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Labour market adjustment in Europe during the crisis: microeconomic evidence from the Wage Dynamics Network survey

Wage Dynamics Network

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Wage dynamics network

This paper contains research conducted within the Wage Dynamics Network (WDN). The WDN is a research network comprising economists from the European Central Bank (ECB) and the national central banks (NCBs) of the EU countries. It aims to study in depth the features and sources of wage and labour cost dynamics and their implications for monetary policy.

The WDN initially operated from 2006 to 2009 and resumed activities, in part, in 2013. At present, 25 NCBs participate in the WDN, which is chaired by Juan F. Jimeno (Banco de España), with Ana Lamo (ECB) acting as secretary. The WDN's current research focus is to assess labour market adjustments in the period 2010-13 and firms' reactions to the labour market reforms which took place over this period in EU Member States. For this purpose, in 2014 the network launched an ad hoc survey of firms called the "WDN3 survey".

The paper is hereto released in order to make the results of WDN's research widely available to encourage comments and suggestions. The views expressed in the paper are those of the authors and do not necessarily reflect those of the ESCB.

Abstract

Against the backdrop of continuing adjustment in EU labour markets in response to the Great Recession and the sovereign debt crisis, the European System of Central Banks (ESCB) conducted the third wave of the Wage Dynamics Network (WDN) survey in 2014-15 as a follow-up to the two previous WDN waves carried out in 2007 and 2009. The WDN survey collected information on wage-setting practices at the firm level. This third wave sampled about 25,000 firms in 25 European countries with the aim of assessing how firms adjusted wages and employment in response to the various shocks and labour market reforms that took place in the European Union (EU) during the period 2010-13. This paper summarises the main results of WDN3 by identifying some patterns in firms' adjustments and labour market reforms. It seeks to lay out the main lessons learnt from the survey in terms of both the general response of EU labour markets to the crisis and how these responses varied across the countries that took part in the survey.

JEL: E24, J30, J52, J68

Keywords: Wage Dynamics Network, Survey data, Labour market adjustment, Labour market reforms

Executive summary

Against the backdrop of continuing adjustment in EU labour markets in response to the Great Recession and the sovereign debt crisis, the European System of Central Banks (ESCB) conducted the third wave of the Wage Dynamics Network (WDN) survey in 2014-15. This was a follow-up to the two previous WDN survey waves carried out in 2007 (WDN1, which covered the period 2002-07) and 2009 (WDN2, which covered the period 2008-09). The WDN survey collects information on wage-setting practices at the firm level. This third wave (WDN3) sampled about 25,000 firms in 25 European countries with the aim of assessing how firms adjusted wages and employment in response to the various shocks and labour market reforms that took place in the European Union (EU) during the period 2010-13. This paper summarises the main results of WDN3.

There is considerable heterogeneity across the 25 EU countries covered by WDN3 in terms of their business cycle position and their labour market performance during the period 2010-13. In order to facilitate the analysis, the sample is split into those countries where unemployment was falling and GDP increasing (Group I), those countries where the unemployment rate increased even though GDP increased (Group II), and those countries where unemployment was rising and GDP was falling (Group III).

The paper first analyses how EU firms reacted to negative demand and financial shocks in terms of labour input – at both the intensive (i.e. average hours) and extensive (i.e. employment) margins – and wages. As expected, negative demand shocks are highly correlated with a negative adjustment in employment – especially in permanent employment and, to a lesser extent, in temporary employment – and in hours worked per employee. This pattern is found to be fairly homogeneous across country groups, although the adjustment in permanent employment is somewhat larger and the change in hours worked per employee is slightly smaller in Group II countries. Difficulties in terms of access to finance also increase the likelihood of employment adjustments, although the effect is much smaller than in the case of demand shocks.

In the case of wages, although negative shocks also increase the probability of wage adjustments, the impact is much lower than on labour input adjustments, confirming that firms used labour input adjustment strategies much more frequently than wage adjustment strategies. Regarding heterogeneity across countries, firms in countries with increasing unemployment (Group II and Group III) are significantly less likely to adjust base wages in the event of a demand shock than are countries in Group I.

WDN3 provides information about the different instruments used by firms to reduce labour input. In general, EU firms used a wide variety of strategies, with the intensity of use of a given strategy determined by country-specific labour market institutions. In this regard, some differences appear across country groups. Collective dismissals were used relatively more often in Group III countries, while individual dismissals were more likely to be used in Group I countries than in the other two groups.

Temporary lay-offs were more often used by firms in Group II countries, while subsidised reductions of working hours were especially relevant in countries such as Germany (Group I) and Italy (Group III). Finally, a large share of firms in almost all countries stopped hiring.

WDN3 also provides information enabling an assessment of the features of wage-setting and wage dynamics. EU firms most typically adjust wages once a year. Around 49% of firms in the 25 EU countries sampled report that, during the period 2010-13, they changed their employees' base wages once a year, while 40% changed them less frequently. The frequency of wage changes in EU countries was lower during the period 2010-13 than during the pre-crisis period (2002-07). This seems to be at least partially attributable to the resistance of firms to lower base wages, i.e. to the prevalence of downward nominal wage rigidity (DNWR).

DNWR was indeed prevalent during the period 2010-13, in spite of the length and intensity of the crisis. Nominal base wage cuts are extremely rare among EU firms, and this was the case even during the crisis. Meanwhile, the percentage of firms that reported having frozen base wages increased dramatically with the crisis, reaching its peak during the period 2008-09, before declining over the period 2010-13. Nevertheless, the evidence from the various WDN waves implies that although DNWR is prevalent in most countries, it can decline substantially in the case of very strong negative shocks. DNWR decreased strongly in countries which suffered GDP declines of 10% or more. This applies to Estonia in the period 2008–09 and to Greece and Cyprus in 2010–13.

Finally, the WDN3 survey collects information that permits an evaluation of the relevance of recent labour market reforms that are deemed to affect labour market adjustments. Labour market reforms have taken place in many EU countries. However, reflecting not only heterogeneity in the response to shocks but also differences in institutions, the composition of measures adopted also differed. The measures and reforms introduced could be roughly categorised as follows: During the initial phase of the crisis – 2007-10 – many countries adopted measures that aimed to maintain employment and provide a safety net for the most vulnerable workers. As the crisis progressed over the period 2010-13, more in-depth reforms were adopted with the aim of making labour markets more efficient – thereby reducing unemployment in the medium run – and increasing competitiveness. This was particularly the case in those countries characterised by continuously disappointing labour market outcomes and structural inefficiencies.

More specifically, the largest and most wide-ranging changes occurred in the southern European countries that suffered the most severe shocks in terms of GDP and unemployment. In the southern European countries under an adjustment program (Greece, Spain and Portugal), the adjustment of employment became more flexible, the wage-setting system became less centralised, and measures to reduce labour costs and increase employment were also adopted, for example sub-minimum wages for young people in Greece, subsidies for new recruits in Spain, and a freeze in the minimum wage in Portugal. A substantial percentage of firms in these countries where significant labour market reforms were implemented found it easier

to adjust both employment and wages in 2013 than in 2010, and they attributed this to reforms and changes in labour laws.

When it comes to remaining obstacles to employment creation, WDN3 showed that economic uncertainty and high payroll taxes are major obstacles to hiring workers on open-ended contracts for a high share of firms in many EU countries. Skill shortages that relate to other structural policies such as education also appear to be an obstacle to hiring workers on open-ended contracts in many EU countries.

1 Introduction

The Great Recession that followed the financial crisis of 2007-08 resulted in large falls in output and rises in unemployment across Europe. Certain euro area countries experienced particularly large rises in unemployment in the wake of the sovereign debt crisis and engaged in structural reforms of their labour markets to become more competitive.

Against the backdrop of continuing adjustment in EU labour markets in response to the Great Recession and the sovereign debt crisis, the European System of Central Banks (ESCB) conducted the third wave of the Wage Dynamics Network (WDN) survey in 2014-15 as a follow-up to the two previous WDN survey waves carried out in 2007 and 2009.[1] The WDN survey collects information on wage-setting practices at the firm level.[2] This third wave (WDN3) sampled about 25,000 firms in 25 European countries with the aim of assessing how firms adjusted wages and employment to the various shocks and labour market reforms that took place in the European Union (EU) during the period 2010-13.[3] Detailed results of the survey are available in individual reports on each of the countries participating. This paper summarises the main results of WDN3 by identifying patterns in firms' adjustments and labour market reforms. It focuses on firms that have more than five workers and operate in the following sectors: manufacturing, energy, construction, trade and transportation, market services and financial intermediation.[4]

More specifically, this paper seeks to lay out the main lessons learnt from the survey in terms of both the general response of EU labour markets to the crisis and how these responses varied across the several countries that took part in the survey. Given the large heterogeneity across the 25 EU countries covered by WDN3 in terms of their labour market performance, Section 2 starts by producing a taxonomy of countries. Section 3 describes the main shocks that caused the crisis, as they were perceived by firms, and the sources of rigidities, identified in the firms' responses to the survey, that conditioned their transmission mechanisms. Section 4 looks at how labour costs responded to the different shocks, with a focus on employment adjustments and the methods used for these. Section 5 focuses on wage adjustments and, in particular, on the extent to which downward nominal wage

1 The first, second and third waves of the WDN survey are referred to as WDN1, WDN2 and WDN3 respectively. See Babecký et al. (2012), Bertola et al. (2012), Druant et al. (2012) and Galuscak et al. (2012) for an overview of WDN1 evidence and Fabiani et al. (2015) for a summary of the main findings of WDN2.

2 The WDN survey collects information that enables researchers to examine the effects on wage, employment and price adjustments of firm characteristics as well as of the economic environment and institutional features of the countries in which the firms operate. The third wave of the WDN survey adds considerable value in that it also collects information that enables an evaluation of the incidence of the various shocks and the relevance of recent labour market reforms that are deemed to affect labour market adjustments.

3 Denmark, Finland and Sweden are the only three EU countries not covered by the WDN3 survey.

4 The WDN3 survey wave also covers non-market services and/or firms with no more than five workers in some countries. See Annex 1 for general information on the WDN survey as well as for details on the features of WDN3.

rigidities act as a potential impediment to cutting labour costs. Section 6 considers labour market reforms during the period 2010-13 and focuses in particular on how firms perceived (and reacted) to them. The section also provides information on the remaining labour market rigidities identified by the survey. Finally, Section 7 concludes.[5]

[5] This paper provides an overview of the main developments with the aim of synthesising the evidence by country groups. Since, however, individual countries' experiences may differ even within these broadly defined groups, the country reports, should be consulted for an in-depth analysis of responses.

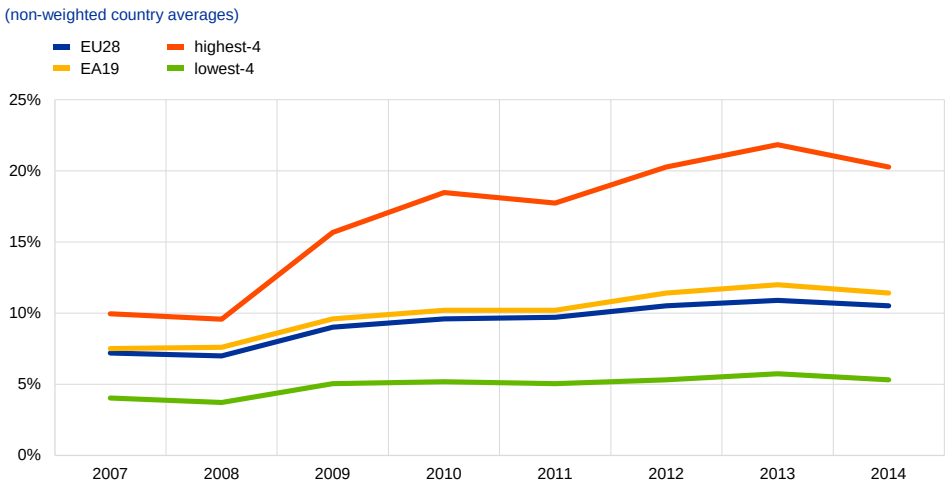
2 A taxonomy of the countries participating in WDN3

Neither the crisis nor the incidence of labour market reforms affected all countries with the same intensity or at the same time. To permit a systematic comparison of the survey results, the paper first provides a brief comparative review of the labour market performance of the countries in the sample. The subsequent sections use country groupings based on the evolution of unemployment and GDP for the purpose of cross-country comparisons.

The most striking development in EU labour markets during the crisis was the widening of unemployment differentials across countries. Chart 1 shows the range of unemployment rates in the EU28 during the period 2007-14 and illustrates that the difference between the average of the unemployment rates in the countries with the lowest rates and that in the countries with the highest rates increased from around 5 percentage points in 2007 to around 13 percentage points in 2010 and to 16 percentage points in 2013.

Chart 1

Unemployment rate in EU countries (2007-14)



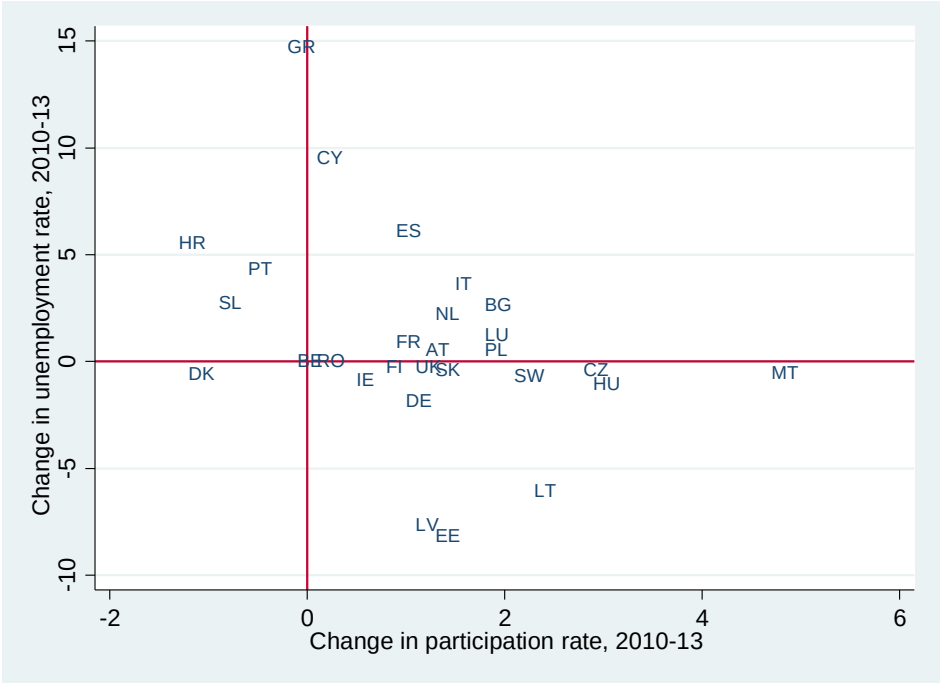
Source: Eurostat.

Cross-country differences in labour market performance during the period 2010-13, which is the period covered by WDN3, were not confined to the evolution of unemployment. There are also notable differences in the change in labour participation rates and in working hours per employee, as shown in Charts 2a and 2b. In most countries the participation rate increased over the period from 2010 to 2013 (the exceptions being Croatia, Portugal, Slovenia, Denmark, Belgium and Greece). Even in countries that saw a large rise in the unemployment rate, participation rates increased significantly, something that was observed neither in previous recessions in Europe nor in the United States during the Great Recession.

As for working hours per employee, these increased significantly only in Ireland, Belgium, the United Kingdom and Greece, but among the countries where they fell there was wide heterogeneity (see Chart 2b).

Chart 2a

Change in unemployment rate and participation rate (2010- 13)



Sources: Eurostat, EU Labour Force Survey.

Since not all countries experienced the economic and financial crisis with the same intensity, this divergence is not surprising. What is more surprising, however, is that the negative relationship between the unemployment rate and GDP growth (normally referred to as “Okun’s law”) shows some variation across countries. To illustrate this fact, Chart 3a plots the changes in the unemployment rate against the changes in output for the 28 EU countries plus the United States as well as for the EU and the euro area as a whole. It does so for the whole period 2007-13, as well as for the two sub-periods 2007-10 and 2010-13, which roughly correspond to the two phases of the recent crisis, i.e. the Great Recession and the European sovereign debt crisis. All but a handful of countries experienced falling output and rising unemployment (i.e. a fall in the top left quadrant) over the period 2007–10, with four – Estonia, Lithuania, Latvia and Spain – experiencing rises in the unemployment rate of more than 10 percentage points. Taking these countries as a group, Okun’s law seems to hold, with a 1% fall in GDP being associated with a 0.43 percentage point rise in the unemployment rate. As for the sub-periods, this coefficient is slightly higher (0.49) for 2007-10, while for 2010-13 – when most countries were firmly in a recovery phase, with GDP growing and the unemployment rate generally falling, but seven countries were still experiencing falling GDP and rising unemployment – it was 0.53.

Chart 2b

Changes in the intensive margin (defined as average hours of work per person employed) and changes in the unemployment rate (2010-13)

Sources: Eurostat, national accounts and EU Labour Force Survey.

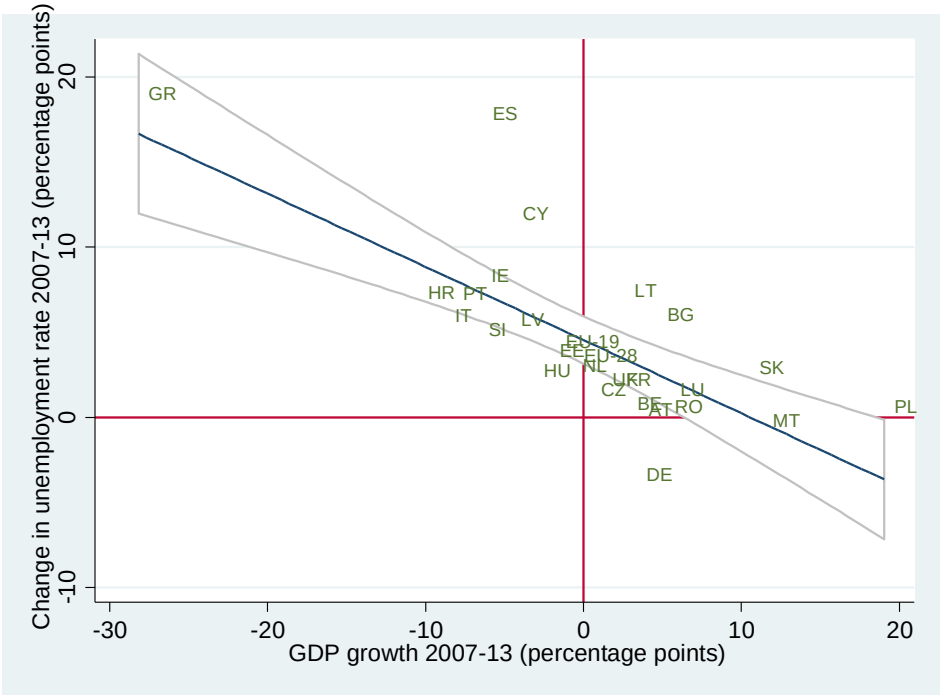
This evidence thus suggests a simple taxonomy of countries as regards their unemployment and GDP performance during the European sovereign debt crisis (2010-13):

- Group I: countries where the unemployment rate decreased and GDP increased (the Czech Republic, Germany, Estonia, Ireland, Latvia, Lithuania, Hungary, Malta, Slovakia and the United Kingdom)
- Group II: countries where the unemployment rate increased even though GDP increased (Belgium, Bulgaria, France, Luxembourg, the Netherlands, Austria, Poland and Romania)
- Group III: countries where the unemployment rate increased and GDP declined (Greece, Spain, Croatia, Italy, Cyprus, Portugal and Slovenia).

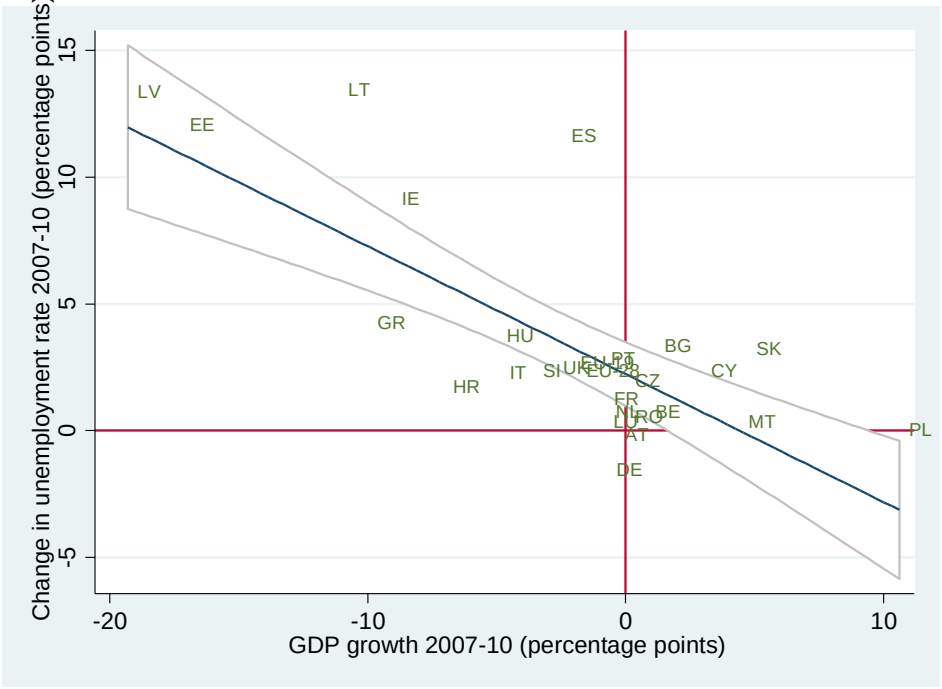
Chart 3a

GDP growth and change in unemployment rates

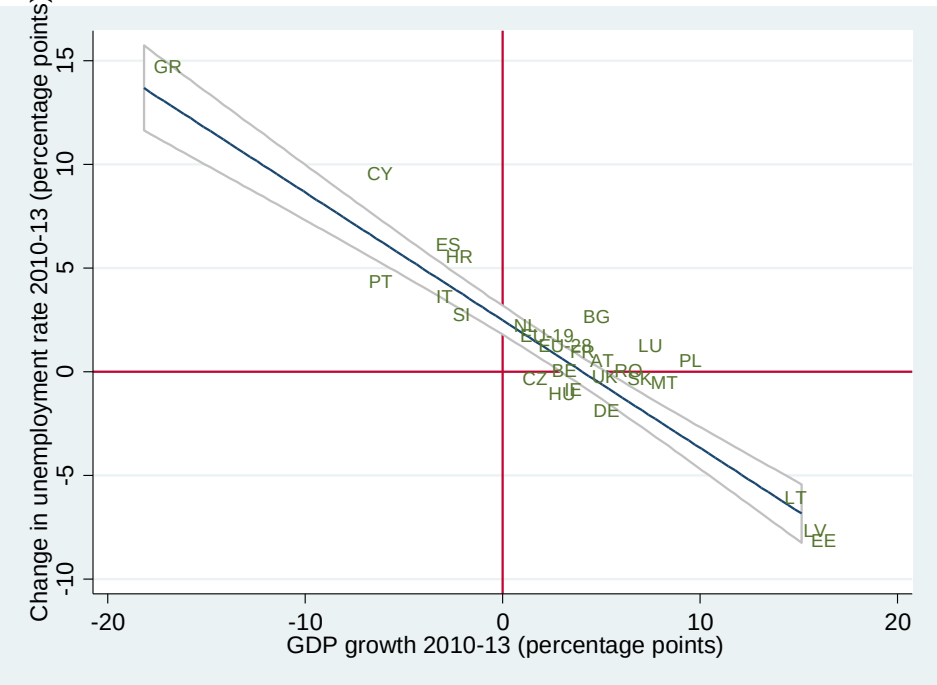
Panel 1: 2007-13



Panel 2: 2007-10



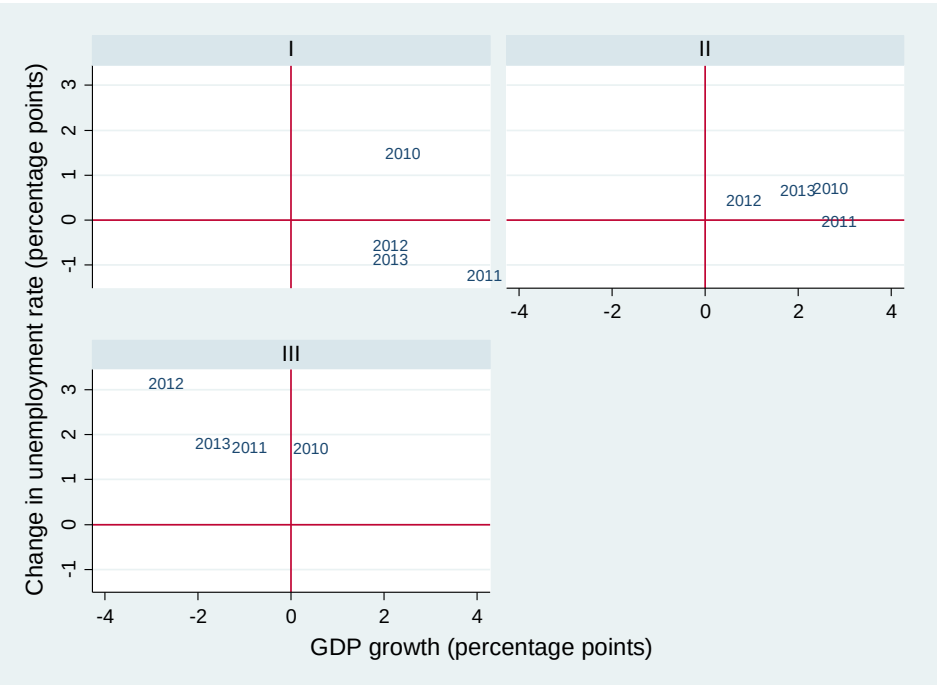
Panel 3: 2010-13



Sources: Eurostat, national accounts and EU Labour Force Survey.

Chart 3b

GDP growth and changes in unemployment rate by country group



Sources: Eurostat, national accounts and EU Labour Force Survey.

Chart 3b shows average year-on-year GDP growth and the average change in the unemployment rate in each country group. Average increases in unemployment are

much larger among Group III countries than in the other two groups, while the average annual growth rates of GDP are clearly smaller. Group I countries reduced their unemployment rates on average during the period 2011-13, and GDP growth remained positive every year in both Group I and Group II countries.

Several factors may explain this heterogeneity. One is the intensity and timing of the shock(s) and/or heterogeneity in the transmission across firm characteristics and sectors of activity, given that the firm/sectoral structure of the economy differs across countries. Countries may also differ in terms of the margins of adjustment (e.g. labour input versus wages; intensive versus extensive margin), as the labour market institutions conditioning the adjustments differ considerably across countries, and this has implications for the speed at which shocks are propagated through the economy and their overall persistence. The subsequent sections of the paper use the classification suggested by Chart 3a to show cross-country differences in the incidence of shocks, firms' adjustments to them and the effects of labour market reforms as measured by WDN3. Although there are other ways to classify the countries, based on, say, labour market institutions or whether or not countries were subject to an IMF/EU adjustment programme, this classification has the advantage of simplicity and clarity and neatly summarises the different experiences of these countries between 2010 and 2013.

3 Demand shocks and limited access to finance in Europe

WDN3 provides qualitative information on firms' perceptions of the nature, size and persistence of shocks hitting them during the period 2010-13. (For some countries this information is also available for the period 2008-10.) The information on the sources of shocks is extensive. A set of questions investigates demand shocks, distinguishing between domestic and external demand shocks, and demand volatility. Another set of questions analyses difficulties in accessing external finance, the impact of financing costs, and access to bank credit (availability and cost) by main purpose: credit for new investment projects, for refinancing debt and for financing working capital. Finally, the questionnaire also includes questions about changes in the costs and availability of (usual) supplies and changes in customers' ability to pay.[6]

The following section summarises the average size of several shocks as perceived by firms (weighted by employment).[7] The scale of the firms' potential responses has been normalised such that 0 is "no change", so that negative (positive) values correspond to negative (positive) shocks[8]. The averages for each country are computed after controlling for firm size and sector,[9] considering only firms in the private sector with at least five employees.[10]

Chart 4 summarises these measures of shocks regarding the level and volatility of demand and its composition between domestic and external demand, access to external finance and changes in financing costs,[11] customers' ability to pay and the availability of supplies (averages by country, after removing size and sector effects). The chart shows that in Group III countries, in which unemployment increased and GDP decreased, negative demand, negative finance and the worsening of customers' ability to pay played a greater role. Group I countries, by contrast, experienced an expansion in demand and, in general, also faced improvements in

6 For each shock firms must refer to the "most significant changes" taking place over the reference period and are asked to provide a qualitative evaluation of the sign and intensity of each shock as measured on a scale from 1 ("strong decrease") to 5 ("strong increase"), with 3 being "unchanged", 2 being "moderate decrease" and 4 being "moderate increase". For the questions about the availability of credit at high costs, the scale goes from 1 ("not relevant") to 4 ("very relevant"), with 2 being "of little relevance" and 4 being "relevant".

7 These averages are weighted by the employment weights provided by the survey

8 The scale is as follows: -2 = strong decrease; -1 = moderate decrease; 0 = no change; 1 = moderate increase; and 2 = strong increase. The survey contains three questions on financing costs. To create a unique index, the variable is first rescaled, e.g. for the availability of credit at high costs, -2 = very high costs of credit; -1 = moderate costs; 0 = very low restrictions due to the cost of credit; 1 = no restriction at all. The sum of the answers to the three questions is then calculated.

9 The indices used in the figures are residuals of an OLS regression which includes sector and size dummies.

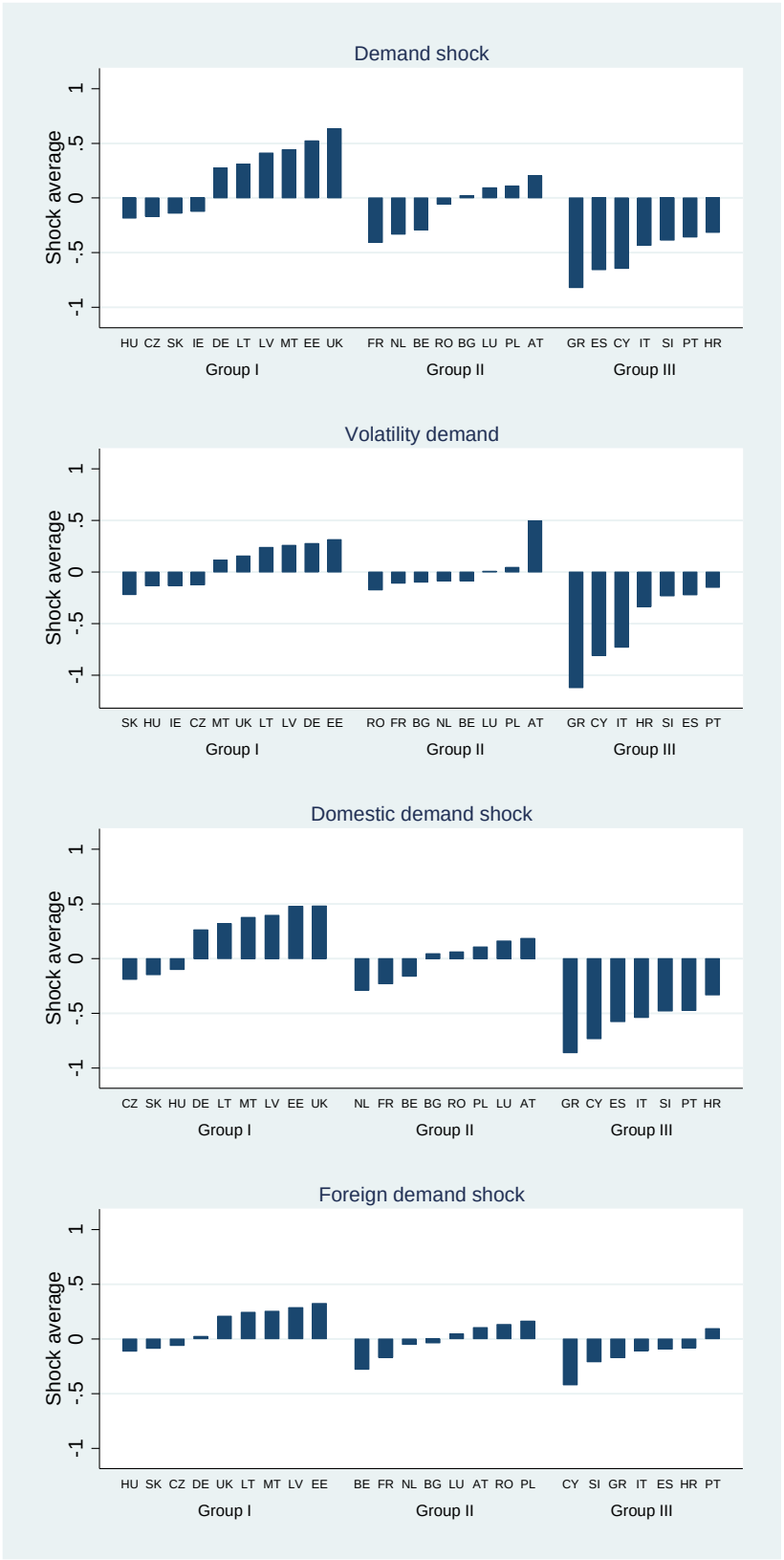
10 This cut-off is likely to be important in some countries where a considerable proportion of firms have fewer than five employees.

11 Financing costs are an indirect measure of the shock experienced by firms. In the context of a generalised increase in the difficulty of accessing credit, changes in financing costs signal the relevance of this component in the total costs of firms.

access to finance and in customers' ability to pay. Group II countries were in an intermediate position for almost all types of shock. Finally, the availability of supplies worsened for all countries (except for the United Kingdom), so it is unlikely that this kind of shock helps to explain cross-country heterogeneity in labour market adjustments. These shocks are, of course, correlated with one another. In particular, the shock related to customers' ability to pay is highly correlated with both access to finance and demand shocks (with correlation coefficients of 0.37 and 0.44 respectively), while the variable measuring the availability of supplies correlates with all other shocks (with a correlation coefficient of around 0.30). The remainder of the paper thus focuses only on shocks to the level of demand (total) and difficulties in accessing external financing.

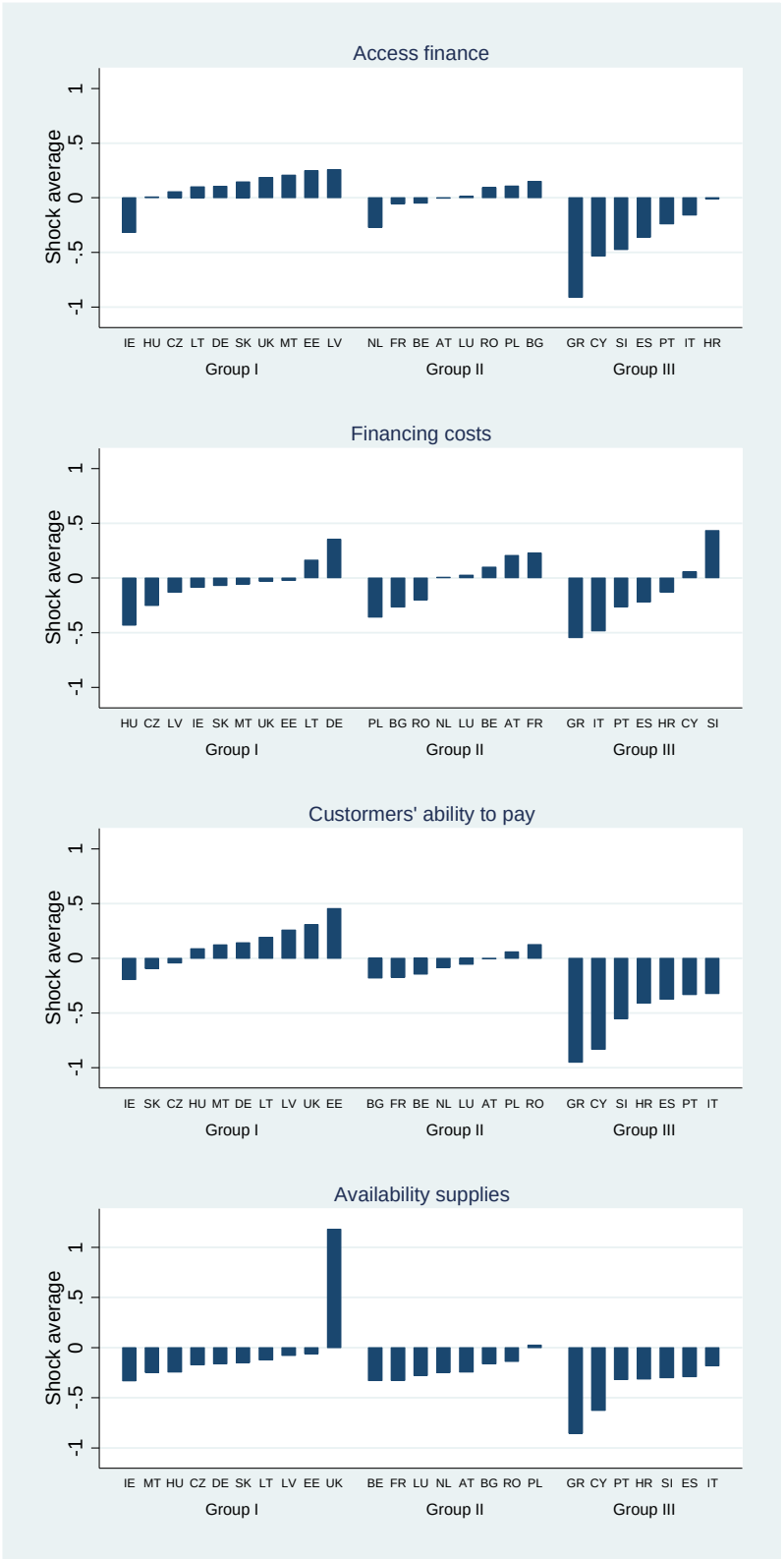
Chart 4

Shocks as perceived by firms



Source: WDN3

Chart 4 (continued)
Shocks as perceived by firms



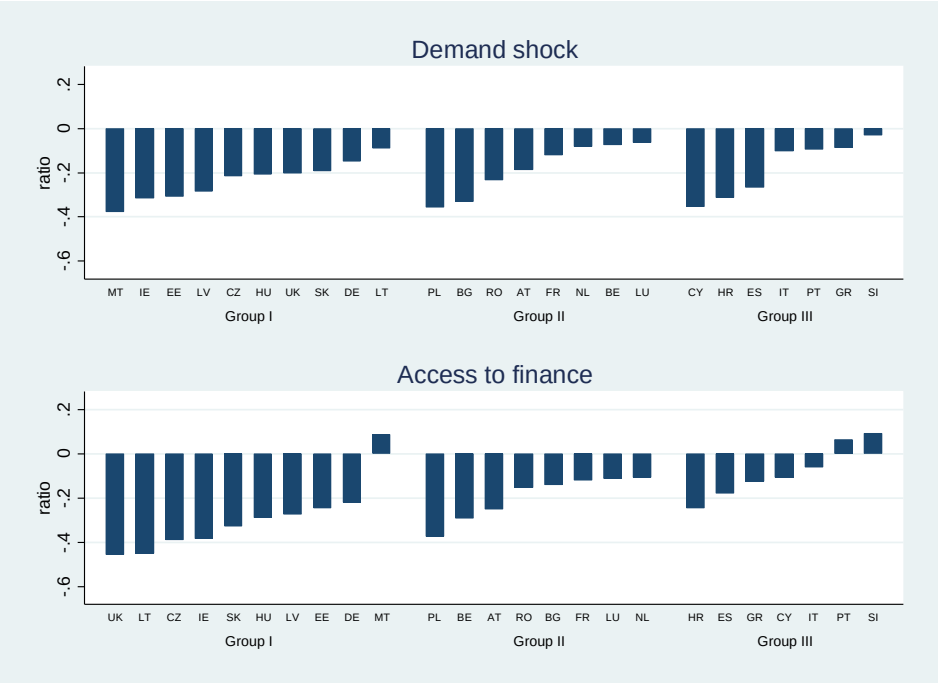
Source: WDN3
Note: Bars measure the average across firms in the country of the corresponding shock as defined in footnote 9.

Charts 5a, 5b and 5c provides information on the incidence of negative shocks to demand and access to finance across firm size and sectors. It focuses on two size classes – large firms, i.e. those with more than 50 employees, and small firms, i.e. those with 5 to 50 employees – and three sectors: industry, construction and private services. Chart 5a shows the deviation from unity of the ratio of the average probabilities of suffering the corresponding shock in large versus small firms. Positive values signal that the ratio is greater than one, i.e. that the shock is more frequent among large firms. Chart 5b and 5c, respectively, compare the incidence of shocks in the services sector with that in the industrial sector and in construction. These charts clearly show that negative shocks mostly affected small firms, as well as firms in the construction sector. This is to be expected, as these firms are more exposed to domestic demand weakness and are typically more credit-constrained. The chart also shows, however, the presence of country heterogeneity: for instance, in Portugal, Slovenia and Malta large firms suffered credit constraints more frequently than small firms.

Chart 5a

Shocks and firm composition

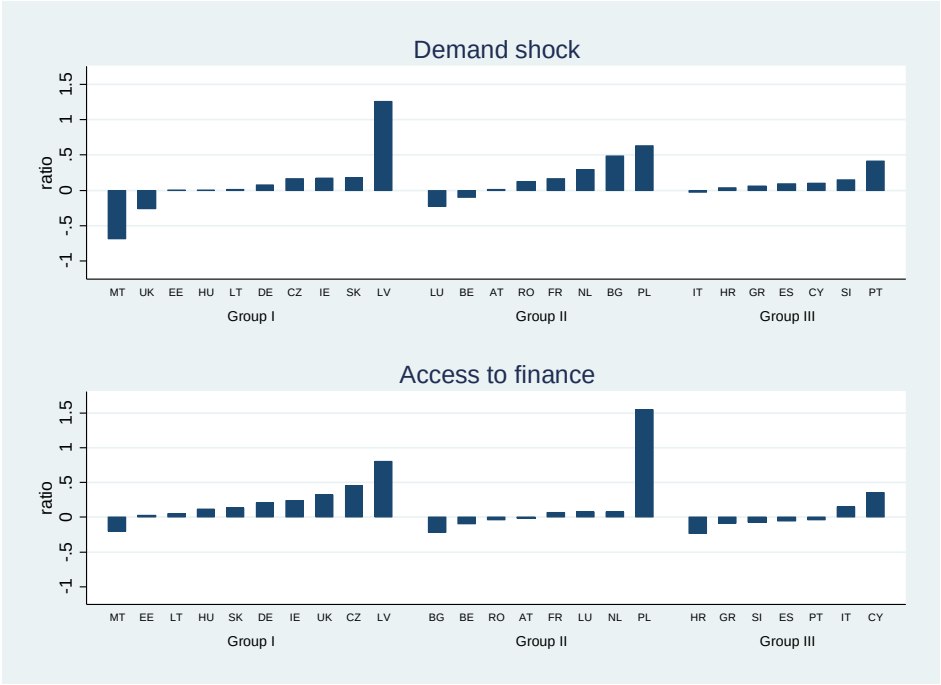
Large versus small firms (total economy)



Notes: The scale represents the deviation from unity of the ratio of the average probability of large firms suffering the indicated shock over that of small firms. Values above 0 signal that the probability is higher for large firms than for small ones.
Source: WDN3.

Chart 5b

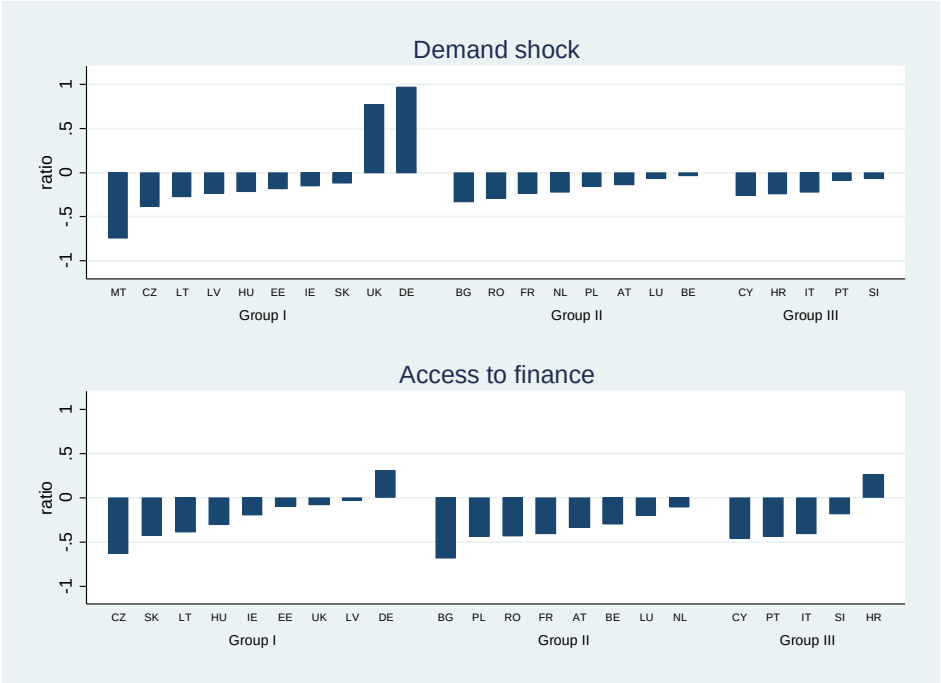
Services versus industry (excluding construction)



Notes: The scale represents the deviation from unity of the ratio of the average probability of firms in the services sector suffering the indicated shock over that of firms in the industrial sector. Values above 0 signal that the probability is higher for firms in the services sector than for firms in the industrial sector.
Source: WDN3.

Chart 5c

Services versus construction

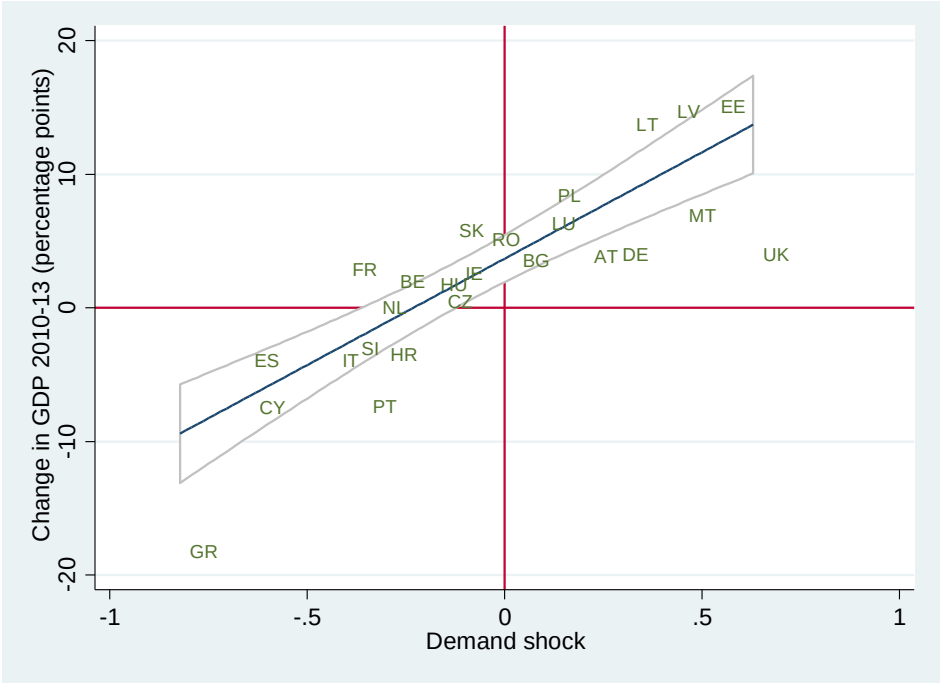


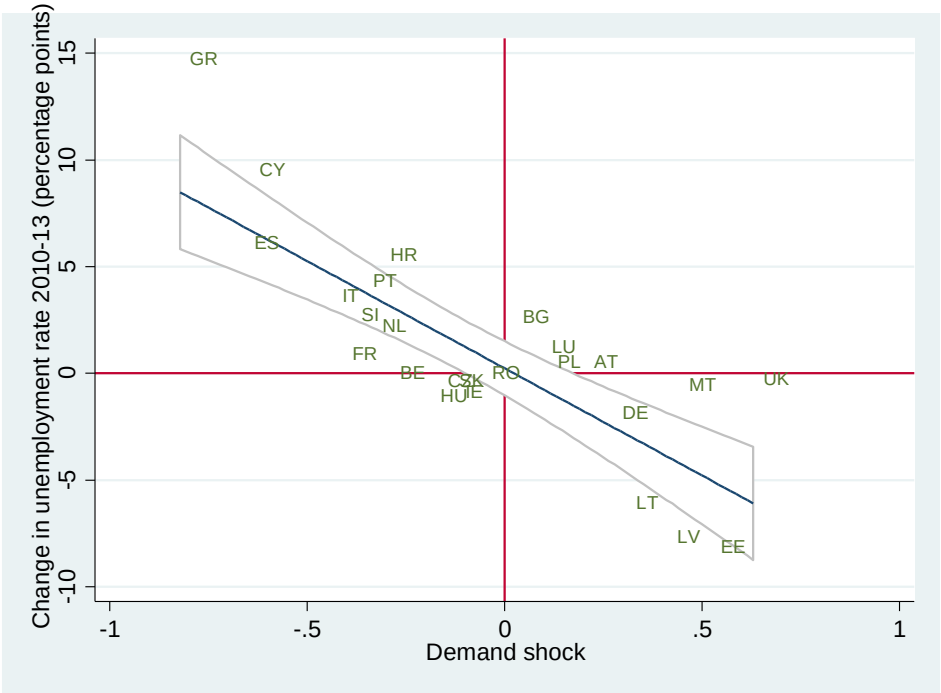
Notes: The scale represents the deviation from unity of the ratio of the average probability of firms in the services sector suffering the indicated shock over that of firms in the construction sector. Values above 0 signal that the probability is higher for firms in the services sector than for firms in the construction sector.
Source: WDN3.

There is concern that this qualitative information regarding firms' perceptions of economic conditions may not be useful, since it is often not related to actual changes in economic conditions. However, in the case of the information provided by WDN3, a strong correlation is found between WDN3 measures of shocks and actual GDP growth and changes in the unemployment rate across countries. Charts 6a and 6b provide these correlations for two different types of shock: demand and access to external finance, respectively. In addition, Table 1 presents the results of simple OLS cross-country regressions of these two macro variables on the WDN3 measures of shocks, which suggest that there is indeed a strong cross-country statistical association with economic meaning between firms' perceptions of shocks, as measured by WDN3, and macroeconomic performance, as measured by GDP growth and changes in the unemployment rate. These correlations also suggest that the microdata from the survey can be used to explain at least part of the cross-country heterogeneity observed in the EU during the crisis (see also Boeri and Jimeno, 2016).

Chart 6a

Firms' perceptions of the demand shock and changes in GDP growth and unemployment rates (2010-13)

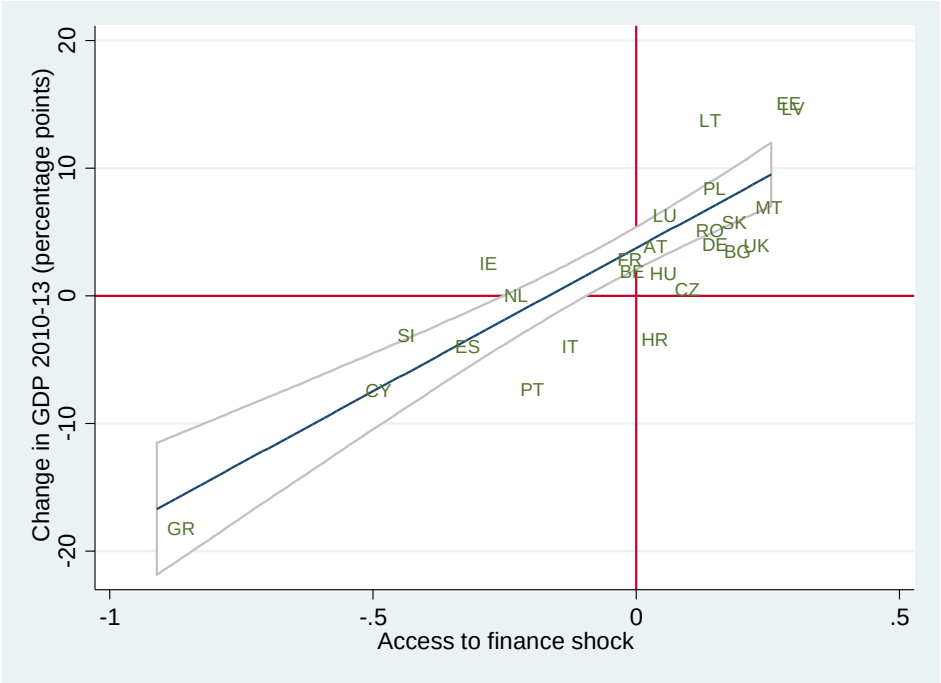


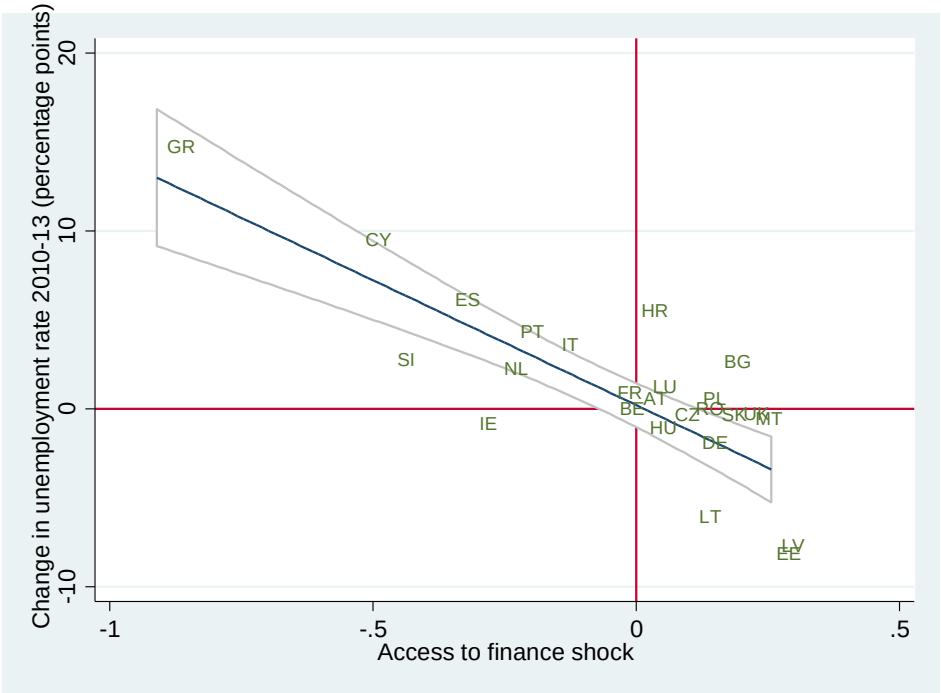


Sources: Eurostat and WDN3.
Note: Shocks are as defined in Chart 4.

Chart 6b

Firms' perceptions of access to external finance and changes in unemployment rate and GDP growth (2010-13)[12]





Source: Eurostat and WDN3. Note: Shocks are as defined in Chart 4.

[12] The index measuring access to external finance has been multiplied by -1, with higher values indicating less difficulty with regard to access to finance.

Table 1

Shocks, GDP growth and changes in unemployment rates (2010-13)

	Unemployment rate coefficients			GDP growth coefficients		
	Slope	Constant	Adjusted R-squared	Slope	Constant	Adjusted R-squared
Demand	-0.07 (3.8)	0.12 (1.9)	0.574	0.13 (4.3)	-0.17 (1.7)	0.609
Volatility/uncertainty of demand	-0.10 (5.6)	0.02 (0.7)	0.579	0.18 (6.4)	-0.00 (1.0)	0.633
Domestic demand	-0.08 (4.2)	0.18 (2.3)	0.656	0.14 (5.2)	-0.27 (2.3)	0.725
External demand	-0.17 (4.2)	0.15 (1.7)	0.415	0.27 (4.0)	-0.24 (1.6)	0.392
Access to finance	-0.13 (5.0)	-0.02 (0.3)	0.617	0.23 (6.3)	0.02 (0.3)	0.726
Financing costs	0.07 (2.8)	0.24 (4.1)	0.449	-0.12 (2.8)	-0.44 (4.7)	0.525

Note: t-stat in brackets.

4 Firms' reaction to shocks: labour cost adjustments

The size, intensity and variety of shocks affecting EU firms between 2010 and 2013 caused deep changes in the economic structure of countries and in firms' strategies. Firms may react to the new economic situation by adjusting prices, costs – including labour and non-labour costs – and/or output and margins. This section analyses firms' reactions in terms of labour costs. WDN3 provides unique data for this purpose. It can also be seen as an important source of information for the evaluation of many other issues, such as the impact of shocks on competitiveness, the impact of credit shocks on total costs, and, for a subset of countries, the relationship between shocks, costs and price adjustments. Nevertheless, several shortcomings should be borne in mind. As with any other cross-sectional dataset, it only contains information on firms that were in the market at the time the data were collected, in this case those firms that survived the sovereign debt crisis. Moreover, responses may be influenced by the specific macroeconomic environment prevailing at the time of the survey.

This section examines the relationship between shocks to demand and credit conditions and the reactions of firms in terms of the various components of labour costs, namely employment (including working hours) and wages, with a focus on the incidence of lay-offs as an employment adjustment mechanism. The subsequent section focuses on wage adjustment. [13]

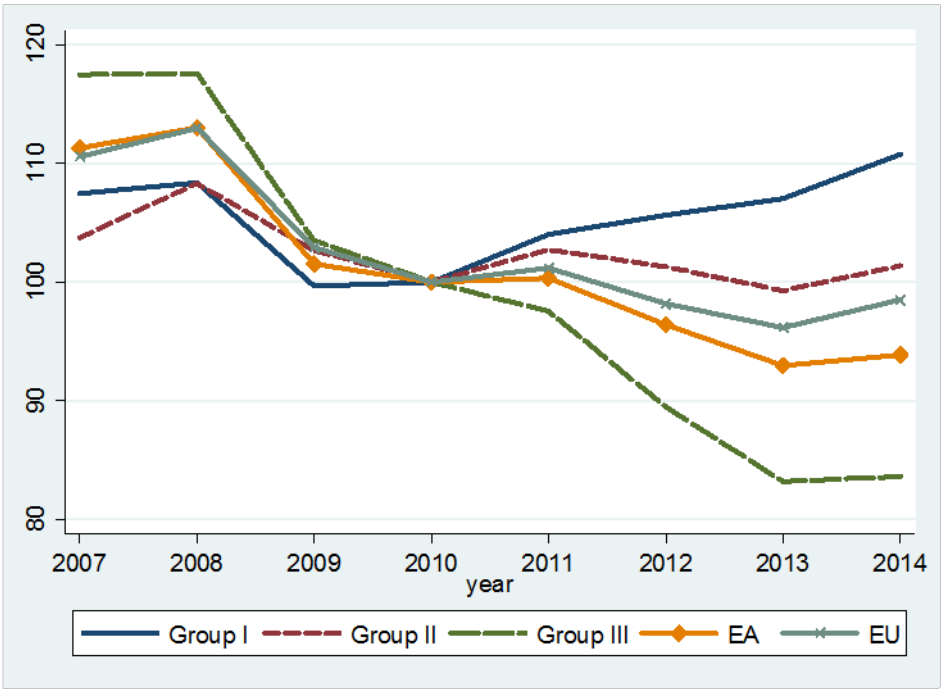
4.1 Labour cost adjustments: a macroeconomic view

Chart 7 plots the dynamics of total hours worked, as reported in national accounts, in the euro area, in the 28 EU countries and in the three groups of countries considered in this paper. The adjustment of hours is not influenced by changes in the participation rate or in the intensive use of labour and can provide a direct measure of the reduction of labour input in private sector firms. Once again, the figure confirms the high degree of heterogeneity across country groups. Group III countries severely reduced labour input from 2010 to 2013 (before it stabilised in 2014). In Group I countries, labour input stabilised after increasing in 2011. Group II countries registered a modest fall.

[13] For a detailed analysis of credit restrictions and labour costs, see also Bodnár et al. (2016).

Chart 7

Dynamics of hours worked in EU countries (2007-14)



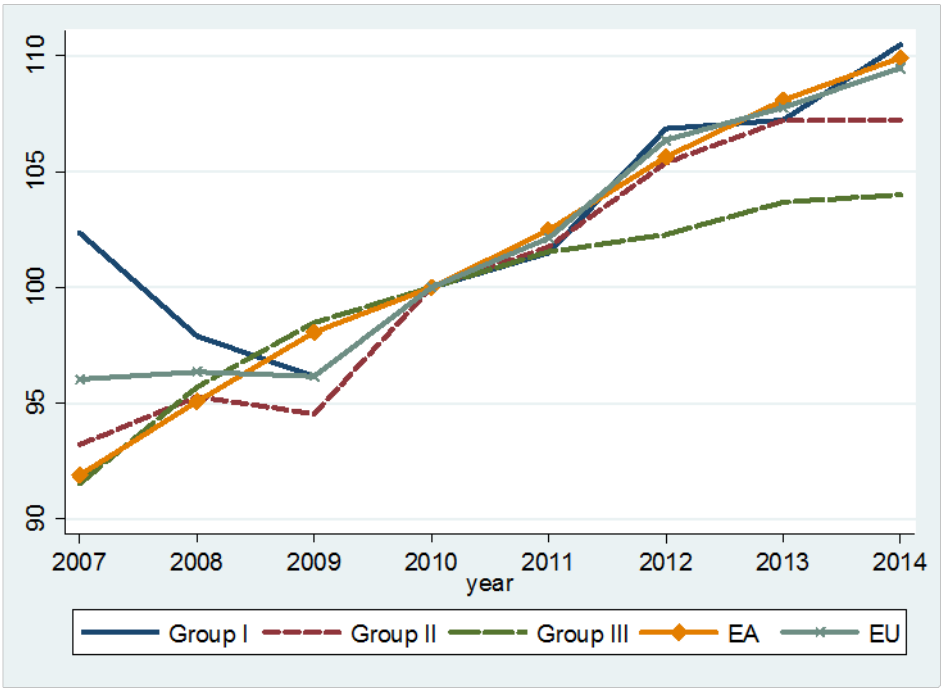
Source: Eurostat, national accounts.
Note: Each data point is an index calculated by setting the value recorded in 2010 equal to 100.

The dynamics of nominal and real hourly wages during the period under consideration were, by contrast, fairly homogeneous across countries (see Charts 8a and 8b), although Group III countries saw weaker wage developments after 2011. Nominal hourly wages rose continuously until 2013, with the exception of the period 2008-09, when they declined in Group I countries (owing to policies undertaken in the Baltic countries), in the United Kingdom and in Ireland. Real wages – i.e. nominal hourly wages deflated by the HICP – stagnated almost everywhere after 2010.[14] This evidence confirms that the reaction of labour input was larger than the reaction of wages, probably due to the very large size of the shocks hitting the EU labour market. This hypothesis will be investigated more closely in the next section. The potential impact of downward nominal wage rigidities is discussed in Section 5.

[14] A notable exception is Germany, where real wages have increased significantly since 2010.

Chart 8a

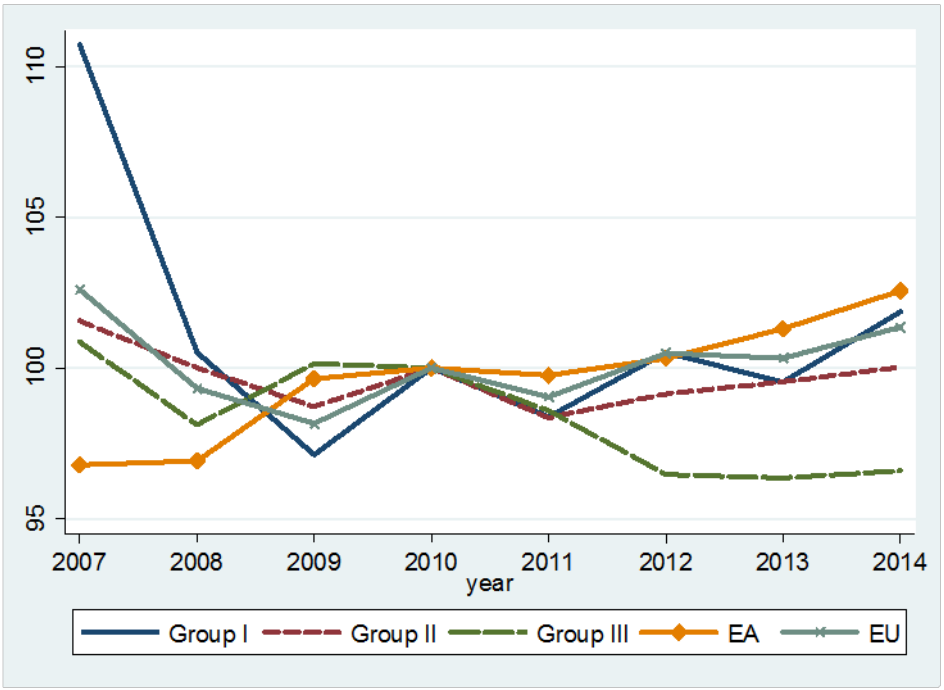
Dynamics of nominal hourly wages in EU countries (2007-14)



Source: Eurostat, national accounts.
Note: Each data point is an index calculated by setting the value recorded in 2010 equal to 100.

Chart 8b

Dynamics of real hourly wages in EU countries (2007-14)



Source: Eurostat, national accounts.
Note: Each data point is an index calculated by setting the value recorded in 2010 equal to 100.

4.2 Labour cost adjustments through the WDN3 lenses

The WDN3 survey makes it possible to check empirically whether these adjustments (quite strong for labour input, fairly modest for wages) were related to demand and access to finance shocks. The survey includes various qualitative measures of labour input and wage adjustments. The survey focuses on the following outcomes: (1) permanent employment; (2) temporary employment; (3) hours per employee, (4) base wages, and (5) flexible wage components. For each outcome firms are asked to report whether, during the period 2010-13, they registered: (a) a strong reduction; (b) a moderate reduction; (c) no change; (d) a moderate increase; or (e) a strong increase.

A linear regression is run for each component of labour costs, where the dependent variables are dummies indicating a strong or moderate decrease in the corresponding outcome. Covariates include sector and size dummies, dummies for country groups, and two dummies indicating a strong/moderate negative shock to demand and strong/moderate difficulty in accessing finance. Shocks are also interacted with the country groups' dummies. The results concerning employment adjustments are reported in Table 2; those regarding wage adjustments are reported in Table 3. The coefficients show the change in the probability of firms indicating a strong or moderate decrease in the dependent variable in response to a strong or moderate fall in demand/increased difficulty in accessing finance.[15]

First, as expected, negative demand shocks are highly correlated with negative adjustments in permanent employment (i.e. firms are much more likely to reduce permanent employment if they face a strong or moderate fall in demand than if they do not), but the adjustment is larger in Group II countries. [16] Difficulties related to access to finance have an additional impact on the negative adjustment of permanent workers (column 2), although the effect is smaller than for demand shocks. This first piece of evidence suggests that the size of the shock played a role in explaining the more intense decline in employment in Group III than in Groups I and II. Adverse demand and credit shocks are also positively correlated with the probability of reducing temporary workers and hours per employee. Interestingly, firms in Group II countries, i.e. countries where unemployment continued to grow after 2010, have a lower probability of reducing labour input on the intensive margin in response to a negative demand shock. This might explain why in these countries the probability of reducing labour input on the extensive margin was relatively high.

[15] This simple exercise does not take into account potential interactions between different types of labour input adjustment after a shock.

[16] Given that this relates to negative shocks leading to negative labour adjustments, coefficients are positive.

Table 2

Changes in labour input and adverse shocks (linear regressions)

	Reduction in permanent workers		Reduction in temporary workers		Reduction in hours per employee	
	(1)	(2)	(3)	(4)	(5)	(6)
Demand shock	0.211***	0.202***	0.127***	0.117***	0.137***	0.131***
	(8.802)	(8.326)	(6.052)	(5.574)	(7.066)	(6.751)
Dem.shock*Group II	0.110***	0.104***	0.008	0.012	-0.057**	-0.066***
	(3.337)	(3.08)	(0.265)	(0.388)	(-2.350)	(-2.747)
Dem.shock*Group III	-0.016	-0.036	0.028	0.002	0.006	-0.009
	(-0.305)	(-0.710)	(0.532)	(0.047)	(0.136)	(-0.210)
Access to finance		0.060**		0.068***		0.042**
		(2.222)		(2.859)		(1.993)
Access to fin.*Group II		0.013		-0.037		0.033
		(0.31)		(-1.038)		(1.037)
Access to fin.*Group III		0.046		0.06		0.036
		(0.816)		(1.069)		(0.723)
Observations	23215	23215	23215	23215	23215	23215

Notes: Robust z-statistics in brackets; *** p<0.01, ** p<0.05, * p<0.1. Weighted regressions using employment weights.

Table 3

Changes in wages and adverse shocks (linear regressions)

	Reduction in base wage		Reduction in flexible wage component	
	(1)	(2)	(3)	(4)
Demand shock	0.075***	0.070***	0.133***	0.127***
	(5.924)	(5.79)	(7.304)	(6.881)
Dem.shock*Group II	-0.034**	-0.034**	-0.006	-0.013
	(-2.015)	(-1.970)	(-0.241)	(-0.493)
Dem.shock*Group III	-0.085***	-0.092***	0.012	-0.018
	(-2.781)	(-2.891)	(0.272)	(-0.422)
Access to finance		0.039***		0.043**
		(2.931)		(2.266)
Access to fin. * Group II		-0.015		0.021
		(-0.699)		(0.666)
Access to fin.* Group III		0.006		0.090*
		(0.21)		(1.761)
Observations	23215	23215	23215	23215

Notes: Robust z-statistics in brackets; *** p<0.01, ** p<0.05, * p<0.1. Weighted regressions using employment weights.

Heterogeneity across groups of countries emerges clearly also when adjustments in base wages are considered. Compared with firms in Group I countries, firms in countries with increasing unemployment (Group II and in particular Group III) are less likely to adjust base wages in the event of a decline in demand. Group III countries in particular did not cut wages at all, signalling the presence of downward wage rigidities. The response of firms to increased difficulty in accessing finance is,

by contrast, homogeneous across groups: flexible wage components were adjusted more evenly across countries.

4.3 Employment adjustments

WDN3 provides information about many different instruments that firms could use to reduce labour input or adjust its composition. Table 4 summarises this information by country and groups, providing the share of (employment-weighted) firms using a given instrument if they have reported a negative shock to demand or access to finance. The last column reports the average number of instruments used.

It is clear that the intensity of use of a given instrument is determined by country-specific labour market institutions. With this caveat in mind, the table first shows a very high degree of heterogeneity across countries in the use of the instruments, but it also shows that the firms in the sample used a wide variety of strategies to adjust labour costs, the average number of instruments being higher than two in all country groups.

With regard to the individual instruments, the probability of using collective dismissals is higher for Group III countries, while the use of individual dismissals is more likely for Group I countries than for the other two groups. It is important to note, however, that individual lay-offs are more prevalent than collective lay-offs across all countries (apart from Italy), even in countries where the costs of dismissal are high.

Temporary lay-offs are not a feature in all countries, but tend to be used more by firms in Group II and Group III countries. Only a few countries allow for the subsidised reduction of hours: this is the case in Germany, where this method was used by one out of three firms hit by a shock, and in Italy, where the share reached 65.4%. Finally, a large share of firms in almost all countries stopped recruiting new staff. [17] Regarding the propensity to use the different instruments, firms in Group III countries were more likely to stop renewing temporary job contracts. Since shocks were mainly concentrated in small firms and in the services sector, where human capital is less firm-specific, firms more often laid off workers instead of adjusting the intensive margin of labour.

[17] This means that firms were not benefiting from potential wage adjustments through this channel, as the wages of newly hired workers might be more responsive to external labour market conditions than those of incumbents.

Table 4

Adjustment of employment

Proportion of firms experiencing a negative shock to demand or access to finance that used each instrument (2010-13)

	Collective lay-offs	Individual lay-offs	Temporary lay-offs	Subsidised reduction of working hours	Non-subsidised reduction of working hours	Non-renewal of temporary contracts at expiration	Early retirement schemes	Freeze or reduction of new recruitment	Reduction of agency workers and others	Average number of instruments used
Group I										
CZ	18.2	59.7		9	19	47.1	13.9	64.9	27.3	2.6
DE	9	43.4		35	28.5	32.3	16.6	51	16.4	2.3
EE	10.3	50.5			25.1	10.1	3.2	41.4	7.6	1.5
HU	13.3	34.3	11	6.7	12.5	22.1	13.6	35.5	12.2	1.6
IE	18.8	36	17.3	16.8	35	18.8	5.6	52.3	17.8	2.2
LT	2.0z	20.3			9.4	19.9	2	28.2	7.8	0.9
LV	11.3	38.6			33.3	17.3	1.9	39	15.1	1.5
MT	12.1	15.3		12.9	34.3	20.3	12.6	46.5	3.6	1.6
SK	29.8	67.8	13	9.1	7.1	31.1	25.1	67.9	24.9	2.8
UK	28.7	56.7	5.9		23.8	19.1		46.7	28.2	2.1
Group II										
AT	15.1	33.9	15.6	5.3	32.5	2.6	2.8	55	41	2
BE	9.6	43.2	47.2	6.1	12.9	30.6	18.9	71.3	41.1	2.8
BG	26	56.2	36.7	14.3	11.8	23.5	7.6	59.5	10.4	2.5
FR	20.5	38	5.8	13.5	26.7	46.6	5.7	73.9	51.2	2.8
LU	3.9	39	5.7	7.1	13.8	33.2	8.3	52.5	41.4	2
NL	17.4	39.5	3.3	1.9	7.2	50.6	9.7	58.9	44.2	2.3
PL	6.8	63.1	17.1	11.9	28.8	61.2	23.3	76.3	38.2	3.3
RO	25	53.7	15.6	11.8	30.5	34.7	12.1	65.7	20.5	2.7
Group III										
CY	22.7	37.4	13.2	4.4	25	21.2	10.2	58.1	2.2	1.9
ES	9.7	56.9	25.4	15.4	19.2	56.1	20.5	37.3	19.5	2.6
GR	4.5	36.5	3.3	1.3	30.6	17.8	7	62	24.4	1.9
HR	24.2	47	9	3.5	22.8	43.4	36	43.4	28.9	2.6
IT	40.4	23		65.4	30.4	47.1	14.8	77.6	46.8	3.5
PT	18.2	40.5	5.3		29.3	64.9	16.3	80.3	36.2	2.8
SI	13.6	44.6	8.6	10.9	9.7	47	19.7	51.2	20.1	2.3
Averages										
Group I	16.5	49.1	2.9	27.4	24.2	29.2	11.7	50.9	20.7	2.2
Group II	17.1	43.3	11.5	9.3	20.9	45.6	10.4	68.6	43.9	2.7
Group III	26.7	36.6	19.2	39.6	26.3	49.1	16.9	62.6	35.2	3

Source: WDN3 survey.
Note: Figures are weighted to reflect overall employment and rescaled to exclude non-responses.

5 Wage adjustments

The data collected in the three waves of the WDN survey make it possible to analyse whether wage adjustment practices have changed during the economic crisis.[18] This paper focuses on two key aspects of wage-setting which have been used as the main indicators of wage rigidity in the related literature: a) the frequency of wage changes, which is an indicator of staggered wage adjustment, and b) downward nominal wage rigidity, with a focus on the rigidity of base wages.[19]

5.1 The institutional context: the coverage and centralisation of collective bargaining

Firms' ability to adjust wages in response to negative shocks depends on labour market institutions. One of the most influential aspects of the institutional environment is the extent and centralisation of collective bargaining. However, given the scarcity of comparable information, it is difficult to obtain a good overview of collective bargaining.[20] WDN1 and WDN3 collected information on the incidence, centralisation and coverage of collective wage agreements directly from firms. This provides an alternative data source to the existing ones and makes it possible to analyse the variation in collective bargaining coverage across firms and countries, as well as recent trends in collective bargaining centralisation, and to explore the relevance of bargaining institutions for labour market adjustments.

Table 5 gives an overview of collective bargaining in 2007 and 2013 on the basis of two waves of the WDN survey: WDN1 and WDN3. The incidence and centralisation of bargaining differ considerably across the three groups of countries. The countries in Group I have on average a much lower level of bargaining coverage and more decentralised bargaining systems. Approximately one-third (35%) of employees are covered by collective agreements in Group I countries on average, while the coverage is 75% in Group II and 91% in Group III countries. Regarding centralisation, about 30% of firms have higher-level collective bargaining agreements in Group I countries, while this share is 56% in Group II and 79% in Group III countries.[21] It is noteworthy that these differences not only are apparent in a comparison of the group averages but also apply to almost all individual countries belonging to each group, with only a few exceptions. Two such exceptions are

18 WDN1, launched in 2007, collected information on the period 2002-07, WDN2, conducted in 2009 collected information for 2008-09, and finally WDN3, conducted in 2014-15, collected information about the period 2010-13.

19 A number of papers use WDN3 data to examine in detail wage adjustment issues and their relationship with institutions and incidence of shock. See Marotzke et al. (2017), Lamo et al. (2016), and Babecky et al. (2016).

20 An exception is the database in Visser (2016). For the euro area, see also ECB (2012) and du Caju et al. (2008).

21 The indicator of centralisation is the incidence of collective bargaining agreements that are signed outside the firm, i.e. at the sectoral, national or occupational level (second and sixth columns, Table 5).

Bulgaria and Poland, which, although belonging to Group II, have very low bargaining coverage, and collective bargaining agreements are mostly signed at the firm level.

Table 5

Collective bargaining coverage, WDN1 and WDN3, by country

	WDN1				WDN3			
	Collective bargaining agreements (% of firms)			Collective bargaining coverage (% of employees)	Collective bargaining agreements (% of firms)			Collective bargaining coverage (% of employees)
	Firm level	Outside the firm	Firm level or outside		Firm level	Outside the firm	Firm level or outside	
Group I countries								
Czech Republic	51.4	17.5	54	50.2	30.6	10	39	33.2
Germany					16.1	47.2	56.9	48.3
Estonia	10.4	3.4	12.1	8.7	10.1	2	11.3	8.2
Hungary	19	0	19	18.4	20.2	6.7	23.2	20.3
Ireland	30.7	68.1	72.4	40.8	11.4	9.8	19.9	9.2
Latvia					16.7	2.3	18.9	18.3
Lithuania	23.7	0.8	24.2	15.6	17.4	1.9	18.2	16
Malta					31	0.5	31	23.8
Slovakia	56.8	19.4	57.6	57.3	35.1	14.8	38.4	35.7
United Kingdom					17.4	7.2	32.7	21.3
Total, group I					18.3	29.2	44	35.3
Group II countries								
Austria	23.4	96.2	97.8	94.5	27.4	88	98.8	80.4
Belgium	35.3	97.9	99.4	87.8	30.8	63	72	94.4
Bulgaria					21.8	7	24.3	17.8
France	58.4	98.8	99.9	66.7	28.9	82.9	88.8	94.4
Luxembourg	17.4	42.8	57	43.7	25.1	33.4	54.9	54
Netherlands	30.1	45.4	75.5	67.6	51.5	54.6	79.7	90
Poland	21.4	4.7	22.9	19.3	17.9	1	20.9	20.9
Romania					69.4	7.7	73	71.6
Total, Group II					33.1	56.6	72.5	76
Group III countries								
Cyprus	28.4	25.4	46.6	33.2	31.7	41.7	56.4	39.6
Spain	16.9	83.1	100	96.8	31	77.3	95.2	96.3
Greece	20.9	85.8	93.4	91	26.2	42.8	60.1	71.4
Croatia					35.4	23.3	45.2	47.1
Italy	42.9	99.6	99.6	97	60.4	89	99.5	99
Portugal	9.6	58.8	61.9	55.3	13	62.2	66.3	62.5
Slovenia	25.7	74.3	100		57.9	75.9	86.9	79.4
Total, Group III					39.3	78.9	91.1	90.8
Total	33.3	64.6	76	67.4	26.8	50.02	63.7	60.7
WDN3 total for WDN1 sample					31.7	63.2	74.9	75.9

Source: Authors' calculations on the basis of WDN1 and WDN3.
Notes: Figures weighted to reflect overall employment and rescaled to exclude non-responses.

The differences in collective bargaining across groups suggest that the institutional environment for wage-setting may have influenced how countries recovered from the Great Recession. Group I countries experienced a significant drop in real wages in 2007–09 (Chart 8b). This was partly the result of currency depreciations in the countries with flexible exchange rates, but some countries belonging to this group were also able to carry out “internal devaluations” by lowering the wages of employees (Latvia, Lithuania, Estonia and Ireland). The decline in real wages in Group I countries is likely to have boosted their international competitiveness and helped them to recover faster from the Great Recession.

The changes in collective bargaining between 2007 and 2013 can only be assessed for the subset of countries that participated in both WDN1 and WDN3. The evidence from other data sources has shown that there has been a general trend towards a decline in unionisation in recent decades (see Visser, 2016). The WDN data do not support this finding. The average incidence of union agreements across the surveyed countries has been stable, and collective bargaining coverage increased between 2007 and 2013. However, the average trends mask strongly divergent developments across individual countries. Collective bargaining coverage has substantially declined in some countries (e.g. Ireland and the Czech Republic), while it has increased in others (e.g. France and the Netherlands).

Some general trends can still be highlighted, in particular for the Group III countries that have suffered the most prolonged crises. The common tendency among this group is a decline in the centralisation of collective bargaining, indicated by an increase in the share of firm-level bargaining agreements (in all Group III countries for which there is comparative evidence) and by a decline in the incidence of higher-level bargaining contracts in some countries (Greece, Spain and Italy).

5.2 The frequency of wage changes

Table 6a

Frequency of wage changes, WDN1 and WDN3, by country

Country	More frequently than once a year (%)	Once a year (%)	Less frequently than once a year (%)	Never/not applicable (%)	More frequently than once a year (%)	Once a year (%)	Less frequently than once a year (%)	Never/not applicable (%)
	WDN1				WDN3			
Group I countries								
Czech Republic	11.5	64.1	23	1.4	1.3	28.6	53.9	16.2
Germany	-	-	-	-	2.6	38.5	54.8	4
Estonia	19.9	64.4	10.5	5.2	3	39.7	50.4	6.9
Hungary	2.6	75	12.2	10.2	1.4	43.6	47.2	7.8
Ireland	14.6	71.2	9.9	4.3	0.9	18.1	38.3	42.7
Latvia	-	-	-	-	5.3	31.2	53.3	10.2
Lithuania	42.1	44	7.5	6.4	9.8	19.9	46.6	23.6
Malta	-	-	-	-	7.3	92.7	0	0
Slovakia	-	-	-	-	3	46.3	39.5	11.2
United Kingdom	-	-	-	-	0.8	71.1	25.4	2.7
Total, Group I					2	49.6	42.7	5.7
Group II countries								
Austria	6.8	84.2	5.9	3.1	2.6	82.6	12.2	2.6
Belgium	22	64.8	9.8	3.4	19.8	40.1	31.4	8.8
Bulgaria	-	-	-	-	1.1	33.1	51.5	14.3
France	19.7	74.1	5.2	1.1	9.2	65.4	22.8	2.5
Luxembourg	7	93	-	-	21	46.2	24.3	8.4
Netherlands	10.8	70.1	17	2.1	8.2	51.4	30.4	10
Poland	13.6	56.3	28.2	1.9	1.5	42.4	46.9	9.1
Romania	-	-	-	-	12.9	33.5	40.3	13.3
Total, Group II					8.1	55.2	30.3	6.4
Group III countries								
Cyprus	-	-	-	-	0.7	35.2	38.5	25.6
Spain	11.9	84.1	2.5	1.5	2.7	46.7	24.9	25.7
Greece	-	-	-	-	2.1	16.8	46.7	34.5
Croatia	-	-	-	-	3	35.4	42.1	19.5
Italy	4.2	26.9	64.6	4.3	2.9	24.6	59.8	12.7
Portugal	5.9	82.2	8.4	3.5	0.7	27.2	38	34.1
Slovenia	27.2	65.6	5.9	1.3	3.7	23.5	49	23.8
Total, Group III					2.6	31.4	46.1	19.9
Non-euro area	14	59.5	23.2	3.3	2	57.1	34.5	6.4
Euro area	11.4	59.5	26.4	2.7	5	43.9	41.6	9.6
Total	12.1	59.5	25.6	2.9	4	48	39.6	8.6
WDN3 total for WDN1 sample					5.3	45.3	37.5	11.9

Sources: Druant et al. (2012) for WDN1; authors' calculations on the basis of WDN1 and WDN3.
Notes: Figures are weighted to reflect overall employment and rescaled to exclude non-responses. Total (WDN1) refers to the averages across countries that participated in WDN1 in 2007. With regard to the WDN1 data, the split between frequencies of wage changes must be interpreted differently for Greece and Cyprus, as the options "never/don't know" were not available in the Greek and Cypriot questionnaires. Results for Greece, Cyprus and Luxembourg are not included in the WDN1 aggregate.

In the countries in the sample, firms most typically change wages once a year (see Table 6a). Around 88% of firms in the 25 EU countries in the sample report that during the period 2010-2013 they changed their employees' base wages once a year or less frequently (around 48% changed their employees' base wages once a year, and 40% changed wages less frequently than once a year), while only 4% did so more frequently than once a year. A higher frequency of wage changes is observed among the countries in Group II, where the unemployment rate increased even though GDP increased, mainly because of Luxembourg and Belgium, where wage-setting is based on automatic indexation. The lowest frequency occurs among firms in countries in Group I, where the vast majority of firms change wages once a year. As for differences across sectors and firms of different sizes (Table 6b), there are no sizeable differences in the proportion of firms changing wages more frequently than once a year, which in all sectors and firm sizes is roughly 5%.

Table 6b

Frequency of wage changes across sectors, WDN3 (2010-13)

	More frequently than once a year (%)	Once a year (%)	Less frequently than once a year (%)	Never/not applicable (%)
Sector				
Manufacturing (a)	3.9	47.9	39.8	8.6
Electricity, gas, water (b)	0.6	38.7	49.4	11.4
Construction (c)	7.7	40.7	41.7	10
Trade(d)	3.3	48.5	38.2	9.9
Business services(e)	4.1	48.1	40.2	7.6
Financial intermediation (f)	1.8	63.5	30.5	4.1
Total	4	47.8	39.4	8.6
Size				
5-19 employees	3.4	35.2	47.4	14.1
20-49 employees	3.9	40	44.6	11.5
50-199 employees	3.7	48	40.3	7.8
200+ employees	4.5	55.7	34	5.9
Total	4	47.8	39.4	8.6

Source: WDN3. Notes: (a) NACE Rev. 2 sector C; (b) NACE Rev. 2 sectors D and E; (c) NACE Rev. 2 sector F; (d) NACE Rev. 2 sector G; (e) NACE Rev. 2 sectors H, I, J, L, M ,N; (f) NACE Rev. 2 sector K.

The frequency of wage changes was lower during 2010-13 than in the pre-crisis period, the data for which are shown in the first block of Table 6a. In 2007, 60% of firms reported that they changed wages once a year, 26% did so less often, and 12% more often.[22] The estimated average duration of a wage spell (i.e. a period in which wages remain unchanged) in 2007 was 15 months, while for the period 2010-13 the average duration among the surveyed firms in the whole sample of 25 countries was

[22] See Druant et al. (2012) for evidence on the frequency of wage changes in the pre-crisis period using data from WDN1.

17 months.[23] This general reduction in the frequency of wage changes is observed in virtually every country, and is most notable in France, the Czech Republic, Estonia, Slovenia and Spain.

The large cross-country differences in the frequency of wage changes during 2010-23, and the reduction in frequency relative to the pre-crisis period, can be attributed to institutional features.[24] However, these differences also depend on features typically linked to the crisis, such as the incidence of shocks and the resistance of firms to cut wages in spite of these shocks. Indeed, multivariate analysis shows that base wages are changed less often if firms experience credit restrictions or a decline in demand, and are reluctant to cut nominal wages. In a period in which economic conditions, at least in some countries and sectors, may in fact call for wage reductions, the reluctance to cut nominal wages might prevent wage changes as firms freeze wages instead of cutting them. In addition, institutional features in the labour market also contribute to explaining the cross-country differences in wage stickiness. Base wages are changed more often in the presence of collective bargaining and internal policies that adapt base wages to inflation.[25]

5.3 Downward nominal wage rigidity

Downward nominal wage rigidity (DNWR) refers to the reluctance of firms to cut nominal wages and/or the resistance of workers to accept such cuts. It prevents wage cuts in favour of freezes, meaning that firms keep base wages unchanged even if economic conditions justify a cut. Few average cuts together with a large number of freezes are therefore indicative of DNWR.

The implications that DNWR might have for the choice of the optimal rate of inflation became topical in the pre-crisis period, which was characterised by moderate levels of inflation in the euro area.[26] This triggered a growing body of empirical literature looking at whether wages were in fact subject to DNWR. Studies using micro data focused on using the distribution of wage changes across individual workers (e.g. Dickens et al., 2007) or sectors (e.g. Holden and Wulfsberg, 2008) to estimate downward wage rigidity. Following the pioneering work of Blinder and Choi (1990), another branch of the empirical literature relied on survey evidence to determine the prevalence and sources of downward wage rigidity.

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23 The average duration of wage spells is estimated following a similar methodology to that for WDN1 (see Druant et al., 2009). The robustness of the results has been assessed by computing duration measures under alternative assumptions concerning the number of months corresponding to the frequency intervals that do not directly translate into a point estimate. Alternative estimations of duration confirm the finding that the frequency of wage changes has declined in comparison with the pre-crisis period.

24 Results from WDN1 clearly showed that the frequency of wage changes is more driven by national institutions than by the economic environment; see Druant et al. (2012).

25 See Lamo et al. (2016).

26 Tobin (1972) claimed that if nominal wages are downwardly rigid, a certain amount of positive inflation may be needed to ease firms' real wage adjustment (i.e. inflation may "grease the wheels" of the economy).

DNWR is also a key factor in facilitating or preventing adjustment to the different shocks. During the recent economic and financial crisis, DNWR may have prevented the optimal adjustment of firms' labour costs, and may have forced firms to adjust employment rather than wages, thus contributing to job destruction.[27]

In addition, in the current period of economic recovery, DNWR continues to be a key concern as it may dampen wage increases. In the presence of DNWR, firms are also likely to moderate wage increases; in a period of low inflation such as the current one, this may trigger second-round effects, further dampening wage inflation. Elsby (2009) and Stüber and Beissinger (2012), among others, argue that although raising nominal wages increases workers' effort and productivity, a wage cut of the same amount will reduce effort and productivity by a larger amount, such that reversing wage increases will incur an extra cost in terms of productivity. As a consequence, forward-looking firms will moderate wage increases in the presence of DNWR.[28]

The three waves of the WDN survey collected information on whether firms cut or froze the base wages of some of their employees and on the proportion of workers affected. Babecky et al. (2012) summarise the evidence on DNWR from WDN1. Fabiani et al. (2015) provide evidence from WDN2 on how wage rigidity led firms to adjust labour in response to shocks during 2008-09, and the current report provides evidence on DNWR for the period of 2010-13, drawn from WDN3.

Although all three waves of the WDN survey collected information on wage cuts and freezes from similar and comparable questions, the length of the reference period for this set of questions differed across waves. WDN1 asked whether wages were cut or frozen during the five-year period prior to the survey, i.e. mid-2002 to mid-2006 (referred to here as 2002-07), which was a period of economic stability and growth. WDN2 covered the incidence of wage cuts and freezes during the early phase of the crisis, from the third quarter of 2008 until summer 2009. Finally, WDN3 collected information on wage cuts and freezes for each year separately, covering the four years from 2010 to 2013.

Since the reference periods differ in length, the incidence of wage cuts and freezes cannot be directly compared across surveys. Table 7a displays both annual cuts and freezes and the percentages of firms that cut and froze wages at least once during the period 2010-13. The reference period for the latter variable is of a similar length to the reference period of the WDN1 data.

Tables 7a-b and Chart 9 provide an overview of the incidence of cuts and freezes of nominal base wages among the countries surveyed in each WDN wave.

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27 As well as the negative effect on employment, a variety of other consequences of these rigidities during the crisis have been pointed out. For example, Favilukis and Lin (2016) argue that during bad times revenue falls, but if wages do not adjust then firms' costs fall by less, making firms' cashflow more sensitive to aggregate shocks and firms more prone to risk.

28 The two main reasons identified in the literature for firms' reluctance to cut nominal wages are (i) the belief that nominal wage reductions can damage worker morale and effort, and (ii) the possibility that the most productive workers would leave as a consequence. See Bewley (1999) and Babecký et al. (2010).

Table 7a

Percentage of firms that cut wages over the period 2002-13, by country

Country	2002-2007*	2008-09**	2010-13***	2010	2011	2012	2013
	WDN1	WDN2	WDN3				
Group I countries							
Czech Republic	8.4	9	6.8	3.4	3	2.9	3.1
Germany	-	-	3.5	1.6	1.3	1.1	0.9
Estonia	3	45.8	12.4	10.7	1.9	1.1	0.4
Hungary	2.6	-	1.2	0.3	0.5	0.7	0.2
Ireland	1.1	-	23.1	15.6	8.5	9.1	7.1
Lithuania	8.3	-	10	6.3	2.6	3.8	2.5
Latvia	-	-	16.3	10.6	6.1	2.6	4.1
Slovakia	-	-	9.8	6.1	1.9	4.2	3.4
United Kingdom	-	-	5.1	3.6	1.3	1.3	0.7
Total, Group I	-	-	4.8	2.8	1.5	1.5	1
Group II countries							
Austria	3	1.5	3	2.3	2.3	2.7	2.5
Belgium	3.1	1	1.4	0.9	0	0	0.5
Bulgaria	-	-	6	2.1	2	2.9	4.3
France	2.5	2.1	1.2	0	0.1	0.8	1.1
Luxembourg	5.7	0.3	0.8	0.2	0.3	0.1	0.4
Netherlands	1.4	2.8	1.9	0.2	0.3	0.2	1.4
Poland	4.4	4	2.9	0.3	0.6	0.7	1.9
Romania	-	-	6.7	2.2	1.6	2.5	3.3
Total, Group II	-	-	2.3	0.5	0.5	0.9	1.6
Group III countries							
Cyprus	-	1.8	37.5	0.6	4.1	9	33.7
Spain	0.1	2.8	7.5	1.5	1	3.4	4.2
Greece	-	-	54.6	8.3	17.5	35.4	28
Croatia	-	-	25.7	7.4	11.3	13.9	15.9
Italy	0.7	2.2	2.3	0.3	0.5	0.8	1.8
Portugal	1	-	6.7	1.8	3.9	4.6	3.8
Slovenia	2.5	-	13	4	3.6	6.7	7.7
Total, Group III	-	-	8	1.6	2.2	4.2	4.7
Non-euro area countries	5.1	7.2	5.1	2.7	1.5	1.6	1.6
Euro area countries	1.3	2.2	4.3	1.4	1.3	1.9	2
Total	2.3	3.1	4.5	1.8	1.3	1.8	1.9
WDN3 total for WDN1 sample			4.3	1.2	1.2	2	2.4

Source: Authors' calculations on the basis of WDN1, WDN2 and WDN3.
Notes: Figures are weighted to reflect overall employment and rescaled to exclude non-responses. Figures for Malta have been excluded from the table. * at least once over the period 2002-07 (defined as such, owing to the formulation of the question in the 2007 WDN survey), **at least once over the period 2008-09 (defined as such, owing to the structure of the 2009 WDN survey), ***at least once over the period 2010-13 (consisting of firms that replied "yes" at least once to the relevant question, posed separately for the years 2010, 2011, 2012 and 2013). Total (WDN1) refers to the averages across countries that participated in the 2007 WDN survey.

Table 7b

Wage cuts and shocks over the period 2002-13, by country

	% of firms having cut wages at least once over 2010-13	% of firms experiencing a decline in demand, and having cut wages	% of firms experiencing a decline in demand and credit restrictions, and having cut wages	% of firms experiencing a strong decline in demand and credit restrictions, and having cut wages
Group I countries				
Czech Republic	6.8	10.6	17.7	17
Germany	3.5	4.3	7.6	0
Estonia	12.4	23.5	11	31.1
Hungary	1.2	2.5	3.7	11.9
Ireland	23.1	28.7	31	33.3
Lithuania	10	14.6	21.2	30.5
Latvia	16.3	24.4	47.5	76.6
Slovakia	9.8	16.8	35.4	66.4
United Kingdom	5.1	2.3	6.4	17
Total, Group I	4.8	5.7	10	18.6
Group II countries				
Austria	3	2.2	2.6	0
Belgium	1.4	0.8	2.1	0
Bulgaria	5	11.9	21.8	14.4
France	1.2	2	1.9	0.6
Luxembourg	0.8	1.6	5.5	7.3
Netherlands	1.9	2.7	3.5	3.2
Poland	2.9	3.2	4.2	3.7
Romania	6.7	13.6	17.6	22.1
Total, Group II	2.3	3	4.2	3.3
Group III countries				
Cyprus	37.5	45	44.3	40.1
Spain	7.5	10.6	10.5	14.6
Greece	54.6	61.8	70.9	79.8
Croatia	25.7	37.5	50.7	70
Italy	2.3	2.6	4.6	11.4
Portugal	6.7	9.2	14.6	16
Slovenia	13	17	23.9	25.6
Total, Group III	8	10.2	13.4	21.7
Non-euro area countries	5.1	6.3	11	17.3
Euro area countries	4.3	5.7	8.9	12.4
Total	4.5	5.8	9.2	13.4

Source: Authors' calculations on the basis of the WDN1, WDN2 and WDN3 surveys.
Notes: Figures weighted to reflect overall employment and rescaled to exclude non-responses. Figures for Malta have been excluded from the table.

Cuts in nominal base wages were very rare over the three waves of the WDN survey, which prima facie is indicative of DNWR. Only 2.3% of firms in the countries sampled in 2007 (WDN1) reported having cut wages in the previous five years. During the acute phase of the crisis, in the second half of 2008 and the first half of 2009, only 3.1% of the surveyed firms reported having cut wages. The only exception to this pattern from the countries covered by WDN2 was Estonia, where 45.8% of firms (30% of employees) experienced wage cuts; the possible reasons why wage-setting in Estonia differed in 2008-09 are discussed in Fabiani et al. (2015).[29] The evidence from the WDN3 survey reveals that only 4.5% of the firms ever cut wages over the four-year period 2010-13. The incidence of wage cuts in each one-year period in 2010-13 ranged from 1.3% to 1.9% of firms.[30] This indicates that wage cuts became only moderately more common after the Great Recession than in the pre-crisis period, but less common than in 2008-09. There is, however, notable heterogeneity in the incidence of wage cuts across countries and across groups of countries; the highest incidence of cuts during the 2010-13 period took place in countries in Group III, whereas wage cuts in Group II countries were particularly rare. The evidence on cuts combined with the evidence on wage freezes reveals the prevalence of DNWR across EU countries. During the second half of 2008 and the first half of 2009, wage freezes became much more prevalent than in the pre-crisis period.[31] The share of firms freezing wages increased drastically at the start of the crisis, from about 10% to 35% in the countries covered by WDN2 in 2009.[32] See Chart 9 for information on individual countries.

29 Cuts were also severe in other countries that were not included in the WDN2 sample, e.g. Latvia, Lithuania and Ireland.

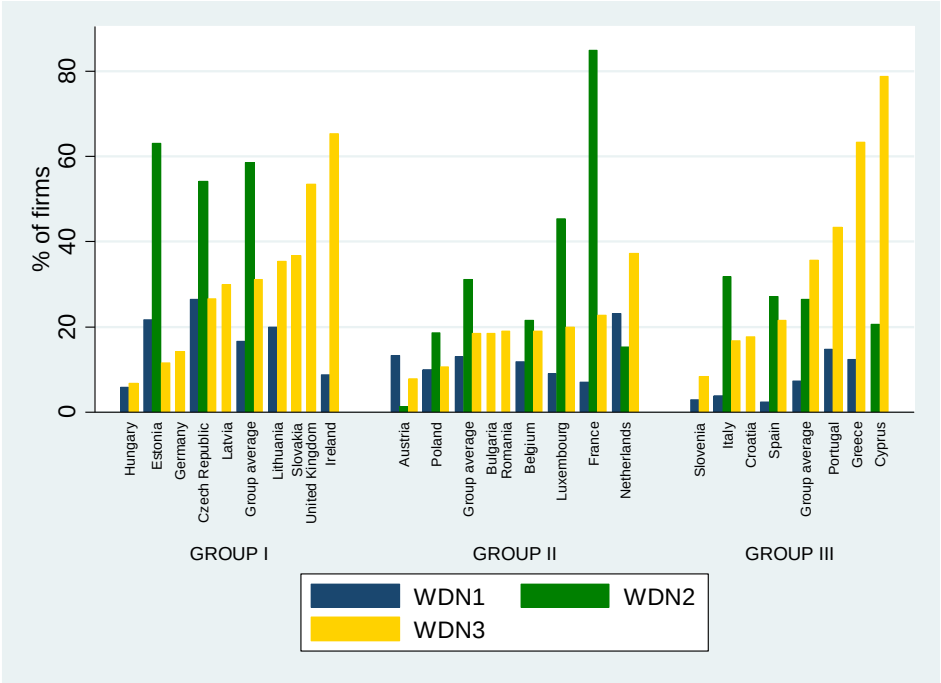
30 The incidence of wage cuts in terms of affected workers is also very low. In the pre-crisis period (2002-07), on average, only about 0.2% of workers a year were affected by wage cuts. During the period 2008-09, in spite of the depth of the shock, the incidence of wage cuts increased only moderately, affecting 1.8% of workers. Finally, during the period 2010-13 the incidence of wage cuts was also minor, ranging from 0.6% to 0.9% of workers per year.

31 Indeed, it is likely that negative demand shocks shifted to the left the wage change distribution.

32 A further 35% of firms indicated their intention to freeze wages in the future.

Chart 9

Firms that froze wages over the period 2002-13, by country



Source: Authors' calculations on the basis of WDN1, WDN2 and WDN3.
Notes: Figures are weighted to reflect overall employment and rescaled to exclude non-responses.* at least once over the period mid-2002 to mid-2006 (defined as such, owing to the formulation of the question in the WDN1survey), **at least once over the period mid-2008 to mid-2009 (defined as such, owing to the structure of WDN2), ***at least once over the period 2010-13 (consisting of firms that replied "yes" at least once to the relevant question, posed separately for the years 2010, 2011, 2012 and 2013). Total (WDN1) refers to the averages across countries that participated in the 2007 WDN survey.

5.4 Comparisons of DNWR using the Dickens et al. (2007) measure

The measure proposed by Dickens et al. (2007) assesses in a synthetic manner the extent of DNWR by combining the evidence on wage cuts and wage freezes. This measure is based on the assumption that every employee whose nominal wages were frozen would have had a nominal wage cut in the absence of DNWR. The Dickens et al. (2007) measure of DNWR is:

$$DNWR=f/(f+c)$$

where f represents the fraction of workers whose wages were frozen and c represents the fraction of workers whose wages were cut. The formula shows the share of workers who received a wage freeze although it would have been optimal for their firm to cut their wages, i.e. the fraction of workers subject to DNWR. In the absence of DNWR there would be no wage freezes and DNWR = 0, whereas if all wage cuts were prevented then DNWR = 1.

This measure represents a conservative estimate of DNWR (overestimating the actual level of DNWR), since it is based on an assumption that every wage freeze would have been a wage cut, although it would be optimal to freeze the wages of a

certain percentage of workers even in the absence of DNWR. Assessing the optimal proportion of freezes in the absence of DNWR would require information on the counterfactual wage change distribution or the wage change distribution that would prevail if wages were completely flexible. As the counterfactual wage change distribution cannot be deduced on the basis of the WDN survey data, this subsection uses the conservative measure of DNWR shown above.[33]

Table 8 provides an overview of DNWR using the Dickens et al. (2007) measure. The figures indicate that DNWR is prevalent, as most of the estimates of the Dickens et al. measure are close to 1.

A comparison of the pre-crisis years with the post-Great Recession period (2010-13) implies that DNWR has become a more binding constraint for firms.[34] The average value of the Dickens et al. measure of DNWR on the basis of WDN1 was 0.81. By contrast, during the years 2010-13 its value ranged from 0.91 to 0.94. This may be caused by the leftward shift of the wage change distribution as in most of the countries surveyed average wage growth declined in 2010-13 by comparison with the pre-crisis period. It is also likely to be related to the much lower inflation that was seen on average across the surveyed countries in the latter period.

[33] The simulations based on the assumption that under complete flexibility wage changes are normally distributed show that the bias in the measure proposed by Dickens et al. (2007) is relatively small and declines when the estimates approach 1. The adjusted measures of DNWR which assume that only 50% of wage freezes represent prevented cuts yield similar analytical implications to those based on the original measures provided in Table 8.

[34] Recent studies also support this; see, for example, Anderton et al. (2016) and Anderton and Bonthuis (2015).

Table 8

Downward nominal wage rigidity, measure by Dickens et al (2007)

	WDN1	WDN2	WDN3			
	(2002-07)	(2008-09)	2010	2011	2012	2013
Group I countries						
Czech Republic	0.89	0.93	0.89	0.9	0.9	0.86
Germany			0.89	0.89	0.85	0.88
Estonia	0.97	0.65	0.61	0.79	0.79	0.89
Hungary	0.92		0.92	0.93	0.91	0.96
Ireland	0.94		0.84	0.89	0.9	0.88
Latvia			0.79	0.95	0.92	0.94
Lithuania	0.81		0.86	0.96	0.92	0.93
Slovakia			0.83	0.96	1	0.96
United Kingdom	-	-	0.84	0.85	0.77	0.71
Total, Group I	-	-	0.85	0.86	0.81	0.78
Group II countries						
Austria	-	-	0.7	0.99	0.96	0.9
Belgium	0.9	0.98	0.9	1	1	0.99
Bulgaria	-	-	0.96	0.92	0.9	0.85
France	0.82	0.98	1	0.99	1	0.99
Luxembourg	0.87	1	0.99	0.96	0.99	0.99
Netherlands	0.99	0.91	0.99	1	0.99	0.98
Poland	0.74	0.87	0.95	0.95	0.95	0.93
Romania	-	-	0.91	0.94	0.9	0.87
Total, Group II	-	-	0.96	0.98	0.98	0.97
Group III countries						
Cyprus	-	-	0.98	0.95	0.87	0.66
Spain	0.99	0.94	0.9	0.96	0.92	0.91
Greece	-	-	0.84	0.69	0.46	0.57
Croatia	-	-	0.67	0.56	0.53	0.46
Italy	0.88	0.96	0.96	0.95	0.94	0.88
Portugal	0.98	-	0.98	0.94	0.94	0.96
Slovenia	0.67	-	-	-	-	-
Total, Group III	-	-	0.91	0.89	0.86	0.84
Total, all WDN3 countries	0.86	0.95	0.88	0.9	0.87	0.86
WDN3 total for WDN1 sample	-	-	0.93	0.94	0.92	0.93

Source: Authors' calculations on the basis of WDN1, WDN2 and WDN3.

The dynamics of the Dickens et al. measure of DNWR in 2010-13 differ across the three country groups used in this report. The measure remained mostly stable over this time period in the countries belonging to the first two groups. By contrast, it declined gradually over the period for most of the Group III countries (with the only exception being Portugal). The largest declines took place in the countries that were the most severely affected by the sovereign debt crisis, i.e. Greece and Cyprus.

The evidence from the WDN surveys implies that although DNWR is prevalent in most countries, it can decline substantially in the event of very strong negative shocks. DNWR decreased strongly in countries which suffered GDP declines of 10% or more. This applies to Estonia in the period 2008-09 and to Greece and Cyprus in 2010-13.

WDN2 did not cover most of the countries in Group I and the measures of DNWR for the Great Recession period are thus missing for most of the group. The coverage of the WDN3 survey starts in 2010. Since employment reacts with a lag to changes in output, the labour markets were still recovering from the Great Recession at the beginning of the reference period for WDN3. It is noteworthy that the DNWR measures were lower for most of the Group I countries in 2010 than in the following years. (This was the case in Estonia, Ireland, Latvia, Lithuania, Slovakia and the United Kingdom.) On the basis of this evidence, it is likely that DNWR also declined in these countries during the Great Recession. (There is evidence that this was in fact the case for Estonia.)

The WDN-based assessment of DNWR supports the findings of earlier empirical studies, which also showed that (nominal base) wage cuts are very rare.[35] Moreover, earlier studies indicated that nominal wages tend to be downwardly rigid even in periods of economic slowdown and near-zero inflation, where the constraint imposed by DNWR is more binding (e.g. Agell and Lundborg,1995). The evidence based on the WDN surveys makes it possible to encompass also the countries that were under severe stress. This evidence shows that in the event of significant economic decline the constraints imposed by DNWR were relaxed. Nevertheless, firms usually consider the possibility of lowering the base wages of incumbent employees as a last resort after other possibilities of lowering labour costs have been exhausted (Fabiani et al., 2015).

5.5 Has it become easier or more difficult to adjust wages since 2010?

The WDN3 survey collected information from firms on whether the adjustment of labour costs via various margins was easier or more difficult in 2013 compared with the situation in 2010. Among other margins, the survey asked firms to assess the adjustment of wages. The answers to this question can be used to assess changes in wage rigidity on the basis of direct perceptions of firm managers.

Chart 10 provides an overview of the perceived change in the ease of adjusting wages across the sampled countries.[36] This graph displays the difference between the share of firm managers who believed that it had become easier to adjust wages in 2013 as compared with 2010 and those who believed it had become more difficult.

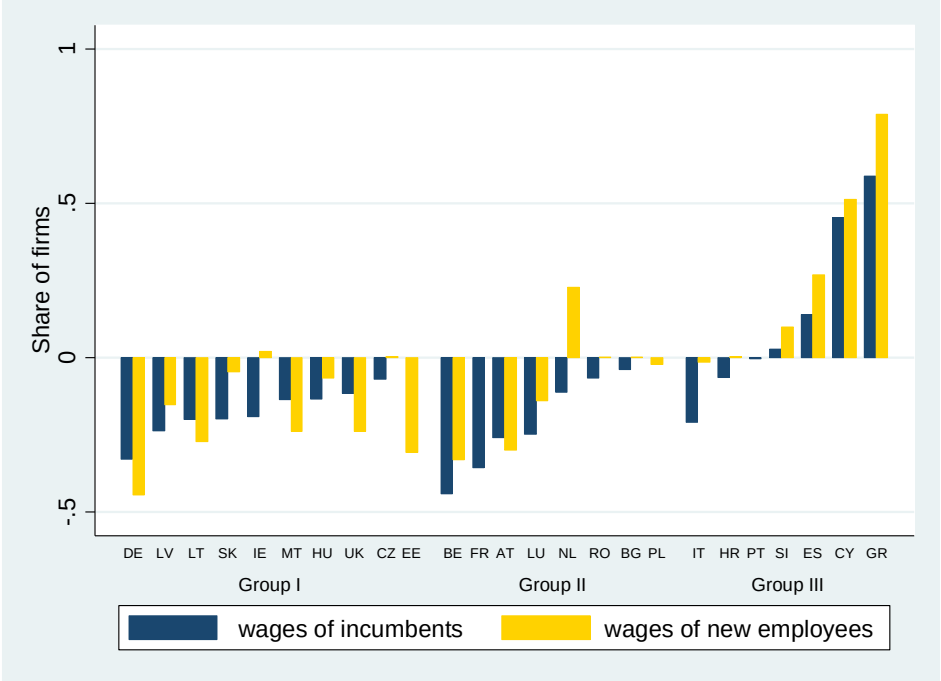
[35] This is shown, for example, by Blinder and Choi (1990), Altonji and Devereux (1999), Bewley (1999) and Babecky et al. (2010, 2012).

[36] A more detailed analysis of these perceptions with regard to adjusting both wages and employment is provided in the next section.

The next section gives a full picture of these perceptions. The focus is on those firms that observed a change in difficulty, abstracting from those firms that found it equally easy/difficult to adjust wages. The figures presented in Chart 10 are mainly negative for countries belonging to Groups I and II, implying that the share of firms that found it more difficult to adjust wages in 2013 by comparison with 2010 is larger than that of firms that found it easier. These findings are in accordance with the rest of the evidence from the WDN surveys (discussed in the previous sections), which showed that owing to the moderation of wage growth and low inflation (real) wages have become more difficult to adjust.

Chart 10

Perceived change in the ease of adjusting wages from 2010 to 2013

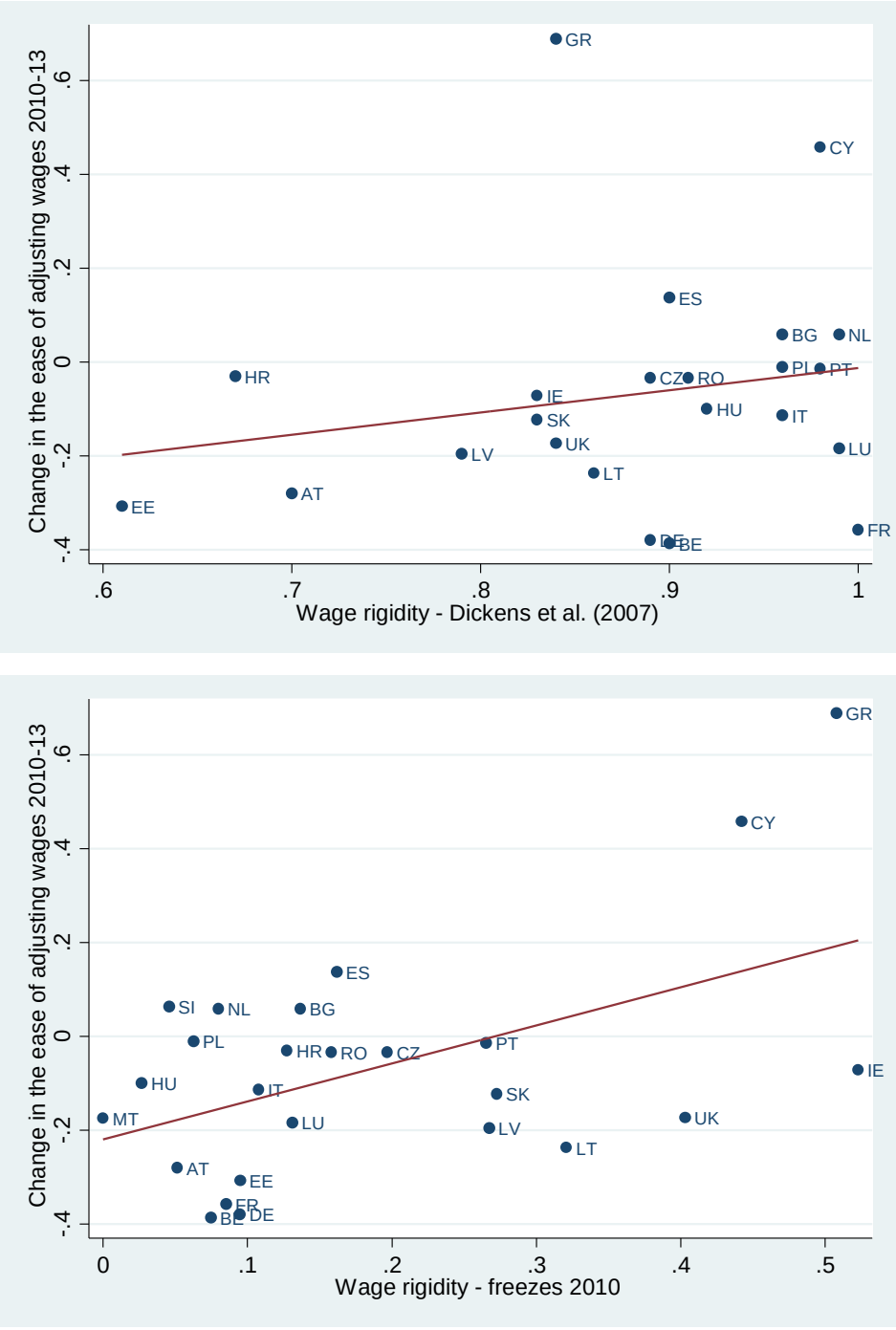


Source: Authors' calculations on the basis of WDN3.
Note: The figures show the percentage point difference between the proportion of firms indicating that it had become easier to adjust the wages of incumbent workers (pay lower wages to new employees) and the share of firms saying that it had become more difficult.

By contrast, the share of firms in Group III countries that found it easier to adjust wages in 2013 than in 2010 is higher (except in Italy and Croatia) than that of firms that found it more difficult (positive bars in Chart 10). This is most pronounced in Greece, Cyprus and Spain, and to a lesser extent also in Slovenia. Here too firms' perceptions are correlated with other measures of wage rigidity based on the WDN surveys. In particular, the Dickens et al. (2007) measures of DNWR indicated that downward nominal wage rigidity declined over this time period in most of the countries belonging to Group III and especially in Greece and Cyprus.

Chart 11

Wage rigidity in 2010 and perceived change in the ease of adjusting wages from 2010 to 2013



Source: Authors' calculations on the basis of the WDN3 survey.

More generally, there is a positive correlation between the initial wage rigidity in 2010 and the perceived change in the ease of adjusting wages (see the indicators in Chart 10). The more rigid were wages at the beginning of the period, the larger was the percentage of firms that perceived it to be easier (relative to those that found it

more difficult) to adjust wages in 2013, as compared with 2010 (see Chart 11). This suggests a potential role for structural reforms in lowering the initial rigidity and thus facilitating the adjustment. The next section explores in detail whether labour market institutions are perceived to hinder or facilitate adjustments to shocks, and in particular the role of the labour market reforms implemented during the 2010-13 period.

6 Labour market reforms and remaining rigidities

As mentioned above, the large rises in unemployment seen in many countries led governments to engage in a number of labour market reforms and employment policies.

The main value added of WDN3 in this regard is that it provides information on whether firms perceive that labour market institutions and employment policies hinder or facilitate adjustments to shocks. Moreover, in those countries where significant labour market reforms were implemented during the 2007-10 period, there is also information on how firms perceive the main consequences of these reforms and on the remaining rigidities that they see continuing to distort hiring, firing and wage-setting decisions.

To put into context these WDN3 results, it is convenient to briefly summarise the scope and extent to which labour market reforms were implemented in EU countries. Annex 2 presents the main changes in labour market institutions and employment policies that were implemented during the periods 2007-10 and 2010-13. The annex is limited to those policy measures that are most likely to affect hiring, firing and wage-setting conditions.

As can be seen, labour market reforms took place in many countries. However, since labour market outcomes differed significantly across countries, the composition of the measures adopted also differed.[37] As a rough categorisation of the measures/reforms undertaken, it could be said that during the initial phases of the crises, i.e. 2007-10, many countries adopted measures aimed at maintaining employment and providing a safety net for the vulnerable. As the crisis progressed in those countries characterised by continually disappointing labour market outcomes and structural inefficiencies, more in-depth reforms were adopted with the aim of making labour markets more efficient – thus reducing unemployment – and increasing competitiveness.

As Annex 2 shows, policy action initially involved measures to support the income of those affected, e.g. the extension of and increases in unemployment benefits (Belgium, Latvia and Poland), and measures to maintain employment, e.g. various employment subsidies (Austria, Luxembourg, the Netherlands, Romania and Slovakia), as well as incentives for employers to employ younger workers (Lithuania) and to recruit and train the long-term unemployed (United Kingdom). To maintain employment, short-time work was also used by many countries (Belgium, Germany,

[37] The intensity and timing of the crisis differed significantly across countries. For instance, the Baltic countries, i.e. Estonia, Latvia and Lithuania, experienced significant increases in unemployment during the initial phases of the global financial crisis and recovered in the following years. In other countries, i.e. Greece, Portugal and Spain, the disappointing labour market outcomes continued and intensified during the EU sovereign debt crisis. The labour market measures presented in Annex 2 reflect the differences in timing of the impacts of the crisis.

Ireland and Luxembourg). Various training programmes were also introduced in order to increase the employability of the unemployed (Bulgaria) and the low-skilled (Austria) and to enhance the skills of short-time workers during their period of short-time work (Germany and Ireland).

Many countries also adopted measures that could be categorised as more structural, i.e. measures changing the level of employment protection (Estonia, Romania and the Czech Republic), the structure of and eligibility criteria for unemployment benefits (Romania, Belgium, Luxembourg, the United Kingdom and Poland), and the structure of the collective bargaining system (Estonia, Romania and France).[38],[39] The adoption of measures of a more structural nature that made the adjustment of employment by firms easier in some of the countries is also confirmed by the evolution of the OECD's employment protection (EPL) index (see Table 9). For instance, the EPL index for Estonia declined significantly between 2008 and 2013.

However, the largest and most wide-ranging changes occurred in the southern European countries (Greece, Italy, Portugal and Spain) – Group III countries – that suffered the most severe shocks in terms of GDP and unemployment. [40] In these countries, the reforms were to a large extent associated with the adjustment programmes that accompanied the loans they required given their difficult fiscal positions.[41] Ireland, a Group I country, was also under an adjustment programme. However, since its labour markets were already fairly flexible before the crisis (the level of employment protection as measured by the EPL index presented in Table 9 is among the lowest, for example), the range of measures adopted were in no way similar to those of the other programme countries. In contrast to the other programme countries, Ireland saw its EPL index actually increase. In Cyprus, a Group III country also under an adjustment programme, the labour market measures taken mainly involved employment subsidies, training schemes and the suspension of the wage indexation scheme in the private sector.

38 While many countries took measures to relax the employment protection of permanent employees, some countries opted for more regulation of temporary employment by reducing the duration of each contract and the number of renewals (Slovakia and the Netherlands) or introducing redundancy payments for fixed-term contracts (Slovenia). Furthermore, while the general trend was towards less centralisation of wage-setting, some countries took measures that introduced sectoral minima into the wage-setting process, e.g. the extension of sectoral agreements in Latvia and the introduction of binding minimum wages in many industries in Germany.

39 Most of the structural measures were taken in the second period. Two exceptions are the changes in employment protection in Estonia and in the collective bargaining structure in France that took place in the first period.

40 In Italy the most significant reforms took place in 2013-14, after the reference period of the survey. Therefore, it is highly unlikely that the current survey will be able to provide an insight on the impact of these reforms.

41 Cyprus, Greece, Ireland, Spain and Portugal were all under an adjustment programme at some point during the 2010-13 period. Hungary, Latvia and Romania also received EU/IMF financial assistance in the initial phase of the financial crisis.

Table 9

Strictness of employment protection [individual dismissals -regular contracts] – OECD employment protection indices

	2008	2009	2010	2011	2012	2013	Change (2008-13)
Austria	2.4	2.4	2.4	2.4	2.4	2.4	0
Belgium	1.9	1.9	2.1	2.1	1.9	1.9	0
Czech Republic	3.1	3.1	3.1	3.1	2.9	2.9	-0.2
Estonia	2.7	2.7	1.8	1.8	1.8	1.8	-0.9
France	2.5	2.4	2.4	2.4	2.4	2.4	-0.1
Germany	2.7	2.7	2.7	2.7	2.7	2.7	0
Greece	2.8	2.8	2.8	2.2	2.2	2.1	-0.7
Hungary	2	2	2	2	2	1.6	-0.4
Ireland	1.3	1.3	1.3	1.3	1.4	1.4	0.1
Italy	2.8	2.8	2.8	2.8	2.8	2.7	-0.1
Latvia					2.7	2.7	
Luxembourg	2.2	2.2	2.2	2.2	2.2	2.2	0
Netherlands	2.9	2.8	2.8	2.8	2.8	2.8	-0.1
Poland	2.2	2.2	2.2	2.2	2.2	2.2	0
Portugal	4.4	4.4	4.1	4.1	3.6	3.2	-1.2
Slovak Republic	2.2	2.2	2.2	2.2	1.7	1.8	-0.4
Slovenia	2.7	2.7	2.7	2.6	2.6	2.6	-0.1
Spain	2.4	2.4	2.4	2.2	2.2	2	-0.4
United Kingdom	1.3	1.3	1.3	1.3	1.3	1.1	-0.2

Source: OECD.

In Greece, Spain and Portugal, the adjustment of employment has become easier as severance pay has been reduced and dismissals for economic reasons have become easier. As Table 9 shows, the reduction in the EPL index is significant for these three countries. In Greece, the structure of the bargaining system has also changed; firm-level agreements, which give firms the ability to adjust their labour conditions and labour costs according to their needs, can now prevail over sectoral/occupational agreements. In Spain, a widening of opt-out clauses gave firms more leeway to diverge from higher level agreements that generally account for average developments in wages and may restrict the ability of firms to adjust to idiosyncratic shocks. [42] Measures to reduce labour costs and increase employment were also adopted, e.g. sub-minimum wages for young people in Greece, subsidies for new recruits in Spain, a reduction in employers' social security contributions in Greece and a freeze in the minimum wage in Portugal.

[42] A change in regulation in Portugal in 2012 required that the subscribing employer associations accounted for at least 50% of the workers in the sector in order for collective agreements to extend to all sector employees. However, in June 2014 the introduction of an alternative criterion that is fulfilled by virtually all employer associations makes the extension of collective agreements much easier compared with 2012. Specifically, if the most demanding criterion – that at least half of the workers in a given sector must be represented – is not met, then the alternative criterion – that a number of associated firms consisting of at least 30% of micro, small and medium enterprises (firms up to 250 employees) are covered – needs to be fulfilled; see Martins (2015).

Given the wide-ranging reforms that have taken place in some countries, it is useful to gather information on the perceptions of firms about these reforms. Generally, reforms are evaluated on the basis of various indices created by classifying the various elements of the underlying legislation (e.g. the OECD's EPL index). These indicators are very useful as they are objective and do not depend on personal judgement. However, firm managers can provide information about the impact of the legislation on their actual ability to adjust. For this reason, WDN3 asked firms whether it had been easier or more difficult to perform a set of actions in 2013 than in 2010. More specifically, firms were asked whether:

- it had become easier or more difficult to lay off employees collectively, individually, temporarily and for disciplinary reasons and to adjust working hours; this set of questions provides an indication of whether it has become easier or more difficult for firms to adjust their labour input;
- it had become easier or more difficult to hire employees;
- it had become easier or more difficult to move employees to other positions or other locations; this set of questions provides an indication of whether it has become easier or more difficult for firms to reorganise their labour input;
- it had become easier or more difficult to lower the wages of incumbent workers and offer new employees lower wages; this set of questions provides an indication of whether it has become easier or more difficult for firms to adjust their wage bill.

In each case firms were asked to provide a response on a five point scale: 1=much less difficult, 2= less difficult, 3=unchanged, 4=more difficult, 5=much more difficult.

Charts 12 to 15 show the proportion of firms answering that it has become less difficult or much less difficult to perform each of the above actions.[43], [44] In the Group III countries, where the most wide-ranging reforms took place, the proportion of firms reporting that it has become easier to perform the above actions is significantly higher than that of the other countries. For instance, around 39% of firms in Greece and 29% of firms in Spain and Portugal say that it has been easier to lay off employees.[45] Similarly, 63% of firms in Greece report that it has become easier to lower the wages of incumbents, while 80% say that it has become easier to offer new workers lower wages. In Spain and Cyprus, a significant proportion of firms state that it has become easier to adjust their wage bill. The proportion of firms

[43] Throughout the paper, firms with fewer than five employees are excluded from the analysis. In Cyprus, a Group III programme country, around 27% of firms belong to this category. The figures presented above for Cyprus are not much different when firms with fewer than five employees are included in the analysis. The differences are in the range of 1 to 3 percentage points.

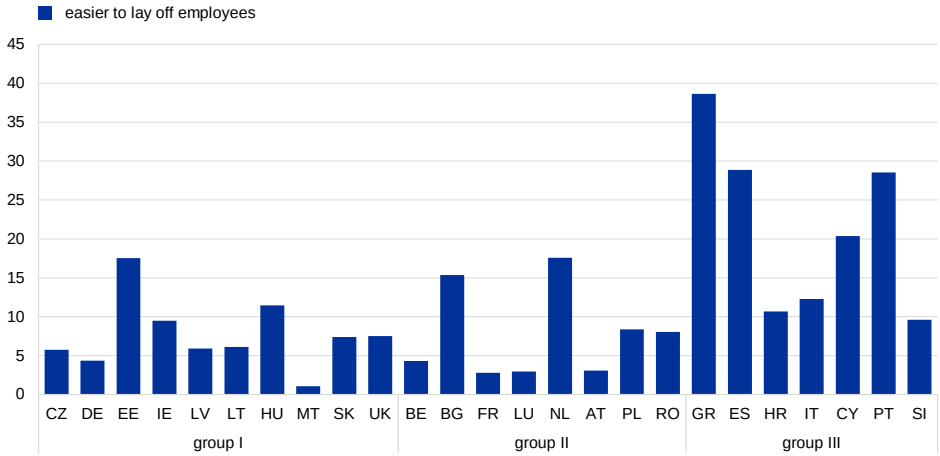
[44] The question was slightly different in the Slovenian questionnaire and is not fully comparable, as it included an extra option.

[45] Firms are asked to answer whether it is less difficult or much less difficult to lay off employees collectively, individually, temporarily and for disciplinary reasons. For expositional purposes, Chart 12 provides the average proportion of firms across the four channels. Information on each individual channel is presented in Table A3.1 in Annex 3.

reporting that it has become easier to adjust labour input and reorganise the firm by moving employees to other places and positions is also significant in these countries.

Chart 12

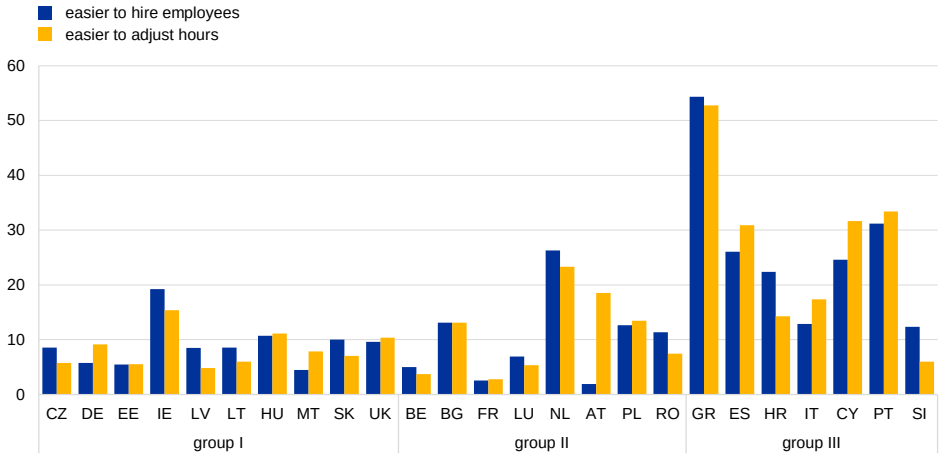
Percentage of firms reporting that it has become easier to lay off employees



Source: WDN3 survey. Note: Figures weighted to reflect overall employment and rescaled to exclude non-responses.

Chart 13

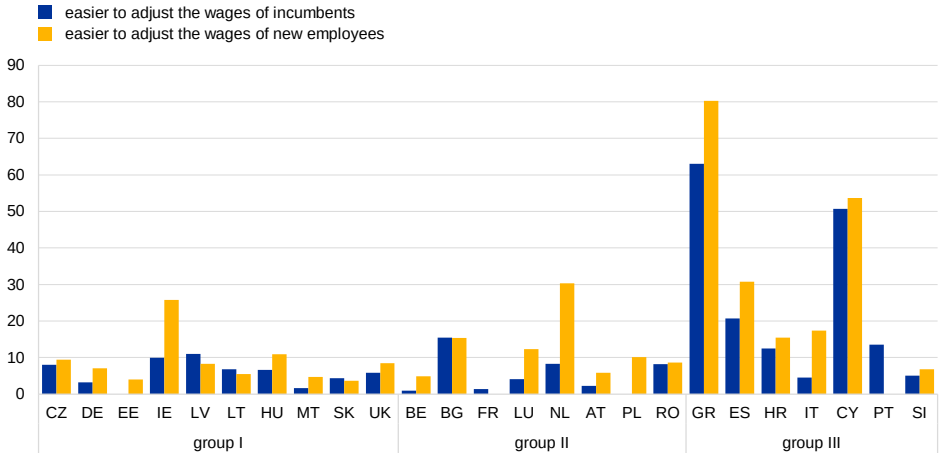
Percentage of firms reporting that it has become easier to adjust labour input



Source: WDN3. Note: Figures weighted to reflect overall employment and rescaled to exclude non-responses.

Chart 14

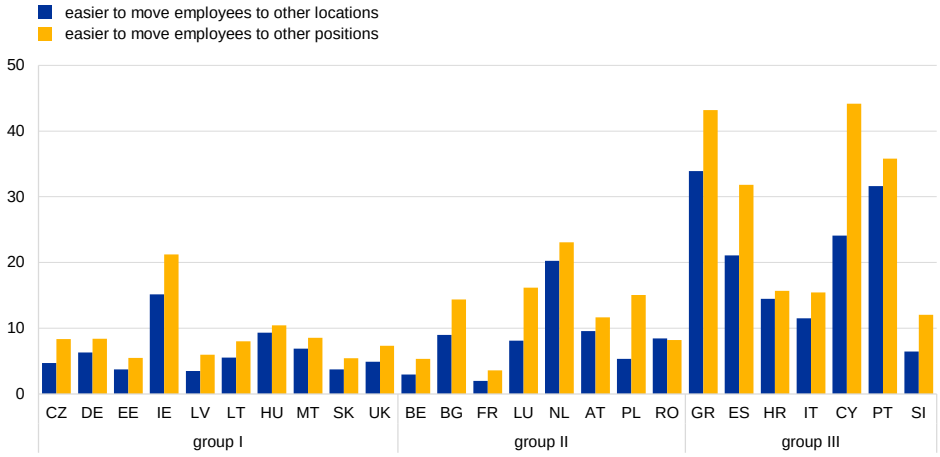
Percentage of firms reporting that it has become easier to adjust wages



Source: WDN3. Note: Figures weighted to reflect overall employment and rescaled to exclude non-responses.

Chart 15

Percentage of firms reporting that it has become easier to reorganise the firm



Source: WDN3. Note: Figures weighted to reflect overall employment and rescaled to exclude non-responses.

For most of the countries in Groups I and II, the proportion of firms reporting that it has become easier to perform a certain action is around 20% or below. In these countries, however, many firms consider adjusting working hours to be much easier than other strategies. Many of these firms also find it comparatively easier to reorganise labour input by moving employees to other locations and positions. In these countries, the majority of the remaining firms believe that the situation has remained unchanged; the percentage of firms finding it more difficult to adjust is significantly lower for all adjustment channels (see Tables A3.2 and A3.3 in Annex 3).

Tables 10 and 11 show how the perceptions of firms differ across sector and size categories in the Group III countries, in which a significant proportion of firms say that it has been easier to adjust labour input and wages. The proportion of bigger firms (with more than 200 employees) perceiving it to be easier to adjust labour input and wages using the above measures is consistently lower for all adjustment

channels. It may be the case that larger firms always had the ability to adjust their labour input and wage bill using various margins of adjustment and that labour market reforms may not have made a significant difference for them. As for the analysis by sector, Table 11 shows that the proportion of firms in the energy and financial intermediation sectors perceiving it to be easier to adjust labour input and wages is lower for most of the channels.

Table 10

Firms' perception of labour market reforms: It has been easier to:

(percentage of firms in Group III countries) – distribution by size

	Lay off employees	Hire employees	Adjust working hours	Move employees to other locations	Move employees to other positions	Adjust wages of incumbents	Offer new employees lower wages
5-19 employees	28	24	27	20	25	23	33
20-49 employees	22	22	25	17	23	17	25
50-199 employees	24	24	29	24	30	19	31
200 employees or more	16	18	21	14	21	8	21

Source: WDN3 survey. Note: Figures weighted to reflect overall employment and rescaled to exclude non-responses.

Table 11

Firms' perception of labour market reforms: It has been easier to:

(percentage of firms in Group III countries) – distribution by sector

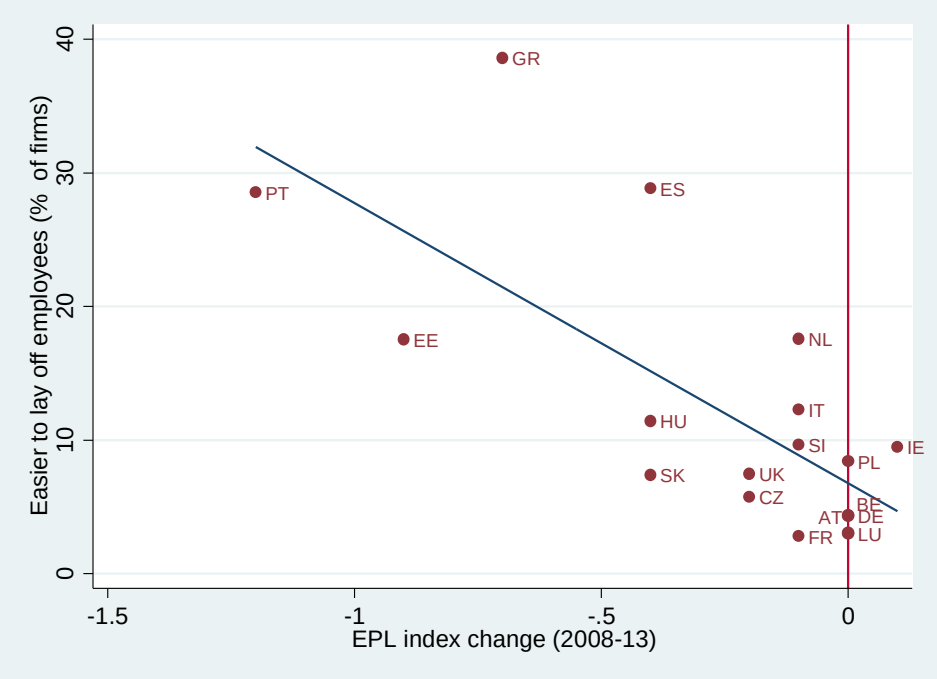
	Lay off employees	Hire employees	Adjust working hours	Move employees to other locations	Move employees to other positions	Adjust wages of incumbents	Offer new employees lower wages
Manufacturing	19	20	22	16	22	10	22
Electricity, gas	8	10	15	11	13	9	14
Construction	22	23	22	26	24	17	22
Trade	21	21	28	14	23	15	22
Business service	20	21	25	20	25	15	29
Financial intermediation	13	55	11	19	23	8	7

Source: WDN3 survey. Note: Figures weighted to reflect overall employment and rescaled to exclude non-responses.

As stated above, the perceptions of the managers answering the questionnaire reflect their opinion about reforms and are based on their actual experience. It is useful, however, to check the consistency of these perceptions using other objective indicators. The EPL index constitutes one such indicator in the case of lay-offs. Chart 16 shows whether perceptions about the ease of laying off employees are in any way correlated with the evolution of the EPL index. In Greece, Estonia, Portugal and Spain, where the reduction of the EPL index is high, firms perceive it to be comparatively much easier to lay off employees. Similarly, in Greece and Cyprus, where wages have adjusted significantly, firms perceive it to be comparatively much easier to adjust the wages of incumbents and offer newly hired employees a lower wage.

Chart 16

Change in EPL index and perceptions about the ability to lay off employees



Sources: OECD and WDN3 survey.

Another question, which was however not included in all countries' questionnaires, asked firms to indicate the factors influencing their answer to the question on how easy it had become to perform certain actions. More specifically, firms were asked which of the following four factors made it easier or more difficult to perform certain actions: a) reforms of labour laws, b) law enforcement, c) a change in the behaviour of trade unions, and d) a change in the behaviour of individuals. Answers to this question are available for ten countries (the Czech Republic, Estonia, Spain, Greece, Croatia, Hungary, Italy, Luxembourg, Poland and Romania).

Table 12 shows the modal answer, i.e. the most frequently cited reason for firms answering that it had become easier to perform an action. For those Group III countries that have significantly reformed their labour markets, i.e. Greece and Spain, the most frequently cited answer when it comes to the ability to adjust labour input and the wage bill is the reform of labour laws. In Estonia, where employment protection was significantly reduced, firms frequently cite labour reforms as the factor making it easier for them to adjust their labour input. In Group I and Group II countries, with regard to the adjustment of the wage bill, the most frequently cited reason is changes in individual behaviour. This is to be expected, since in an environment of uncertainty workers are more likely to accept lower wages in order to save their position or enter the labour market.

Table 12

Most frequently cited reason for the ability to perform the following actions (modal answer)

		Lay off employees collectively	Lay off employees individually	Lay off employees for disciplinary reasons	Lay off employees temporarily	Hire employees	Adjust working hours	Move employees to other locations	Move employees to other positions	Adjust wages of incumbents	Offer new employees lower wages
Group I	CZ	4	4	4		4	4	4	4	4	4
	EE	1	1	1		4	2	1/2*	4		4
	HU	1	1	1	1	1	1	1	1	1	4
Group II	LU	1	2	4	1	4	4	4	4	4	4
	PL	1	2	4	4	4	4	4	4		4
	RO	2	2	2	2	4	2	4	4	4	4
Group III	ES	1	1	1	1	1	1	1	4	1	1
	GR	1	1	1	1	1	1	4	4	1	1
	HR	1	1	1	1	1	1	1	1/4*	4	4
	IT	1	1	2	1	1	4	4	4	4	1

Source: WDN3. Notes: 1=reform of laws, 2=law enforcement, 3= changes in the behaviour of unions, 4= changes in the behaviour of individuals. Green: reform of law. Red: changes in the behaviour of individuals. * Two reasons are cited most frequently.

Since significant reforms took place especially in those countries that suffered the most severe and long-lasting shocks, many firms in these countries believe that it has also become easier to adjust their labour input and wage bill. However, what is also crucial at the current juncture is how employment will evolve as these countries come out of the crisis. WDN3 asked firms about their perceptions regarding obstacles to hiring. This question is fairly broad and its scope is not limited to the regulatory framework per se (i.e. payroll taxes, hiring and firing costs); it also collects information on other factors that may influence firms' decisions regarding hiring, such as the impact of economic uncertainty on hiring and the impact of skill shortages.

More specifically, firms were asked to rank in terms of relevance (i.e. not relevant, of little relevance, relevant, very relevant) the following nine factors: a) uncertainty about economic conditions, b) insufficient availability of workers with the required skills, c) access to finance d) firing costs, e) hiring costs, f) high payroll taxes, g) high wages, h) risks that labour laws will change, and i) costs of other inputs complementary to labour. Tables 13a and b present the most frequently cited answer for each reason. For expositional purposes, reasons are classified in two categories. One category refers to the environment in which the firm operates (Table 13a) and the other to the regulatory framework (Table 13b). Only two reasons are assigned the highest relevance score (very relevant) most frequently by firms, and this is only the case for a few countries. These two reasons are uncertainty and high payroll taxes. The first is related to the environment in which the firms operate and the latter to regulation.

Table 13a

Obstacles to hiring – most frequent ranking of reasons (modal answer)

Economic environment

		Uncertainty	Insufficient availability of required skills	Access to finance	Cost of other inputs
Group I	CZ	3	3	3	2
	DE	2	3	1	1
	EE	3	3	3	3
	HU	1	1	1	1
	IE	3	3	1	3
	LT	3	3	1	2
	LV	3	3	3	3
	MT	3	3	1	1
	SK	3	3	3	2
	UK	2	3	1	1
Group II	AT	1	1	1	1
	BE	3	3	2	2
	BG	4	3	3	3
	FR	4	3	2	2
	LU	3	3	2	2
	NL	3	2	2	2
	PL	3	3	3	3
	RO	3	3	1	3
Group III	CY	4	1	1	1
	ES	4	1	1	2
	GR	4	1	1	2
	HR	4	3	3	3
	IT	4	2	2	2
	PT	3	2	2	2
	SI	3	3	1	2

Source: WDN3. Notes: 1=not relevant, 2=of little relevance, 3=relevant, 4=very relevant. Green: relevant. Red: very relevant.

Interestingly, “very relevant” is the most frequently cited answer when it comes to economic uncertainty for some of the Group II and III countries in which unemployment increased during the crisis, i.e. Bulgaria, France, Cyprus, Spain, Greece, Croatia and Italy. When it comes to high payroll taxes, “very relevant” is the most frequently cited answer for countries from all three groups, i.e. Latvia, Lithuania, Belgium, Poland, Spain, Croatia, Italy and Slovenia.

These results indicate that uncertainty weighs heavily on firms’ decisions to hire employees, especially in countries that suffered the most during the crisis and experienced an increase in unemployment. High payroll taxes are also a concern in some of the countries that saw an increase in unemployment. Employment could thus be expected to increase when economic uncertainty is reduced. However, in these countries the positive impact of reduced uncertainty may be counterbalanced by the negative impact of high payroll taxes.

Table 13b

Obstacles to hiring – most frequent ranking of reasons (modal answer)

Regulatory framework

		Firing costs	Hiring costs	High payroll taxes	High wages	Risk that legal framework will change
Group I	CZ	3	2	3	2	2
	DE	1	2	2	2	2
	EE	2	2	3	3	2
	HU	1	1	1	1	1
	IE	1	2	3	3	2
	LT	3	3	4	3	2/3*
	LV	3	2	4	3	3
	MT	1	1	1	3	1
	SK	3	2	3	3	3
	UK	1	1	1	2	1
Group II	AT	1	1	1	1	1
	BE	3	2	4	3	3
	BG	1	1	3	3	3
	FR	3	2	3	3	3
	LU	3	2	2	3	2
	NL	2	2	3	3	2
	PL	3	3	4	3	3
	RO	1	1	3	3	3
Group III	CY	1	1	1/3*	1	1
	ES	3	2	4	3	2
	GR	2	1	3	1	1
	HR	3	3	4	3	3
	IT	3	2	4	2	3
	PT	3	2	3	2	3
	SI	3	3	4	2	3

Source: WDN3. Notes: 1=not relevant, 2=of little relevance, 3=relevant, 4=very relevant. Green: relevant Red: very relevant. * Two relevance scores are cited most frequently.

The above case is further strengthened by the information presented in Table 14, which shows that in many countries firms that experienced a decrease in demand assign economic uncertainty and high payroll taxes the highest relevance score most frequently.

Tables 13a and b further show that firing costs and high wages are most frequently considered to be relevant by firms in many countries. Firing costs and high wages are two obstacles that relate to labour market regulation. During the recent crisis many countries took significant steps towards reducing firing costs. As noted earlier, Estonia and Greece are two countries for which the EPL index decreased significantly. Indeed, as Table 13b shows, firms in these countries most frequently consider firing costs to be of little relevance. By contrast, in Spain, France, Italy and Portugal, firms think that firing costs constitute a relevant obstacle to hiring. In

Cyprus and Greece, countries where wages were significantly adjusted, firms most frequently consider high wages to be of no relevance.

Table 14

Obstacles to hiring – most frequent ranking of reasons (modal answer) by firms suffering a demand shock

Group	Country	Uncertainty	High payroll taxes
Group I	CZ	3	4
	DE	3	3
	EE	3	3
	HU	3	3
	IE	3	3
	LT	3	4
	LV	3	4
	MT	3	1
	SK	3	3/4*
	UK	2	1/2*
Group II	AT	1	1
	BE	4	4
	BG	4	3
	FR	4	4
	LU	4	2
	NL	3	3
	PL	3/4*	4
	RO	3	4
Group III	CY	4	4
	ES	4	4
	GR	4	3
	HR	4	4
	IT	4	4
	PT	3	3
	SI	4	4

Source: WDN3. Notes: 1=not relevant, 2=of little relevance, 3=relevant, 4=very relevant. Red: very relevant. * Two relevance score are cited most frequently.

The availability of relevant skills is most frequently assigned the second highest relevance score by firms in many countries (see Table 13a). Since this obstacle also relates to other structural policies, countries aiming to increase or maintain employment should consider the role of the educational system in this.

To sum up, firms currently consider uncertainty about economic conditions to be a very relevant obstacle to hiring. However, as the economic situation improves, countries aiming to improve their employment outlook would also need to consider the impact of high payroll taxes, high wages, firing costs and the availability of employees with the required skills, a factor that cannot be tackled by changes in labour laws alone. A policy mix including education would need to be considered.

7 Concluding remarks

This paper provides cross-country comparisons of the nature of the shocks facing firms in the wake of the Great Recession and the European sovereign debt crisis, of the firms' adjustments to these shocks, of the institutional framework that conditioned employment and wage adjustments, of labour market reforms undertaken during the crisis period and of remaining rigidities after those reforms. These comparisons are constructed from the information collected by WDN3 on a wide variety of firm characteristics and their employment and wage changes throughout the 2010-13 period.

The wealth of information provided by WDN3 and the many aspects that could be analysed when identifying the main reasons behind cross-country differences in firms' adjustments to shocks mean that it is not feasible for this report to cover all the results provided by the survey. Indeed, researchers are encouraged to make use of the data themselves. The wealth of information also makes it difficult to summarise even the main results presented in this paper in a brief concluding section. Nevertheless, from the main results presented here, it can be concluded that i) the information provided by the survey about the nature and size of the shocks is consistent with the changes in GDP and unemployment observed across countries, ii) labour market institutions conditioned to a great extent the way in which firms adjusted to the shocks, and iii) despite the labour market reforms introduced in some countries during the crisis period, which made it comparatively easier for firms to adjust, some obstacles remain, influencing firms' decision to hire.

These broad and general messages should provide a starting point for further research on the WDN3 data, both with a focus on particular countries – building on the country reports written by members of the Wage Dynamics Network – and with an international perspective, building on some of the cross-country comparisons presented in this paper.

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Annex 1
The WDN survey

The WDN survey offers a unique dataset to explore wage dynamics, accounting for institutional features, firm-specific features and the economic environment in which firms were operating. It was launched by the Wage Dynamics Network, a European System of Central Banks (ESCB) research network focusing on identifying the sources and features of wage and labour cost dynamics that are most relevant for monetary policy. The first wave of the WDN survey (WDN1) was carried out by 17 national central banks (NCBs) between the end of 2007 and the first half of 2008. It collected information on a period of economic stability and relatively stable growth, namely 2002-07. In summer 2009, ten NCBs conducted a more focused follow-up survey with the specific aim of understanding firms' reactions to the initial stage of the crisis (2008-09). This was the second wave of the WDN survey (WDN2).

The third wave of the WDN survey (WDN3) was conducted by 25 ESCB NCBs between the end of 2014 and the first half of 2015. The aim of the WDN3 survey was to assess recent labour market adjustments and firms' reactions to the various shocks and labour market reforms that took place during the second phase of the crisis (2010-13). This wave collected information from over 25,000 firms from the following sectors: manufacturing, energy, construction, trade and transportation, market services, financial intermediation and, for some countries, non-market services. By design, the sample is relatively balanced across firm size categories within each country and across the sectors considered. Its distribution closely follows the distribution of private employment in each country. However, the sample size varies across countries both in absolute terms and relative to the number of firms in each country. Thus, individual weights have been calculated for each firm to make the sample representative of the overall number of firms in each country and to account for the number of workers that the firm represents in a given country.

The WDN surveys are ad hoc surveys at the firm level that respond to specific information demands. This feature has resulted in different questionnaires across waves. Coverage in terms of countries also varies across waves, as does the sample of firms in each country. Thus the WDN surveys are not, strictly speaking, different waves of a panel, but have led to cross-country datasets with ample geographical and sectoral coverage. The main advantage of conducting an ad hoc survey at the firm level is its flexibility. Firms can be asked directly about the features of their wage and price setting, their reactions to shocks or their perceptions of the effectiveness and impact of reforms: information that would otherwise be difficult to collect. Where wages are concerned, surveys addressed to firms typically provide more accurate information than those addressed to households. Nevertheless, several shortcomings inherent in ad hoc surveys should be borne in mind, such as low response rates and potential misinterpretations of the questions. Moreover, responses may be influenced by the specific macroeconomic environment prevailing at the time of the survey.

Table A1

WDN3 survey – main characteristics of the national surveys

	National central banks	Sectoral coverage *	Firms' size (number of workers)	No of respondents (response rate)	Who conducts the survey	How is the survey conducted
BE	Nationale Bank van België/Banque Nationale de Belgique	1, 3, 4, 5, 6, 8	1 +	991 (21%)	National central bank	Traditional mail
BG	Bulgarian National Bank	1, 3, 4, 5, 8	5 +	528 (<59%)	External company	Online, personal interviews
CZ	Česká národní banka	1, 3, 4, 5	10 +	1011 (20%)	National central bank	Traditional mail, online
DE	Deutsche Bundesbank	1, 2, 3, 4, 5, 6, 7, 8	1 +	2454 (24.5%)	National research body	Traditional mail, fax
EE	Eesti Pank	1, 2, 3, 4, 5, 6, 8	1 +	500 (13.8%)	External company	Telephone, online
IE	Central Bank of Ireland	1, 2, 3, 4, 5, 6, 7, 8	1 +	1569 (5%)	External company	Traditional mail
GR	Bank of Greece	1, 4, 5	5 +	402 (8%)	National central bank	Email
ES	Banco de España	1, 2, 4, 5	5 +	1975 (64.8%)	External company	Online
FR	Banque de France	1, 3, 4, 5	5 +	1156 (24%)	National central bank	Traditional mail, telephone
IT	Banca d'Italia	1, 2, 3, 4, 5, 6	5 +	1102 (29.4%)	External company	Online
CY	Central Bank of Cyprus	1, 3, 4, 5, 6	3 +	182 (11%)	National central bank	Traditional mail, email
LV	Latvijas Banka	1, 3, 4, 5, 6	10 +	557 (27%)	External company	Telephone, online
LT	Lietuvos bankas	1, 3, 4, 5, 6	5 +	515 (6% approx.)	External company	Not specified
LU	Banque centrale du Luxembourg	1, 3, 4, 5, 6	1 +	674 (13.5%)	National research body	Traditional mail, online
HR	Hrvatska narodna banka	1, 3, 4, 5	5 +	301 (7%)	External company	Online, telephone
HU	Magyar Nemzeti Bank	1, 3, 4, 5, 6	5 +	2032 (58%)	External company	Personal interviews
MT	Central Bank of Malta	1, 2, 3, 4, 5, 6, 7, 8	10 +	178 (66%)	National central bank	Personal interviews
NL	De Nederlandsche Bank	1, 3, 4, 5, 6	5 +	727 (77%)	External company	Not specified
AT	Oesterreichische Nationalbank	1, 3, 4, 5, 6	5 +	784 (>= 20%)	National central bank	Traditional mail, online
PL	Narodowy Bank Polski	1, 2, 3, 4, 5, 6, 7, 8	1 +	1200 (27.9%)	National central bank	Traditional mail, online, personal contact
PT	Banco de Portugal	1, 2, 3, 4, 5, 6, 7, 8	10 +	1282 (28%)	National central bank	Traditional mail, online
RO	Banca Naţională a României	1, 3, 4, 5	20 +	1530 (88%)	National statistics office	Traditional mail
SI	Banka Slovenije	1, 2, 3, 4, 5, 6, 8	5 +	1285 (43%)	National central bank	Traditional mail, online
SK	Národná banka Slovenska	1, 2, 3, 4, 5, 6	5 +	621 (7.7%)	National central bank	Traditional mail, email
UK	Bank of England	1, 3, 4, 5, 6, 8	1 +	654 (3.6%)	National central bank	Online, email

* Where Sector 1 = Manufacturing (NACE code C), Sector 2 = Electricity, gas and water (NACE codes D, E), Sector 3 = Construction (NACE code F), Sector 4 = Trade (NACE code G), Sector 5 = Business services (NACE codes H, I, J, L, M, N), Sector 6 = Financial intermediation (NACE code K), Sector 7 = Public sector services (NACE codes O, P, Q) and Sector 8 = Arts (NACE codes R, S).

Annex 2
Major labour market reforms across the EU

Table A2

	2007-10	2010-14
Belgium	UB: Temporary increase.	UB: Reduced progressivity (first temporary, since 2012 permanently). Limitation of early exits from labour market.
	EPL: Extension of temporary lay-offs to employees (2009). Temporary reductions in working time schemes.	EPL Unification of employment protection legislation for blue and white-collar status (2014).
Bulgaria	EP: Successive cuts in social security contributions (2007, 2008 and 2009).	EPL: Regulation of part-time work: transforming part-time employment contracts into full-time when the controlling authorities establish that work is being conducted outside agreed hours without the existence of conditions for overtime work (2012).
	EP: Allocation of funds to programmes seeking to encourage employers to create jobs (2008) and employment subsidies to employers for green jobs to be offered to unemployed (2010).	EPL: Suspension of the ability of an employer to terminate the employment of a worker that has acquired the right to a pension (2012).
	EP: Measures to counter the financial crisis: encouragement and guarantee of part-time work for more than three months. Introduction of flexible hours and various forms of unpaid leave (2008, 2010).	CB: Four agreements covering water supply, brewing, the paper and pulp industry and the mineral processing sectors were extended to all employees by the Minister of Labour and Social Policy (2010, 2012).
	EP: Introduction of a new reason for terminating employment: if the employee receives a pension. (2010)	EP: Training and provision of grants to unemployed to start their own business (2012, 2013).
	EP: Support for employers in training and retraining of employees (2008) and training support to the unemployed dismissed since 1.1.2008 as a result of firms' closure/restructuring (2009). Various training programmes for the employed in order to improve their career development. (2009, 2010).	EP: Subsidised employment and training for people under the age of 29, people with disabilities and unemployed parents with children (2012).
	EP: Extension of traineeship period for young people that have no work experience and have completed their professional training in the last 24 months (2010).	EP: Measures to encourage life-long learning of people of all ages and improvements in the quality of vocational training (2012).
		EP: Regulation of remote work and teleworking (2011).
Czech Republic	UB: Reductions in coverage, duration and replacement rates.	EPL: Reductions in severance payments.
		UB: Not granted to workers with severance payments.
		MW: Increased.
Germany	EP: Training programmes for unemployed and short-term workers.	CB: Extensions of CB agreements made easier.
	CB: Before the crisis (2004-08), many collective agreements provided for working time corridors, working time accounts, and opening clauses for times of crisis.	CB: Sector-specific minimum wages further disseminated by introducing generally binding minimum wages in further industries.
	EP: Temporary extension of short-time work. Starting from early 2009, conditions for employers to use short-time work were made more favourable with respect to entitlement duration, access and costs.	
	CB: During the period of extensive short-time work, employers often topped up short-time working benefits with additional supplements as stipulated in number of collective wage agreements.	
	CB: More flexibility at the company level was introduced during the crisis through a number of supplementary collective agreements to reduce weekly working time and by firm-level agreements on	

	2007-10	2010-14
	guaranteeing jobs.	
	MW: Raising of existing or introduction of sectoral minimum wages; widening of sectoral coverage of minimum wages by declaring them to be generally binding.	
Estonia	MW: Increases in 2007 and 2008.	CB: Widening of opt-out clauses. MW: Increases in 2012, 2013 and 2014.
	EPL: Reform in 2009.	UB: Decrease in contributions in 2013.
	UB: Increase in contributions in 2009.	
Ireland	UB: Duration and replacement rates reduced.	UB: Further reductions.
	EP: Activation and re-skilling of the unemployed. Various training schemes for workers made redundant and short-time workers.	MW: Reduced.
Greece	EP. Various training programmes and programmes of subsidised employment (2007-09).	EPL: Lowering the threshold for collective dismissals (2010).
	EP. Efforts to reduce early retirement, e.g. by reducing the pension received by those retiring early -before the age of 60 (2008).	Shorter notice period for the termination of employment contracts (2010) and reduction of severance pay on dismissals (2012).
		CB: Firm-level agreements can provide for remuneration and working conditions that are less favourable than the sectoral agreement - the national general collective agreement still acts as floor (2010-11).
		CB: Suspension of the extension of occupational and sectoral collective agreements to non-signatory parties for the duration of the Medium-Term Fiscal Strategy Framework (2011).
		EPL. Extension of the duration of temporary work - from 2 to 3 years (2011).
		MW. A statutory minimum wage is introduced - previously it was the outcome of a bargaining process (2012).
		MW. Sub-minimum wages for workers under the age of 25.
		UB. While in 2012 the basic UB declined, as the crisis progressed in 2013 there was a change in the eligibility criteria for the provision of the UB to long-term unemployed in an effort to strengthen the social safety net for the most vulnerable social groups. In addition, previously self-employed and currently unemployed workers can claim monthly unemployment benefits.
		EP: Training programmes and employment subsidies for the young (2011-2012-2013).
		EP. Reduction in employers' social security contributions (2012).
Spain	UB: Extension.	EPL: Changes in definition of fair economic dismissals in 2010 and 2012 and reduction of severance payments in 20132 Introduction of new contract for firms with fewer than 50 employees in 2012. Increase of flexibility in working hours.
		CB: Changes in extension rules and widening of opt-out clauses.
		EP: Incentives for job creation and subsidies for new hires.
France	EPL: Introduction of a new contract breach (*rupture conventionnelle*) which depends on both parties' agreement (2008).	EPL: Creation of a personal account containing rights to train (2013). Support for recovering firms through negotiations on wages and work time (2013-15). Subsidies for hiring young workers under permanent contracts (2013).
	UB: Reform of the general scheme for social benefits to improve work incentives.	UB: Higher social contributions on very short-term contracts (2013).
	CB: Improving trade unions' representation in negotiations (2008).	
	MW: Creation of an independent expert committee to	

	2007-10	2010-14
	limit minimum wage increases.	
Croatia		EPL: Simplification of procedures for collective lay-offs. Greater flexibility regarding fixed-term and permanent contracts and working hours.
Italy	CB: Reform in 2009 (by social partners).	EPL Reforms in 2012 (and in 2015); Reform of temporary employment.
		CB: Reform (by social partners).
		EP: Jobs Act (in 2015) to support people looking for a job, and reduce the type of contracts.
Cyprus	EP: Various training programmes for the unemployed and the young.	EP: Employment subsidies and various training programmes.
	EP: Incentives for firms to hire unemployed people.	MW: Suspension of wage indexation in the private sector.
		CB: Reductions of public sector employees' wages.
Latvia	UB: Extension.	CB: Extension of sectoral agreements.
		EPL: Extension of Atypical Contracts.
		EP: Incentives for job creation and subsidies for new hires.
		MW: Increases in hourly rate in 2011 and 2013.
Lithuania	EP: Entrepreneurship scheme for the unemployed and incentives to employ younger workers.	EP: Voucher system for the training of the unemployed and new opportunities for vocational training.
	UB. Decrease in the replacement rate.	MW: Change in procedure for the determination of the minimum wage.
		EPL. Increased flexibility for temporary work agencies and temporary expansion of valid reasons for fixed-term contracts.
Luxembourg	EPL: Changes in short-time work schemes (extension of coverage, maximum duration and enhancement of entitlements).	EPL: Extension and scaling-up of short-time work provisions introduced in the previous period.
	EP: Extension of employment support contracts targeted at young workers. Financial aid to hire long-term unemployed: temporarily scaled up in 2010, until 2013.	EP: Major reform of the national employment agency ADEM. Strengthening of activation requirements. In 2014, the government introduced the so-called youth guarantee, ensuring that all young people get a reasonable offer (job, apprenticeship or training) within four months of registration with the national employment agency ADEM.
	EPL: Unification of "blue-collar" and "white-collar" statutes.	UB: Benefit entitlement linked to compliance with obligations (such as early registration with public employment services, active job search or the acceptance of suitable job offers). Mutual obligations and rights are formalised in binding contracts.
	CB: The indexation scheme was (temporarily) changed on several occasions.	UB: Duration and replacement rates temporarily increased.
		CB: In autumn 2010, social partners agreed to a one-off change to the automatic indexation mechanism, postponing any payout in 2011 to October 2011 at the earliest. Along the same lines, in December 2011, the government decided to postpone any payout in 2012 to October 2012. In addition, over the period 2012 to 2014, a time span of at least 12 months had to elapse between two automatic wage hikes. This measure introduced a de facto cap of 2.5pp for the contribution of wage indexation to year-on-year nominal wage growth. Fundamental reshaping of the public sector wage-setting mechanism.
Hungary	EP: Training programmes and financial incentives for young low-skilled.	EP: Changes of rules of parental leave. Job protection plan from 2013 to increase employment of groups whose employment rates were lower.
		UB: Decrease of replacement rate and duration in 2011.
		MW: Significant increase in 2012.
Malta	EP: Initiatives to attract and retain people in the labour market, especially women.	EP: Initiatives to attract and retain people in the labour market, especially women.

	2007-10	2010-14
Netherlands	EP: Increase of employment subsidies.	UB: Duration reduced.
	EPL: Extension of the duration of fixed-term contracts for young people	EPL: Maximum duration of fixed-term contracts has been reduced, maximum number of renewals has been reduced and the interval required between consecutive contracts has increased.
Austria	UB: Strengthening activation policies.	EP: Young entrepreneur fund, hiring subsides for older workers and grants for the low skilled to access training.
	EP: Youth employment packages and training provision to support employers and employees during short-time work.	
Poland	UB: Increased.	EP: Improvement of activation and integration of the unemployed and of employment services in general
	EP: Action in the area of life-long learning and measures to improve the economic activity and employability of the unemployed and inactive.	EP: Incentives for hiring young and older unemployed.
	EP: Programmes increasing the participation rate of persons over 50 (2008); cancellation of early pensions (2009).	EP: New regulation governing the length of unemployment benefits introduced to rationalise the system. Instead of a flat benefit rate paid during the whole period, payments are now higher in the first 3 months after registration and then decrease by about 21%. The maximum period of payments was reduced from 18 to 12 months but the minimum period has remained unchanged (6 months). (2010)
	EP: An anti-crisis package of measures introduced flexible working-time solutions, and more freedom for employers to organise work processes (2009).	
	EP: Successive reduction of tax wedge (2007, 2008 and 2009).	
Portugal	EPL: Reduction in the notice period for collective dismissals and the maximum duration of fixed-term contracts	EPL: Significant reduction of severance payments and (light) facilitation of dismissal clauses.
		CB: Limitations to extensions of sectoral CB agreements (2012).
		CB: New alternative criteria for the extension of sectoral agreements were introduced, making extension easier compared with the regulation introduced in 2012.
		MW: Freeze.
		UB: Changes in entitlement rules.
		EP: Increased flexibility for working schedules.
Romania	UB: Unemployment benefit duration increased while the eligibility criteria for the unemployment benefit were tightened and the unemployment benefit decreased.	UB: More control of refusal of job offers.
	EP: Increased financial support to employers offering training.	EPL: Extension of trial periods. Restriction on the rollover of fixed-term contracts. Extension of maximum duration of fixed-term contracts. Possibility of reducing working hours due to economic reasons.
		CB: Elimination of national level of negotiation. New eligibility criteria for firm-level representation and trade union capability to bargain.
Slovenia	EP: Improvements in training and employment services.	UB: Increase in coverage and replacement rates.
		EPL: Shorter notice period and a reduction in severance payments and introduction of redundancy pay for fixed-term contracts (2013).
		MW: The statutory minimum wage increased from €597 to €734 gross per month, or by 22.9% (2010)
Slovakia	MW: New indexation mechanism, giving social partners room to negotiate the increase.	EPL: Restrictions on maximum duration of fixed-term contracts and maximum number of renewals of fixed-term contracts.
	EPL: Adoption of a more precise definition of dependent employment and limits on the renewal of	EPL: Reduction of dismissal costs.

	2007-10	2010-14
	fixed-term employment contracts.	
	EP: Subsidies for new jobs.	EP: Employers are offered a subsidy for full-time jobs offered to unemployed under 29 years old and over 50 years old.
United Kingdom	EP: "Flexible New Deal", implemented in October 2009 that acted as a hiring subsidy by providing the long-term unemployed with intensive support and employers with incentives to recruit and train them.	EP: New rights for agency workers, increasing the cost to firms of using this particular type of "flexible labour". Abandonment of the New Deal in October 2010, and introduction in June 2011 of the 'Work Programme' to replace it. This programme was also aimed at getting the long-term unemployed into work, and so can be seen as a hiring subsidy.
	MW: Minimum wage for an employee aged 22 or over rose from £5.52 in 2007 to £5.93 in 2010.	UB: In 2013, the government launched the Universal Credit, which represented a major reform of the benefit system, affecting in particular the benefits available to unemployed workers.
		MW: Minimum wage for an employee aged 21 or over rose from £5.93 in 2010 to £6.50 in 2014 and public sector wages were frozen between 2010 and 2013, since when pay growth has been capped at 1%.

Note: Brief description of changes in labour legislation regarding collective bargaining (CB), employment protection legislation (EPL), unemployment benefits (UB) and minimum wages (MW), and the implementation of employment policies (EP).
Sources: WDN and LABREF database.

Annex 3
Detailed statistics on firms' perceptions about labour market reforms

Table A3.1

Firms' perceptions about labour market reforms: It has been easier to:

(percentage of firms)

Group	Country	Lay off employees collectively	Lay off employees individually	Lay off employees for disciplinary reasons	Lay off employees temporarily
Group I	CZ	4.4	6.4	6.4	
	DE	3.0	5.3	4.8	
	EE	16.6	22.9	13.0	
	HU	10.1	14.1	11.0	10.6
	IE	9.1	12.2	4.5	12.2
	LT	1.6	5.6	11.2	
	LV	4.4	7.2	6.2	
	MT	0.9	1.9	1.5	0.0
	SK	5.5	8.7	11.0	4.5
	UK	5.5	8.8	10.9	4.8
Group II	AT	2.9	3.7	1.7	4.0
	BE	2.1	4.5	1.9	8.8
	BG	13.3	15.8	13.7	18.6
	FR	1.6	1.8	0.8	7.0
	LU	2.3	3.9	1.8	3.8
	NL	17.1	20.1	15.8	17.3
	PL	8.0	11.7	5.9	8.0
	RO	6.6	12.4	7.1	6.2
Group III	CY	16.9	26.5	8.0	30.0
	ES	33.1	41.3	16.6	24.4
	GR	43.5	53.4	24.1	33.6
	HR	7.1	12.0	12.7	10.8
	IT	9.7	13.6	8.2	17.5
	PT	33.0	32.7	17.6	31.0
	SI	4.6	15.9	6.7	11.2

Source: WDN3.
Note: Figures weighted to reflect overall employment and rescaled to exclude non-responses.

Table A3.2

Firms' perceptions of labour market reforms: It has been equally difficult to:

(percentage of firms)

Group	Country	Lay off employees	Hire employees	Adjust working hours	Move employees to other locations	Move employees to other positions	Adjust wages of incumbents	Offer new employees lower wages
Group I	CZ	88	64	87	89	85	77	82
	DE	66	44	59	63	66	61	41
	EE	72	59	82	87	83		61
	HU	77	69	77	80	79	73	71
	IE	69	48	65	73	67	61	50
	LT	81	65	81	84	83	66	62
	LV	80	53	75	84	78	54	68
	MT	88	46	74	80	77	83	67
	SK	74	69	75	84	83	71	88
	UK	78	51	74	84	84	77	59
Group II	AT	79	73	46	65	64	69	58
	BE	68	47	63	73	73	54	57
	BG	65	69	70	78	69	65	69
	FR	74	53	56	72	71	62	
	LU	84	60	75	76	67	67	62
	NL	68	62	67	72	70	72	62
	PL	87	73	76	90	80		77
	RO	82	69	83	86	86	77	83
Group III	CY	76	65	63	74	53	44	44
	ES	60	67	63	74	61	67	58
	GR	59	30	39	63	53	33	18
	HR	76	62	72	80	72	69	70
	IT	75	67	70	76	71	70	64
	PT	63	53	60	60	57	73	
	SI	25	52	46	36	45	45	36

Source: WDN3.
Notes: Figures weighted to reflect overall employment and rescaled to exclude non-responses. Lay off employees: average proportion of firms finding it equally difficult to lay off employees collectively, individually, temporarily and for disciplinary reasons.

Table A3.3

Firms' perceptions of labour market reforms: It has been more/much more difficult to:

(percentage of firms)

Group	Country	Lay off employees	Hire employees	Adjust working hours	Move employees to other locations	Move employees to other positions	Adjust wages of incumbents	Offer new employees lower wages
Group I	CZ	6	28	7	7	7	15	9
	DE	29	50	31	30	26	36	52
	EE	11	35	12	9	11		35
	HU	12	20	12	10	10	20	18
	IE	22	32	20	11	12	29	24
	LT	13	26	13	11	9	27	33
	LV	14	38	20	13	16	35	24
	MT	11	50	19	13	14	15	28
	SK	19	21	18	12	12	24	8
	UK	14	39	16	12	9	17	32
Group II	AT	18	25	35	26	25	28	36
	BE	28	48	34	24	22	45	38
	BG	20	18	17	13	16	19	15
	FR	23	45	42	26	26	37	
	LU	13	33	20	16	17	29	26
	NL	14	12	9	8	7	19	8
	PL	5	15	10	4	5		12
	RO	10	20	9	6	6	15	9
Group III	CY	3	10	5	1	2	5	2
	ES	11	7	6	5	7	13	11
	GR	3	16	8	3	4	4	1
	HR	13	16	14	6	12	19	15
	IT	13	20	13	13	13	26	19
	PT	9	16	7	9	8	14	
	SI	2	8	3	3	3	4	2

Source: WDN3.
Notes: Figures weighted to reflect overall employment and rescaled to exclude non-responses. Lay off employees: average proportion of firms finding it equally difficult to lay off employees collectively, individually, temporarily and for disciplinary reasons.

Abbreviations

Countries

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

In accordance with EU practice, the EU Member States are listed in this report using the alphabetical order of the country names in the national languages.

Others

BIS	Bank for International Settlements	GDP	gross domestic product
CPI	Consumer Price Index	HICP	Harmonised Index of Consumer Prices
DG ECFIN	Directorate General for Economic and Financial Affairs, European Commission	i.i.p.	international investment position
		ILO	International Labour Organization
ECB	European Central Bank	IMF	International Monetary Fund
EDP	excessive deficit procedure	MFI	monetary financial institution
EER	effective exchange rate	MIP	macroeconomic imbalance procedure
EMI	European Monetary Institute	NCB	national central bank
EMU	Economic and Monetary Union	OECD	Organisation for Economic Co-operation and Development
ERM	exchange rate mechanism		
ESA 95	European System of Accounts 1995	SSM	Single Supervisory Mechanism
ESCB	European System of Central Banks	TSCG	Treaty on Stability, Coordination and Governance in the Economic and Monetary Union
ESRB	European Systemic Risk Board		
EU	European Union		
EUR	euro		

Conventions used in the tables

“-” data do not exist/data are not applicable
“.” data are not yet available

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