crisis has evolved by comparing the wage-change distribution in 2008 with that in 2012. To this end, the wage-growth distribution is divided into bins of 0.5% each. The vertical axis measures the fraction of the workforce in each bin. In order to give an indication of the extent of real wage rigidity, the expected rate of inflation is also represented in each year (measured by the inflation rate one year hence):

- In 2008, there is only modest evidence of downward wage rigidity and real DWR appears to be more important than nominal DWR. The share of workers in the bin that contains zero is about 1.7 percentage points higher than the shares in the adjacent bins. Given the observed number of nominal wage cuts and wage freezes, this means that about one in ten notional wage cuts were prevented by nominal DWR. Real DWR seems more important, with a considerable spike around the level of inflation and significant heaping in the bins immediately to the right, although without estimating a notional wage change distribution, it is difficult to establish how important real DWR precisely is. The relative importance of real wage rigidities may reflect the role of automatic indexation clauses in collective bargaining agreements (OECD, 2013c).

- Between 2008 and 2012, the importance of downward wage rigidity appears to have increased substantially as the wage change distribution has shifted to the left. However, in contrast to the situation in 2008, DWR largely takes the form of nominal DWR, while there is little evidence of real DWR. While nominal wage cuts and wage freezes have both become more common, the incidence of nominal wage cuts increased from 13% to 24%, while the incidence of wage freezes increased from about 3% to 22%. Consequently, it appears that the number of notional wage cuts prevented by nominal DWR increased from one in six in 2008 to almost one in two in 2012.

Box 2.3. **Analysing downward wage rigidity: An application using administrative data for Spain**[*] *(cont.)*

The incidence of nominal downward wage rigidity has increased dramatically in Spain since the start of the global financial crisis

Percentage of full-time job stayers (aged 15-64) in the workforce, 2008 and 2012[a, b]
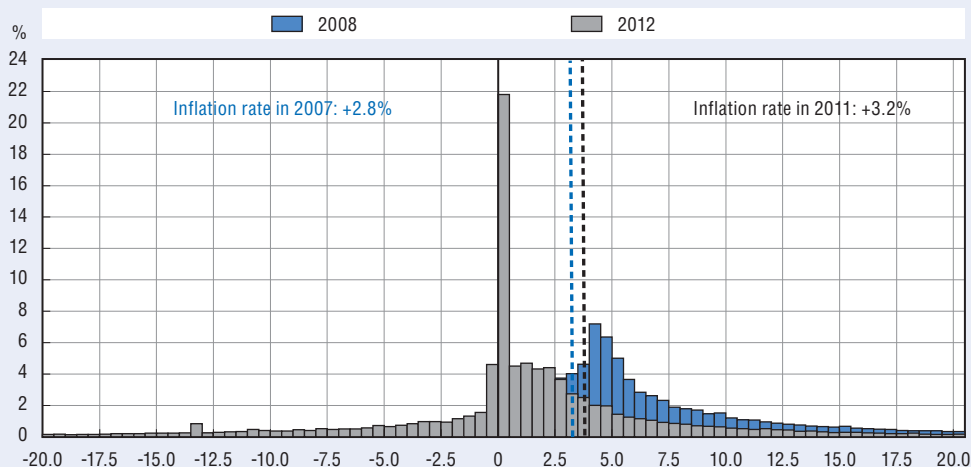
a) Gross monthly earnings measured by contribution bases (censored at 90th percentile).
b) Excluding firms with less than three employees in non-agricultural market sector, temporary-agency workers, interns and apprentices.
Source: Calculations by Marcel Jansen, Sergi Jimenez and Jose Ignacio Garcia Pérez based on *Muestra Continua de Vidas Laborales*.

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The figure below presents similar information for low and high-wage workers. Low-wage workers are defined as those in the bottom tercile of the wage distribution (in levels) in the base year, while high-wage workers are those in the top tercile. The figure shows a qualitatively similar pattern for the two earnings groups. For both groups real DWR was more important in 2008 (not reported), while nominal DWR was much more important in 2012. However, the overall importance of downward wage rigidities in both years is much more important for low-wage workers than for high-wage workers. In 2012, the incidence of nominal wage freezes is considerably larger than the share of nominal wage cuts among low-wage earners. As many as two-thirds of notional nominal wage cuts may have been prevented by nominal DWR. In contrast, for high-wage workers, the incidence of nominal freezes is significantly smaller than the incidence of nominal wage cuts. Only about a third of notional nominal wage cuts among high-wage workers may have been prevented by nominal DWR. The results, thus, suggest that wages are considerably more flexible downwards for high-wage workers than for low-wage workers. This may imply that, to a relatively large extent, the adjustment to the crisis took the form of wage losses for high-wage workers, while for low-wage workers job losses were relatively more important. The relative flexibility of high wages may reflect the greater role of bonus and other non-pay benefits for high-wage workers (Babecky et al., 2012), but also the greater importance of *de facto* wage floors for low-wage workers.

Box 2.3. **Analysing downward wage rigidity: An application using administrative data for Spain**[*] *(cont.)*

The incidence of nominal downward wage rigidity is concentrated among low-wage workers

Percentage of full-time job stayers (aged 15-64) in the corresponding earnings tercile, 2012[a, b]
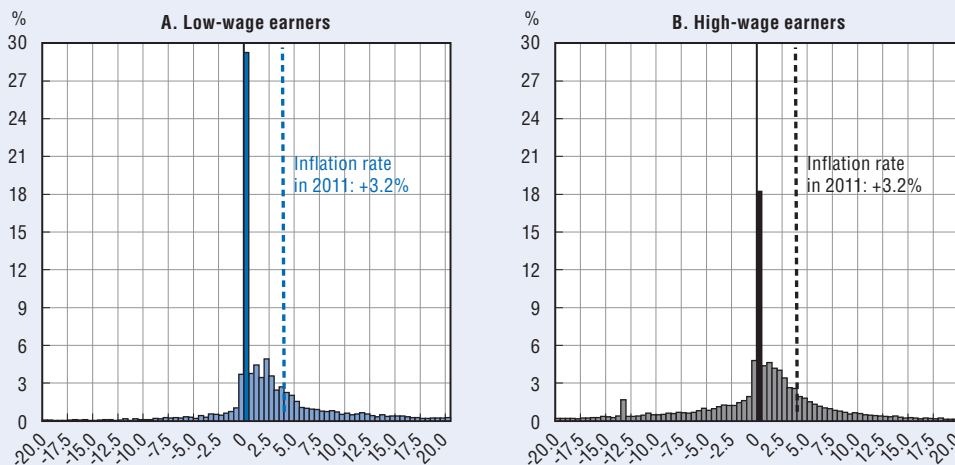
a) Gross monthly earnings measured by contribution bases (censored at 90th percentile).
b) Excluding firms with less than three employees in non-agricultural market sector; temporary-agency workers, interns and apprentices.
Source: Calculations by Marcel Jansen, Sergi Jimenez and Jose Ignacio Garcia Pérez based on *Muestra Continua de Vidas Laborales*.

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The stylised facts on the increased incidence of nominal DWR and the reduced incidence of real DWR documented here are unlikely to be related to the major labour market reform that was implemented in 2012 given the likely lag involved before the effects of this reform would be felt. Instead, they are likely to reflect a shift in the objectives of wage-setting institutions, such as minimum wages and collective bargaining agreements, from preserving earnings in real terms to preserving earnings in nominal terms. For example, the minimum wage has been effectively frozen in nominal terms since 2009/10 (increasing less than 2% since the middle of 2009 to the beginning of 2014). Nevertheless, the labour market reform may have important effects on the process of wage adjustment in the near future. Indeed, the OECD's recent evaluation of the labour market reform suggests this is already starting to have effects on wage moderation and job creation (OECD, 2013c).

[*] This box was prepared in collaboration with Marcel Jansen, Sergi Jimenez and Jose Ignacio Garcia-Pérez. Research assistance by Alfonso Arellano, from FEDEA, is gratefully acknowledged.

While evidence by Holden and Wulfsberg (2014) suggests an important role for policies and institutions for nominal DWR already before the crisis,[24] their role may have increased further as the objective of various wage-setting institutions has effectively shifted from preserving earnings in real terms towards preserving earnings in nominal terms. For example, given the current economic situation, trade unions may not have enough bargaining power to maintain real wages, but may still be able to maintain nominal wages. Moreover, in several countries, including in Ireland, Portugal and Spain, the statutory minimum wage has been virtually constant in nominal terms during most of the crisis period.

The wages of new hires tend to be much more responsive to the cycle than those of incumbent workers…

While there is ample evidence of downward wage rigidity among job stayers, whether or not downward wage rigidities have an impact on the amplitude and persistence of unemployment fluctuations is subject to considerable debate. Indeed, the view that wage rigidities account for an important part of the volatility and persistence of unemployment over the business cycle has recently been challenged by a number of influential studies which argue that what matters for unemployment fluctuations is not the wage-setting process in existing job matches, but the way wages are determined in new job matches (Pissarides, 2009; Haefke et al., 2013). Consequently, a number of recent empirical studies analyse the cyclicality of wages separately for job stayers, job movers and new hires from non-employment. Most of these studies suggest that the wages of job movers and new hires are much more sensitive to the business cycle than those of job stayers and may even be as pro-cyclical as productivity (Devereux, 2001; and Haefke et al., 2013, for the United States; Devereux and Hart, 2006, for the United Kingdom; Martins et al., 2012; and Carneiro et al., 2012 for Portugal). The presence of systematic differences between job stayers and job starters points to the importance of long-term implicit contracts between employers and employees, and can give rise to persistent cohort effects that reflect the labour market situation at entry (Beaudry and DiNardo, 1991).

While starting wages appear to be more sensitive to the business cycle than wages in ongoing job spells, little is known about the wage-setting process in new job matches. In principle, one would expect wage-setting institutions, such as minimum wages and collective wage bargaining, to have an impact on the cyclicality of wages among both incumbent workers and new hires. Moreover, it seems plausible that the fairness considerations that explain the reluctance of employers to engage in nominal wage cuts of incumbent workers also apply, at least to some extent, to the way wages are set for new recruits. However, evidence on the role of wage-setting institutions or internal pay structures for the determination of wages for new hires is scarce. A notable exception is Galuscak et al. (2012). Using a firm-level survey for 15 European countries, they find that the internal pay structure is more important for determining hiring wages than external labour market conditions. They also suggest that the role of external labour market conditions tends to be less important for workers who are covered by a collective wage agreement.

… but also depend on the nature of wage-setting institutions

In order to complement the existing evidence of the cyclicality of wages for job stayers and job starters, Figure 2.4 provides some new evidence using worker-level panel data for selected European countries during the period 2005-10. More specifically, the figure represents estimates of the elasticities of hourly wages with respect to the regional unemployment rate for all workers, job stayers and job starters. The baseline estimates of the wage elasticities control for composition effects through the inclusion of worker-fixed effects as well as for the possible role of the national statutory minimum wage.[25] The effect of the minimum wage is analysed by allowing the elasticity of wages to vary with respect to the regional unemployment rate according to the minimum wage by including an interaction term between the unemployment rate and the minimum wage relative to the median wage in the region. The results provide two important insights:

- The wages of job starters are considerably more sensitive to fluctuations in unemployment over time than the wages of job stayers. The results suggest that a one percentage-point increase in the regional unemployment rate reduces wages in new

Figure 2.4. **Wages are more cyclical for new hires than incumbent workers**

Percentage change in real hourly wage in response to a one percentage-point increase
in the regional unemployment rate for all workers, job stayers and job movers[a]
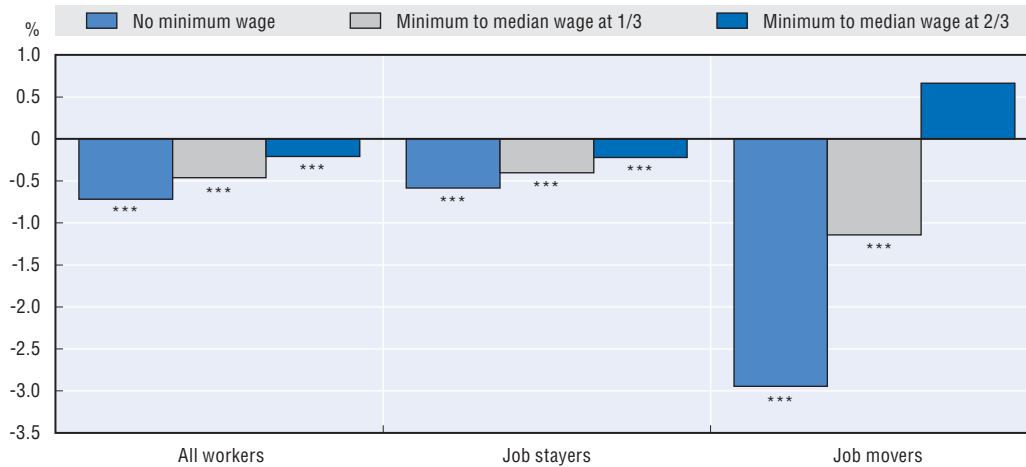
***, **, *: statistically significant at 1%, 5% and 10% levels, respectively.
a) Estimates control for person fixed effects.
Source: OECD estimates based on the European Union Statistics on Income and Living Conditions (EU-SILC) and
national labour force surveys for France and the United Kingdom.

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matches by 2.9% in the absence of a national minimum wage compared with 0.6% for
wages in ongoing spells. The cyclicality of wages in new matches in the absence of a
minimum wage is similar to the ballpark figure of 3% that is cited in Pissarides (2009).
While the 3% figure is considered to be broadly consistent, in principle, with one-to-one
movements between wages and productivity under flexible wages, Haefke et al. (2013)
note that small frictions in wage setting on the hiring margin can have potentially large
implications for the evolution of unemployment over the business cycle.

● The sensitivity of wages appears to be significantly affected by the presence of a national
minimum wage, as identified by the interaction term between the regional unemployment
rate and the ratio of the national minimum wage to the median wage in the region. More
specifically, the estimates suggest that an increase in the ratio of minimum wage to the
median wage of 10 percentage points reduces the wage elasticity of job stayers by
about 0.1 and that of job starters by 0.3 percentage points. Evaluating the wage elasticities
using 0.33 and 0.67 for the ratio of the minimum wage to the median, which corresponds
to approximately the minimum and the maximum value across OECD countries (Box 2.4),
yields wage elasticities that are considerably smaller than those obtained in the absence
of minimum wages.

While these results seem plausible in the light of recent studies that have found that the
wages of job starters are much more sensitive to the cycle than the wages of job movers, they
should be interpreted with considerable caution. Even though the analysis controls for
composition effects that result from movements in and out of the workforce through the
inclusion of person-fixed effects, it does not control for changes in the composition of newly
created jobs over the business cycle. A number of recent studies by Gertler and Trigari (2009),
Hagedorn and Manovski (2013), Gertler et al. (2013) argue that estimates of the wage
elasticity among job starters are biased downward (larger in absolute value) because the jobs
created in bad times tend to be of lower quality than those that are created in good times,

even after controlling for person-fixed effects, due to cyclical changes in the composition of job characteristics, firm characteristics or match quality. Using different approaches, they provide evidence using data for the United States that most or even all of the observed difference in wage elasticities between job stayers and job starters disappears when controlling for job characteristics or differences in match quality.[26] These studies, therefore, not only suggest that downward wage rigidities among job stayers are likely to have important implications for the persistence of unemployment in a recovery, they also suggest that the new jobs that are being created are of lower quality (e.g. in European countries new jobs are more likely to take the form of temporary contracts).

While the recent debate on the cyclicality of wages at the margin questions somewhat the relevance of downward wage rigidities among job stayers for understanding cyclical variations in unemployment, this does not imply that the nature of wage-setting among job stayers does not matter. There are at least three reasons for this. First, wage dynamics for job stayers and job starters are unlikely to be completely independent. Indeed, the results in Figure 2.4 suggest that minimum wages affect wage dynamics among both groups of workers. Second, the evolution of wages after hiring also matters (Kudlyak, 2011). If wages were to be fully flexible at the margin and wage differences related to business conditions at the time of hiring fully persistent, job-creation incentives should remain broadly constant over the cycle.[27] By contrast, if differences in wages related to market conditions at the time of hiring dissipate over the course of the employer-employee relationship, job creation should be more strongly pro-cyclical. Third, even if wage rigidities among job stayers would not affect employment dynamics over the business cycle, the wage dynamics of job stayers remain crucially important for determining the rate of inflation, the growth in unit labour costs and external competitiveness.

2. How is the burden of wage adjustment shared over the workforce?

As already mentioned, the interpretation of aggregate wage dynamics over the course of the business cycle is complicated due to the confounding role of changes in workforce composition which tend to be particularly pronounced in deep recessions. Moreover, only average wage developments are captured and not the way wage adjustments are distributed over the workforce.[28] To shed light on these issues, this section documents how wage growth has adjusted since the start of the crisis for different segments of the workforce. It also discusses the relative importance of pure wage effects and composition effects.

The slowdown in real earnings growth was widely spread across the earnings distribution…

In order to analyse how real earnings adjustments varied among workers according to their level of earnings, the difference in the average annual growth rate of real earnings between the period since the start of the crisis (2007-12) and the period before the crisis (2000-07) is documented for workers at the 1st (bottom), 5th (median) and 9th (top) deciles of the earnings distribution (Figure 2.5). The analysis is based on the *OECD Earnings Distribution Database* which provides information on the distribution of earnings among full-time employees across 26 OECD countries. The following results emerge:
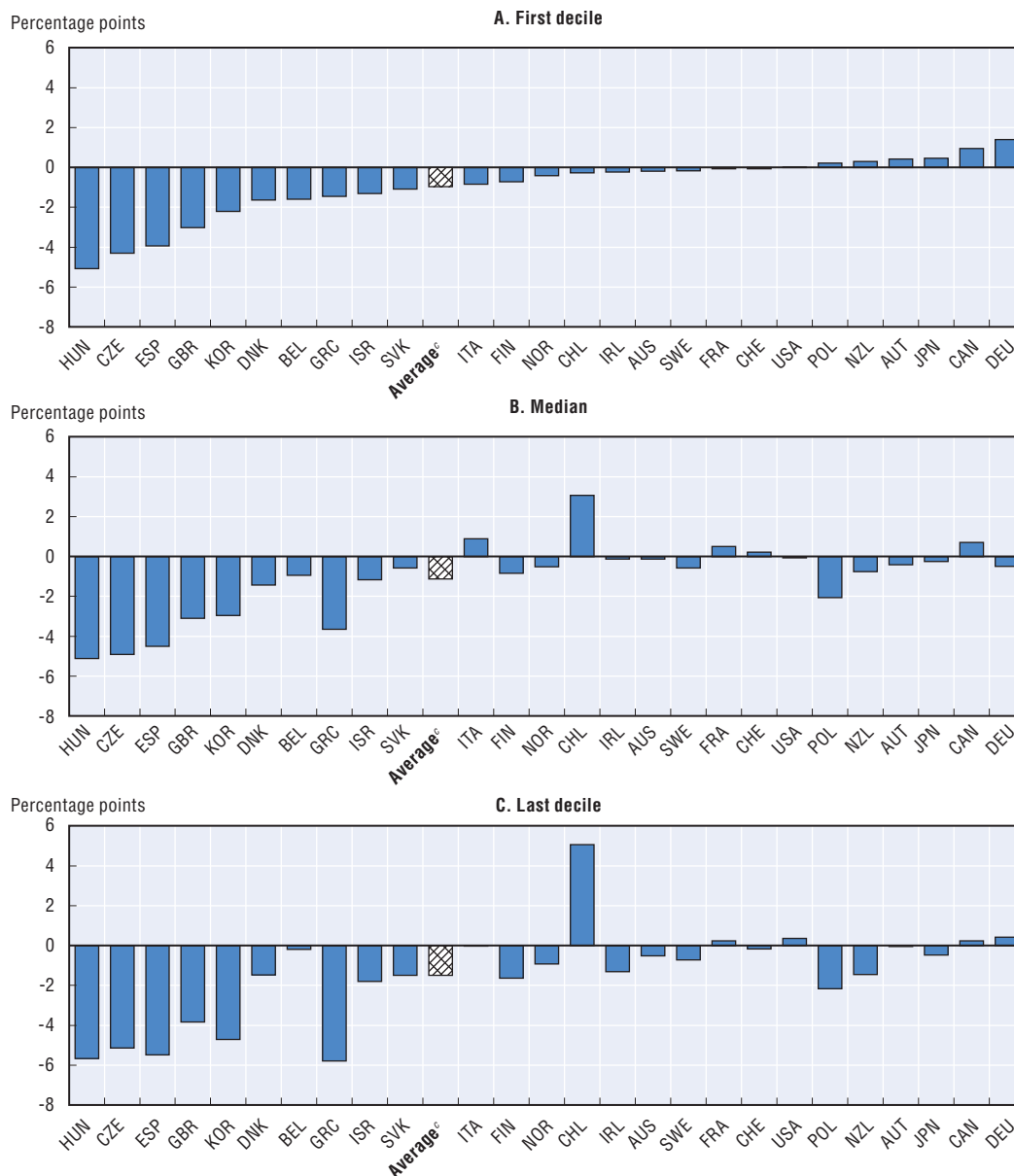
● The slowdown in the growth rate of earnings was fairly evenly spread across the earnings distribution (Figure 2.5). The change in the annual average growth rate of real earnings amounted to -1.0 percentage points at the bottom decile, -1.1 percentage points

at the median and -1.5 percentage points at the top decile. The somewhat smaller slowdown in earnings growth at the bottom of the distribution is consistent with the analysis for Spain in Section 1 which suggested that nominal downward wage rigidities tend to be more pronounced among low-paid workers. The relatively small slowdown at the bottom of the distribution may also reflect the role of minimum wages and collective bargaining agreements in OECD countries where they are binding. While these factors are likely to have mitigated the social consequences of downward wage adjustments, even modest declines in earnings or earnings growth can lead to economic hardship among workers in precarious jobs and living conditions.

● The evolution of the distribution of earnings growth differs, however, importantly across countries.

  ❖ The slowdown in earnings growth at the bottom of the distribution was most pronounced in the Czech Republic, Hungary, Korea, Spain and the United Kingdom (between 2 and 5 percentage points).[29] While earnings growth at the bottom of the distribution in Germany and the United States increased or remained stable, these countries experienced substantial absolute declines in real earnings in the seven years before the crisis, of 8% and 2% respectively. The continuous decline in real earnings growth at the bottom of the earnings distribution in the United States since the start of the 2000s has reinforced policy concerns about the rising incidence of low-wage employment and has led to calls for raising the federal minimum wage. The Obama administration has proposed to raise the federal minimum wage to USD 10.10 in 2016 (see Box 2.4).[30]

  ❖ The slowdown in the growth rate of the median real earnings was most pronounced in the Czech Republic, Hungary and Spain (about 5 percentage points) and in Greece, Korea, Poland and the United Kingdom (more than 2 percentage points). However, there was a sizeable pick-up in growth by about 3 percentage points in Chile.

  ❖ Earnings growth at of the top decile declined by over 5 percentage points relative to the pre-crisis period in the Czech Republic, Greece, Hungary and Spain and by over 3 percentage points in Korea and the United Kingdom, while it increased by about 5 percentage points in Chile.

... leaving earnings inequality largely unchanged in most countries

As a result of real wage adjustments across all segments of the workforce, overall earnings inequality (D9/D1) has remained unchanged during the crisis on average across countries and in more than two-thirds of countries (Figure 2.6). The decile ratio D9/D1 of earnings over the period 2007-12 decreased by 0.4 point or more in Greece, Hungary and Spain. In contrast, overall earnings dispersion increased during the crisis by 0.2 points in Australia and Denmark, and 0.4 points in the United States. The relatively large increase in the United States is driven by rising earnings dispersion in the top half of the earnings distribution.

Figure 2.5. **The slowdown in real wage growth was widely spread**

Difference in the average annual growth rate of real earnings between 2000-07[a] and 2007-12[b] at different deciles of the earnings distribution

Percentage points

A. First decile

Percentage points

B. Median

Percentage points

C. Last decile

Note: Estimates are based on gross earnings of full-time wage and salary workers. However, this definition may vary from one country to another. Further information on the national data sources and earnings concepts used in the calculations can be found at: *www.oecd.org/employment/outlook*. Countries are shown by ascending order of the difference in average annual real earnings growth for the first decile.

a) 2000-08 for Switzerland; 2000-09 for Chile; 2001-07 for Israel; 2001-08 for Poland; 2002-07 for the Slovak Republic; and 2004-07 for Greece, Italy and Spain.

b) 2007-10 for France; 2007-11 for Israel; 2008-10 for Switzerland; 2008-12 for Poland; and 2009-11 for Chile.

c) Unweighted average of countries shown.

Source: OECD calculations based on the *OECD Earnings Distribution* (database), *http://dx.doi.org/10.1787/data-00302-en*.

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Box 2.4. **The role of minimum wages in reducing low pay**

While much policy concern has focused on the large numbers of persons out of work, low-paid employment is also of concern (see the discussion of job quality in Chapter 3), particularly when it is associated with in-work poverty or reflects situations where workers are unable to find jobs that make full use of their skills. These concerns are also relevant in countries such as Germany, where unemployment has declined sharply throughout the crisis, and the United States, where unemployment has fallen considerably from its peak in 2009. In both countries, the proportion of low-wage earners, earning less than two thirds of median earnings, is above the OECD average and respectively concerns approximately one-fifth of employees in Germany and one-quarter in the United States. The national government in both countries has proposed measures to address problems associated with low-wage employment by either introducing a national legal minimum wage in the case of Germany or substantially raising the existing minimum wage in the case of the United States. Apart from improving equity by raising wages of low-wage earners, adequately set minimum wages can also help to encourage inactive people on the margin of the labour market, in particular those with low skills, to actively search for a job.

In setting the level of the minimum wage, a careful balancing act is required since too high a level may reduce employment opportunities for low-skill workers, while too low a level may fail to address in-work poverty and could undermine work incentives. OECD countries have drawn this balance very differently. From the point of view of workers, what matters is the minimum wage in *net* terms, i.e. their take-home pay after they pay taxes and social security contributions, and including any in-work benefits for low-income workers. By contrast, employers are more concerned about the minimum wage in *gross* terms, i.e. the cost of employing a minimum-wage worker once payroll taxes and employers contributions are added, and whether the resulting cost places them at a competitive disadvantage. The figure below provides information on the net and the gross minimum wage for the 25 of the 34 OECD member countries that have a statutory minimum wage in place. As a central benchmark, it also reports the minimum wage without taking account of employer social-security contributions. To enhance cross-country comparability, the three different measures of the minimum wage are shown as a proportion of the corresponding median wage of full-time workers in each country. The information refers to 2012.

In terms of the central benchmark, there are broad variations in the level of the minimum wage relative to the median wage across countries. While many countries set the minimum wage at about one-half of the median wage, the minimum wage ranges from only a little more than one-third of the median wage in the Czech Republic, Estonia, Japan and the United States to two-thirds of the median wage or more in Chile and Turkey.[a] When converted into a 2012 equivalent value, the German proposal to introduce a legal hourly minimum wage of EUR 8.50 in 2017 implies a minimum wage set at about one-half the median wage, which is also the level implied by the Obama Administration's proposal to raise the US hourly minimum wage to USD 10.10 in 2016.[b, c] These reforms would thus situate both countries close to the OECD average.

OECD countries also differ significantly in terms of both the take-home pay of minimum wage workers and the gross costs employers face in employing them. The difference between the gross and the net minimum wage provides an indication of the tax wedge at the minimum wage. On average, the tax wedge at the minimum wage corresponds to 20%. In general, take-home pay rises more steeply with the level of the minimum wage than gross labour costs, because the tax and benefit systems typically seek to reinforce the impact of the minimum wage in raising living standards of effected workers while minimising any possible disemployment effects by cushioning the cost impact for firms. There are large country variations across the OECD. Employers are not subject to social security contributions and other taxes at the minimum wage in Chile and New Zealand and receive substantial reductions in Belgium and France. In others, non-wage costs relative to gross minimum wages are lower than 10% in Australia, Israel, Ireland and the United Kingdom, and amount to 30% or more in the Czech Republic, Mexico, the Slovak Republic and Spain. There is a large empirical literature on the possible employment effects of minimum wages (see, for example, CBO, 2014, for a survey). While the conclusions from this literature are not unanimous, the

Box 2.4. **The role of minimum wages in reducing low pay** (cont.)

majority of studies suggest that the adverse employment effects of minimum wages tend to be small overall, but can be non-negligible for specific groups such as youth. There are a number of ways minimum wages can be set to minimise any adverse employment effects (Martin and Immervoll, 2007). For example, minimum wages can be differentiated to allow for lower wages of young workers (e.g. in Australia, Belgium, Greece, Ireland, the Netherlands and the United Kingdom) or regional differences in economic conditions (Canada, Japan, Mexico and the United States). Adverse employment effects can further be mitigated by allowing for reduced employer social security contribution rates for workers at the minimum wage to lower non-wage labour costs (Belgium, France, Hungary, Ireland and the United Kingdom). Some countries have also set up independent bodies to set or advise on the appropriate level of the minimum wage (Australia, France, Ireland and the United Kingdom).

Some OECD countries set the legal minimum wage much higher relative to the median wage than others

Ratio of minimum to median wage of full-time employees

Note: Countries are ordered by ascending order of the minimum-to-median wage ratio.
*a)* Median ratio for the countries shown.
Source: OECD (2014), *OECD Minimum Wage* (database), *http://dx.doi.org/10.1787/data-00313-en*; and OECD (2014), *OECD Tax-Benefit Models, http://dx.doi.org/10.1787/data-00201-en*.

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a) The reason why the estimates of the minimum wage are so high in Turkey and Chile is partly because they are calculated relative to the median wage of all workers and not just those in the formal sector. The ratio of the minimum wage to the median wage in the formal sector in Chile is 0.65, three percentage points lower than in the figure in the box, but still substantially above the OECD average.
b) The federal minimum wage would increase from its current level of USD 7.25 per hour to USD 10.10 in three steps each year from 2014 to be fully implemented in the second half of 2016 and then revised annually for inflation as measured by the consumer price index.
c) For Germany and the United States, the 2012 values retained in the figure of the box are estimated by deflating the respective 2017 and 2016 values of the minimum wage by the consumption price index.

Figure 2.6. **The crisis left wage inequality largely unchanged**

Earnings dispersion in 2000,[a] 2007[b] and 2012[c]
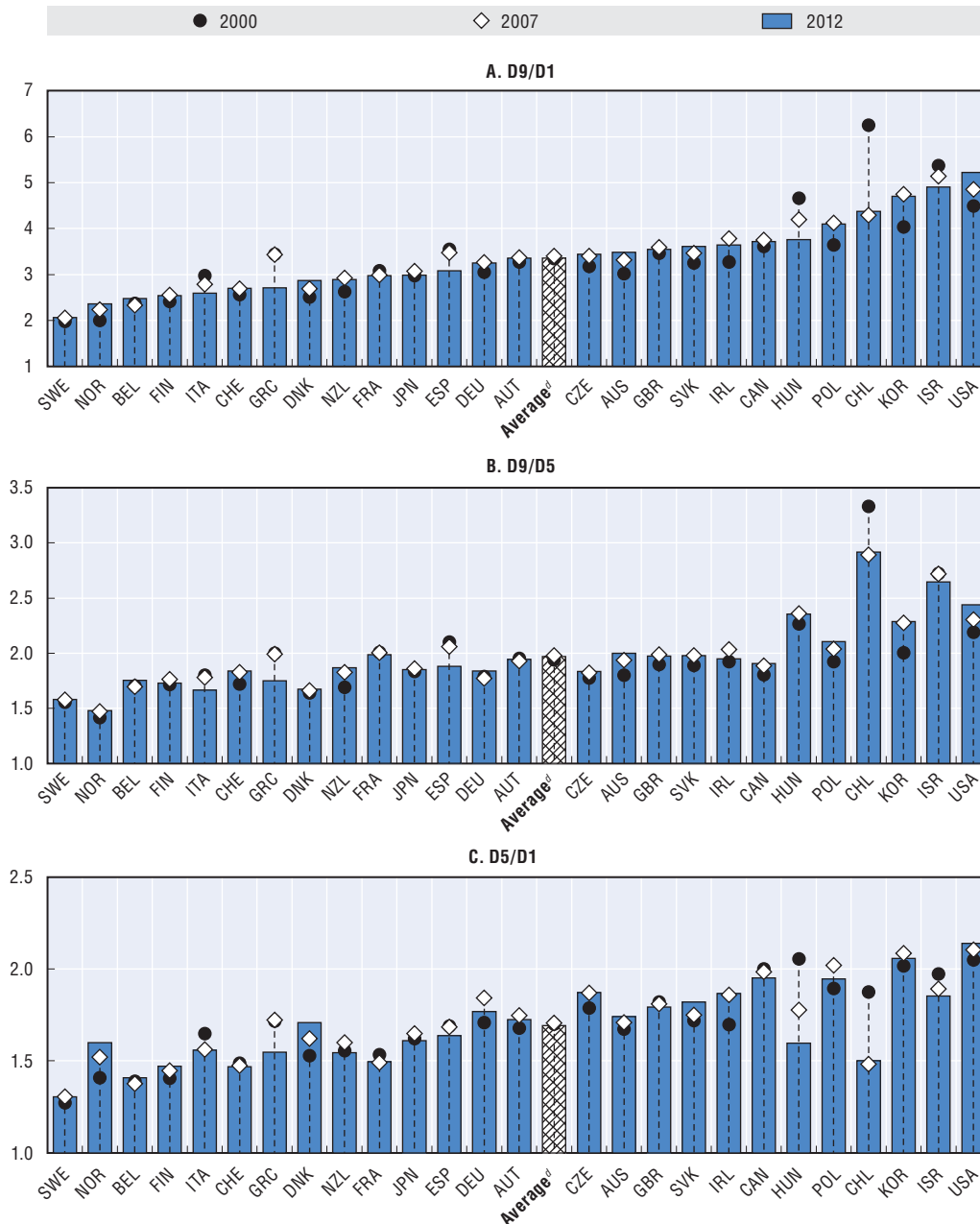
Note: Estimates based on gross earnings of full-time wage and salary workers. However, this definition may vary from one country to another. Further information on the national data sources and earnings concepts used in the calculations can be found at: www.oecd.org/employment/outlook. Countries are shown by ascending order of the ratio D9/D1 in 2012.

a) 2001 for Israel and Poland; 2002 for the Slovak Republic; 2004 for Greece, Italy and Spain.

b) 2008 for Poland and Switzerland; and 2009 for Chile.

c) 2010 for France, and Switzerland; and 2011 for Chile and Israel.

d) Unweighted average of countries shown.

Source: OECD calculations based on the *OECD Earnings Distribution* (database), *http://dx.doi.org/10.1787/data-00302-en.*

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Box 2.5. **Decomposing aggregate wage changes into composition and pure wage effects**

So far, the analysis of changes in average real earnings or at different points in the earnings distribution has not taken into account compositional effects. In order to analyse the role of these effects on the evolution of real hourly wage growth, various decompositions methods are employed in order to separate out pure wage effects from composition effects. The analysis focuses on real hourly wages using household or labour force survey data for 20 countries for the period 2004 to 2010. Composition effects are identified based on the following determinants of wages: worker characteristics (potential work experience measured in five-year intervals, education measured as either low secondary, upper secondary and tertiary, and gender) and job characteristics (part-time/full-time, temporary/permanent contract, occupation). In order to examine the impact of the crisis on wages, this box focuses on the change in the growth rate of wages relative to the pre-crisis trend. The growth rate during the crisis refers to the average annual growth rate during the three-year window 2007-10, while the pre-crisis trend is defined as the average annual growth rate during the three-year period 2004-07. For further details on the methodology and the results at different parts of the distribution, see the web annex of this chapter (OECD, 2014b).

The box figure below presents the decomposition results based on average real wages. It confirms that average real wage growth has tended to slow down relative to the pre-crisis trend, but also shows that in several countries some of the decline in aggregate average wage growth is obscured by composition effects that are driven by movements in and out the workforce. Once composition effects are netted out, the slowdown increases from 1.1 to 1.3 percentage points. Looking at the more detailed results by period in OECD (2014b) suggests that composition effects are substantial and positive in the period following the crisis compared with the degree of real wage growth since the start of the crisis. The rather modest impact of composition effects on the slowdown in average wage growth since the start of the crisis in the box figure therefore reflects the fact that composition effects are small relative to the considerable slowdown in average wage growth since the start of the crisis, but also that composition effects tended to be positive even before the crisis as a result of skill upgrading and population ageing (see Chapter 1 of this publication for a discussion of these trends). The tendency of composition effects to mask the extent of the decline in real wage growth could indicate that employment losses since the start of the crisis are biased towards workers with below-average wages, such as low-skilled workers and workers on temporary contracts.

Similar patterns are observed when decomposing wage changes at different parts of the distribution (see the web annex in OECD, 2014b). Large and positive composition effects are observed during the crisis in the majority of countries considered and at all parts of the wage distribution. The largest composition effects are observed in the top half of the wage distribution in countries such as Greece, Portugal and Spain which all have seen massive reductions in employment during this period. Nevertheless, as in the case of average wages, composition effects have only a modest impact on the slowdown of wages at different parts of the distribution. On average across the countries considered, netting out composition effects changes the slowdown in real wage growth from 1.2 percentage points to 1.3 at the first wage decile, from 1.3 to 1.6 at the median wage and from 0.8 to 1.0 at the last wage decile.* Consequently, adjusting for composition effects has little impact on the conclusions in the main text that the slowdown in wages was widely spread across the workforce. There is no longer evidence that the slowdown was somewhat smaller among low-paid workers. However, this reflects differences in the country sample, data period and concept of earnings used and not the role of composition effects.

* The numbers cited here differ from those in the main text because of differences in country coverage, the period considered and data sources used.

Box 2.5. **Decomposing aggregate wage changes into composition and pure wage effects** (*cont.*)

Real average wage growth has tended to slow somewhat more strongly once composition effects are taken into account

Percentage-points change in the average annual growth rate of mean real hourly wages between 2004-07 and 2007-10[a]
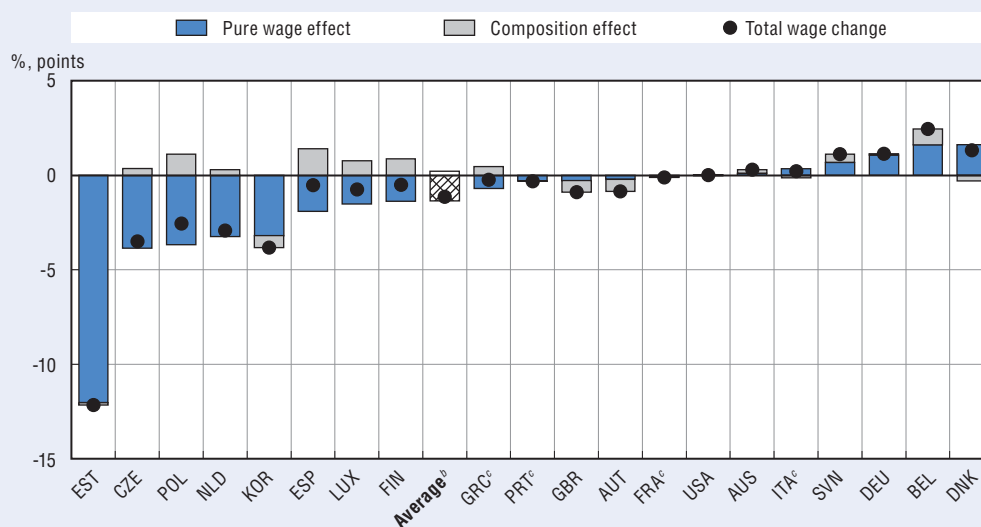
Note: Countries are shown by ascending order of the pure wage effect.
a) 2005-07 for the Czech Republic, the Netherlands, Poland, Slovenia and the United Kingdom; 2007-09 for Greece and Korea.
b) Unweighted average of countries shown.
c) Net hourly earnings.
Source: OECD calculations based on the European Union Statistics on Income and Living Conditions (EU-SILC) for European countries, Household, Income and Labour Dynamics (HILDA) for Australia, German Socio-Economic Panel (GSOEP) for Germany, Korean Income and Labour Panel Study (KLIPS) for Korea, and national labour force surveys for France, the United Kingdom and the United States.

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Conclusions

The increase in unemployment since the start of the crisis has put considerable downward pressure on real wages in many OECD countries and led to an increase in the number of nominal wage cuts and wage freezes. It a number of cases, further real wage adjustments would be difficult to undertake in the face of significant nominal downward wage rigidities. While the significant real and even nominal wage cuts have helped countries with large current account deficits accumulated prior to the crisis to restore competitiveness, further improvements should be sought on the basis of structural reforms that boost competition in the markets for goods and services.

Wage-setting institutions have a potentially important role for promoting the role of wage flexibility and, therefore, labour market resilience, but also should ensure that wage adjustments are not concentrated on the most vulnerable workers and their families. This may in certain cases lead to difficult policy trade-offs. For example, this chapter provides new evidence that minimum wages have a tendency to reduce the flexibility of wages for both incumbent workers and new hires. However, the chapter also suggests that minimum wages can help to limit the extent of wage adjustments among low-paid workers. In a

number of countries, such as Germany and the United States, concerns about rising wage inequality have given rise to ambitious proposals to introduce or increase the level of the minimum wage.

Wage flexibility and wage-setting institutions not only matter for labour market resilience over the course of the business cycle, but also play a crucial role for shaping structural outcomes. This is important in normal times, but may be especially relevant in the present context where the economic recovery increasingly requires structural adjustments across sectors and occupations. This is particularly the case in the euro area countries hard hit by the crisis where the economic recovery has to come from enhanced competeveness. Analysing the role of wage-setting institutions for structural adjustment remains an important area for further work.

Notes

1. As emphasized in Chapter 3 of this publication, this is important because overall well-being does not just depend on the average level of wages but also on the way they are distributed across the workforce.

2. In this case, the role of wage flexibility is largely distributional and this was essentially the argument for the claim in OECD (2012a) that wage-setting institutions that increase the flexibility of wages to aggregate shocks, such as co-ordination in collective wage bargaining, can help to promote labour market resilience.

3. This may be especially important in countries with policy interest rates close to zero or countries in the euro area without an independent monetary policy.

4. While nominal wage growth and consumer-price inflation were essentially uncorrelated across countries in each year during the period 2010 to 2012, the relationship appears to have become more pronounced in the course of 2013 as consumer prices have started to respond to the slowdown in nominal wage growth. Consumer-price inflation declined from close to 2% in 2012 in most countries to 1.3% in the OECD area as a whole, 0.5% in Ireland, 0.3% in Portugal, and -0.9% in Greece. The recent slowdown in inflation in the euro area periphery has not had a major impact on the speed of the decline in real wages so far.

5. *Nominal* wage rigidities cause cyclical unemployment according to Keynesian economic theory, defined here as rigidities in the responsiveness of nominal wages to prices. Structural unemployment is independent of the degree of nominal wage rigidities. If prices fall but nominal wages adjust with a lag, real wages go up and unemployment rises. As unemployment goes up more workers compete for jobs bidding offer wages down. *Real* wage rigidity, in this context, refers to the responsiveness of real wages to productivity and mark-ups. The structural rate of unemployment is a function of labour market frictions (mark-ups), real wage rigidities and productivity growth.

6. Similar patterns of asymmetric wage adjustment of the business cycle have also been documented in Abbritti and Fahr (2013) and ECB (2012).

7. In many OECD countries, basic pay can only be reduced in nominal terms by mutual consent (MacLeod and Malcomson, 1993; Holden, 1994).

8. The concepts of wage rigidity used here differ from those used in most macro models where nominal rigidities typically refer to the responsiveness of nominal wages to prices and real wage rigidities to the responsiveness of real wages to productivity.

9. Rather than using the actual level of inflation, the expected level of inflation may be more appropriate when analysing real wage rigidity since this is the relevant factor for salary negotiations. Since inflation expectations may differ across regions, sectors and workers, it tends to be difficult to precisely identify the degree of real DWR in the data.

10. So far little attention has been paid to the consequences of downward wage rigidities for employment and unemployment. It has implicitly been assumed that nominal DWR not only drives employment fluctuations but also is consistent with job stayers experiencing a wage freeze (Elsby et al., 2014).

11. These most likely reflect a combination of differences in data sources and data quality, policies and institutions and business cultures.

12. Moreover, nominal DWR may also reduce the size of nominal wage cuts in addition to their incidence (Holden and Wulfsberg, 2014).

13. Elsby et al. (2013), however, question the importance of nominal DWR in the United States as the evidence is based on household surveys and measurement error related to rounding in such data have a tendency to increase the estimated degree of nominal DWR.

14. Blundell et al. (2013) show that in the United Kingdom between 2010 and 2011 70% of employees incurred real wage cuts, 21% nominal cuts and 12% nominal freezes based on the New Earnings Survey.

15. Nominal wage freezes are defined as nominal wage changes between -0.5% and +0.5% when the household data is used as well as when using administrative data for Spain. The broad definition of nominal wage freezes used here implies that the importance of nominal DWR is likely to be overestimated. However, this is unlikely to have a major impact on the qualitative results. When using administrative data for Portugal and the United Kingdom, nominal wage freezes are defined as exact zero changes.

16. While the analysis is restricted to full-time workers, this refers to usual working hours and, therefore, does not exclude the possibility of temporary reductions in actual working hours that result in lower monthly earnings (e.g. short-time work).

17. Major exceptions are Greece and Portugal (using administrative data) where nominal wage freezes affected over a quarter of the workforce in 2010. In Portugal, the incidence of nominal wage freezes increased to 76% in 2012.

18. In Portugal, nominal DWR increased to 95% in 2012. However, before the crisis, it was also extremely high affecting between 73% and 94% of notional wage cuts.

19. The incidence of nominal wage cuts drops from 52% in the household data to 9% in the administrative data in Portugal, from 31% to 24% in the United Kingdom and from 45% to 31% in Spain.

20. Previous evidence for the United Kingdom suggests that rounding has a tendency to increase the reported incidence of zero wage changes in household data (Smith, 2000). This seems to be confirmed by the results for the United Kingdom. The importance of nominal wage freezes is considerably smaller in the administrative data than in the household data. However, the same pattern is not observed in Portugal or Spain. While in the incidence of nominal wage freezes is similar in the context of Spain, it is much larger in the administrative data than in the household data in the case of Portugal (30% versus 5%).

21. This may reflect the role of declining inflation in those countries.

22. In the United Kingdom, the importance of nominal DWR also continued to increase somewhat after 2010 (according to the administrative data). It increased from 10% in 2007 to 24% in 2010 and to 28% in 2012. This is the highest level since the start of the New Earnings Survey in 1976.

23. For a more in-depth discussion of the role of peer effects for subjective well-being, see Chapter 3 of this publication.

24. Holden and Wulfsberg (2014) find that strict employment protection, higher union density and more centralised wage setting are positively correlated with nominal DWR and co-ordination in collective bargaining negatively.

25. This also implies that only workers are taken into account who are employed in at least two years. Job movers include both workers who move directly from one job to another as well as those experiencing intermediate spells of non-employment.

26. Nevertheless, two studies for Portugal by Martins et al. (2012) and Carneiro et al. (2012) control for job and firm characteristics, but still find that starting wages are much more cyclical than wages in ongoing job matches.

27. This is effectively a restatement of the argument by Pissarides (2009).

28. Documenting how the process of wage adjustment is shared across the workforce is of interest in its own right but also provides an indication of the extent to which wage adjustment is concentrated on the most vulnerable and, therefore, the social costs associated with downward wage adjustments. It also provides an indication of the risk that downward wage adjustment reduces consumer spending and, hence, aggregate demand.

29. By contrast, substantial increases in the average annual growth rate of wages in the bottom decile were comparatively rare. Only in Belgium, Denmark and Greece did the average annual growth rate of wages increase by more than 2 percentage points relative to the pre-crisis period.

30. In Germany, the increase in the incidence of low-paid employment also represents a major policy concern. To an important extent, this reflects the significant decline in real wages at the first decile of the wage distribution, following the Hartz reforms (almost 41% a year during the period 2000-12).

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ANNEX 2.A1

Supplementary material

Table 2.A1.1. **Growth in real wages, labour productivity, unit labour costs
and consumer prices in OECD countries**

Annual average growth rates, 2007-13[a]

	A. Real hourly wage[b]							B. Hourly labour productivity[c]						
	2007	2008	2009	2010	2011	2012	2013	2007	2008	2009	2010	2011	2012	2013
OECD[e]	**0.9**	**-0.3**	**1.8**	**0.3**	**-0.5**	**0.3**	**0.2**	**1.2**	**0.0**	**0.2**	**2.5**	**0.8**	**1.2**	**0.7**
Euro area (18)	**0.7**	**-0.1**	**3.2**	**-0.3**	**-0.7**	**0.1**	**0.6**	**1.8**	**0.0**	**-1.1**	**2.1**	**1.5**	**0.9**	**0.8**
Australia	4.5	-0.2	0.9	2.3	2.4	3.7	-0.2	1.6	-0.4	2.4	0.3	0.5	3.2	2.0
Austria	0.9	0.5	4.0	-0.1	-1.6	1.0	1.5	2.1	0.1	-0.1	1.8	1.0	0.5	1.1
Belgium	1.3	-0.6	2.8	-1.0	-0.8	0.9	1.3	0.9	-0.6	-0.9	1.5	-0.1	-0.1	0.8
Canada	1.2	0.7	2.8	-0.4	0.8	1.2	1.6	0.0	-0.1	0.9	1.5	1.0	0.0	1.0
Czech Republic	3.3	-2.2	-0.7	-0.5	0.1	-2.1	-2.6	4.3	0.2	-1.4	1.5	1.8	-0.9	-0.4
Denmark	3.2	0.5	2.2	1.8	-2.1	-0.8	0.7	0.6	-1.6	-2.2	4.5	0.4	0.2	0.4
Estonia	15.9	0.9	3.7	-2.8	-6.3	3.3	4.6	6.6	-2.9	2.2	5.3	0.2	3.1	0.1
Finland	1.1	1.2	2.9	0.3	0.0	0.5	0.9	3.2	-1.2	-5.3	3.1	1.5	-1.2	0.5
France	0.4	-0.3	2.7	0.7	0.4	0.6	1.0	0.3	-0.4	-0.6	1.7	1.5	0.7	0.7
Germany	-1.6	-0.3	3.2	-0.7	0.5	1.1	0.5	1.7	-0.2	-2.4	1.7	1.8	0.5	0.3
Greece	2.5	-2.3	5.4	-6.9	-8.8	-4.8	-5.5	2.9	3.1	-3.9	-3.5	-2.5	1.7	0.4
Hungary	-1.9	0.9	-5.0	-5.2	-1.3	0.1	3.2	-0.3	2.4	-3.6	0.5	0.4	2.7	1.0
Ireland	1.3	2.0	5.2	-2.3	-2.8	-1.5	-2.6	1.3	-0.5	3.3	3.7	4.0	0.5	-3.2
Italy	0.6	-0.2	1.2	0.8	-1.9	-1.7	0.2	0.5	-0.7	-2.2	2.4	0.1	-0.9	0.1
Japan	-0.7	0.4	-0.5	-0.3	0.6	0.4	0.3	2.1	0.4	-2.1	4.0	-0.4	1.6	1.2
Netherlands	1.6	0.2	1.6	0.3	-1.0	-0.6	-0.2	1.5	0.1	-2.4	2.0	0.2	-1.2	0.2
New Zealand	1.8	1.3	2.0	-0.9	-1.1	1.9	1.2	2.7	-0.5	3.0	0.4	-0.3	3.1	-0.1
Norway	4.8	1.9	2.8	-0.2	3.8	3.1	1.9	-1.8	-3.4	0.4	0.1	-0.1	0.4	-0.5
Poland	2.2	4.9	0.6	5.0	1.4	-0.6	2.3	2.2	1.7	2.1	6.6	4.2	2.2	1.3
Portugal	0.8	1.0	3.3	0.3	-3.9	-6.0	2.3	1.7	0.2	-0.2	3.6	1.3	0.5	1.0
Slovak Republic	5.2	2.1	2.0	2.1	-1.2	-0.6	0.4	7.0	2.3	-2.4	4.3	2.0	2.0	2.8
Slovenia	3.0	2.3	7.8	0.7	0.2	-2.9	-2.6	4.1	0.5	0.7	2.9	2.9	-1.4	0.4
Spain	2.7	2.3	4.0	-1.6	-2.5	-2.0	-1.1	1.3	0.7	2.4	1.9	1.6	3.4	1.9
Sweden	1.2	-1.6	2.5	0.4	-1.6	2.0	1.8	0.0	-1.4	-2.5	4.1	1.0	0.6	1.1
United Kingdom	2.1	-1.6	1.4	-0.4	-2.4	-1.9	-1.6	2.5	-1.2	-2.4	1.1	0.7	-1.7	-0.3
United States	1.3	-0.8	2.3	0.5	-1.1	0.2	-0.2	0.8	0.4	2.8	2.3	0.0	1.0	0.2

Table 2.A1.1. **Growth in real wages, labour productivity, unit labour costs and consumer prices in OECD countries** (cont.)

Annual average growth rates, 2007-13[a]

	C. Nominal unit labour cost[d]							D. Consumer price inflation						
	2007	2008	2009	2010	2011	2012	2013	2007	2008	2009	2010	2011	2012	2013
OECD[e]	**2.1**	**3.1**	**1.5**	**-0.7**	**1.5**	**1.3**	**0.9**	**2.1**	**3.2**	**0.0**	**1.4**	**2.6**	**1.9**	**1.3**
Euro area (18)	**1.3**	**3.8**	**4.2**	**-0.7**	**0.7**	**1.7**	**1.1**	**2.1**	**3.3**	**0.3**	**1.6**	**2.7**	**2.5**	**1.3**
Australia	5.2	4.4	0.2	4.9	5.1	2.3	0.2	2.3	4.3	1.8	2.9	3.3	1.7	2.4
Austria	1.5	4.1	4.5	0.3	0.9	3.2	2.6	2.1	3.2	0.5	1.8	3.2	2.5	2.0
Belgium	2.2	4.4	3.6	-0.3	2.8	3.8	1.7	1.8	4.4	-0.1	2.2	3.5	2.8	1.1
Canada	3.3	3.1	2.3	-0.1	2.7	2.7	1.6	2.1	2.3	0.3	1.8	2.9	1.5	0.9
Czech Republic	2.7	3.7	1.4	-0.9	0.4	2.8	0.6	2.9	6.1	1.0	1.5	1.9	3.2	1.4
Denmark	4.9	6.0	5.5	-0.5	0.1	1.5	1.2	1.7	3.3	1.3	2.3	2.7	2.4	0.8
Estonia	14.7	15.1	1.1	-5.3	-2.0	3.8	7.3	6.4	9.8	0.0	3.0	4.8	3.9	2.7
Finland	0.6	6.6	7.9	-1.6	2.0	4.3	2.3	2.5	4.0	0.0	1.2	3.4	2.8	1.5
France	1.7	3.0	3.2	0.4	0.9	1.6	1.1	1.5	2.8	0.1	1.5	2.1	1.9	0.9
Germany	-0.8	2.7	5.4	-0.9	0.9	3.0	2.1	2.3	2.6	0.3	1.1	2.1	2.0	1.5
Greece	4.5	4.7	5.0	0.5	-2.6	-5.7	-7.8	2.9	4.1	1.2	4.6	3.3	1.5	-0.9
Hungary	6.8	4.6	3.3	-0.3	2.0	2.9	4.0	7.6	5.9	4.1	4.8	3.8	5.5	1.7
Ireland	4.1	6.0	-2.7	-6.1	-3.4	0.0	-0.1	4.8	4.0	-4.6	-1.0	2.6	1.7	0.5
Italy	2.2	5.0	4.5	-0.5	1.1	2.3	1.4	1.8	3.3	0.8	1.5	2.7	3.0	1.2
Japan	-2.4	1.5	0.8	-4.5	1.0	-1.2	-0.7	0.1	1.4	-1.4	-0.7	-0.3	0.0	0.4
Netherlands	1.8	3.3	5.0	-0.8	0.9	2.2	1.2	1.6	2.4	1.2	1.3	2.3	2.4	2.5
New Zealand	2.5	6.3	0.2	0.8	3.4	1.7	2.1	2.4	3.9	2.1	2.3	4.0	1.1	1.1
Norway	7.8	9.3	4.7	2.2	5.4	3.6	4.6	0.7	3.7	2.1	2.4	1.3	0.7	2.1
Poland	3.8	8.0	2.5	1.2	1.3	1.1	2.0	2.4	4.1	3.7	2.6	4.2	3.5	0.9
Portugal	1.6	3.4	3.2	-0.8	-0.7	-3.8	2.3	2.4	2.6	-0.8	1.4	3.6	2.7	0.3
Slovak Republic	-0.1	3.2	4.2	-0.9	1.5	1.5	-0.7	2.7	4.5	1.6	1.0	3.8	3.5	1.4
Slovenia	2.6	6.6	8.0	-0.4	-1.4	0.3	-1.4	3.6	5.5	0.8	1.8	1.8	2.6	1.8
Spain	4.4	5.5	1.5	-1.7	-0.8	-4.1	-2.3	2.8	4.0	-0.3	1.8	3.1	2.4	1.4
Sweden	3.4	3.7	4.4	-2.6	0.7	2.5	0.9	2.2	3.4	-0.5	1.2	2.9	0.9	0.0
United Kingdom	1.8	3.2	5.7	1.1	1.2	2.4	1.3	2.3	3.5	2.2	3.2	4.4	2.8	2.5
United States	3.4	2.6	-0.9	-0.2	2.0	1.2	1.0	2.8	3.8	-0.4	1.6	3.1	2.0	1.5

a) 2013 is the average of the first three quarters for Poland.
b) Total compensation of employees (total wages for New Zealand) divided by total hours worked of employees deflated using the consumer price index.
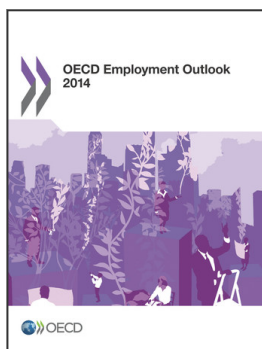*c)* Real GDP divided by total hours worked.
d) Total compensation of employees divided by real GDP.
e) OECD is the weighted average of the 26 OECD countries shown.
Source: OECD calculations based on quarterly national accounts.

StatLink ᘛᘚᐟ *http://dx.doi.org/10.1787/888933133134*

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