

# **Labour market adjustment in Europe during the crisis: Microeconomic evidence from the Wage Dynamics Network Survey**

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## **Executive summary**

Against the backdrop of continuing adjustment in European labour markets in response to the Great Recession and Sovereign Debt crisis, the European System of Central Banks (ESCB) conducted the third wave of the Wage Dynamics Network (WDN) survey in 2014-2015. This was 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 (WDN3) sampled about 25,000 firms in 25 European countries aiming at 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. This OP summarises the main results of WDN3.

There is large heterogeneity across the 25 EU countries covered by the WDN3 in terms of their business cycle position and their labour market performance. So, to facilitate the analysis, we create a taxonomy of countries based on their recent – ie, 2010-2013 – unemployment and GDP growth experiences. Specifically, we split our countries 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).

We analyse how European firms reacted to negative demand and financial shocks in terms of labour input (both at the intensive and extensive margins) and wages. As expected, negative demand shocks are highly correlated with negative adjustment in employment, especially in permanent employment and, to a lower extent, in temporary employment and hours per employee. This pattern is found to be rather homogeneous across country groups, although the adjustment in permanent employment is somewhat larger and the change in worked hours per employee is slightly lower in Group II countries. Difficulties in access to finance also contribute to the probability of adjusting employment, although the effect is much smaller than for demand shocks.

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

The third wave of the WDN survey provides information about the different instruments that firms used to reduce labour input. In general, we observe that European 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 relatively more often used in Group III countries, while the use of individual dismissals is more likely in Group I countries as compared to the other two groups. Temporary layoffs were more often used by firms in Group II countries while subsidised reductions of working hours were especially relevant

in countries like Germany and Italy. Finally, a large share of firms in almost all countries stopped hiring.

The WDN3 also provides information to assess 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 2010-2013, they changed their employees' base wages once a year, while 40% changed them less frequently than once a year. The frequency of wage changes in EU countries was lower during the period 2010-13 than during the pre-crisis period (2002-2007). This seems to be at least partially attributable to the resistance of firms to lower base wages, ie, to the prevalence of downwards nominal wage rigidity (DNWR).

DNWR was indeed prevalent during the period 2010-2013, in spite of the length and intensity of the crisis, although to a lesser extent than during the period 2008-2009. Nominal base wage cuts are extremely rare among European 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 2008-2009, before declining over the period 2010-2013. Nevertheless, the evidence from WDN surveys 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 2008–2009 and to Greece and Cyprus in 2010–2013

Finally, the WDN3 survey collects information that enables us to evaluate the relevance of recent labour market reforms that are deemed to affect labour market adjustments. Labour market reforms took 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. To somehow provide a rough categorisation of measures/reforms, one could say that during the initial phase of the crisis – 2007-2010 – many countries adopted measures that aimed at maintaining employment and providing a safety net for the most vulnerable workers. As the crisis progressed more in-depth reforms were adopted with the aim of making labour markets more efficient – so 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, 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, eg, sub-minimum wages for the youth in Greece, subsidies for new hires in Spain, and a freeze in 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 attribute this to reforms and changes in labour laws.

When it comes to remaining obstacles to employment creation, economic uncertainty and high pay-roll taxes are very relevant 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 a relevant obstacle to hiring workers on open-ended contracts in many EU countries.

## 1. Introduction

The Great Recession that followed the financial crisis of 2007-8 resulted in large falls in output and rises in unemployment across Europe. In particular, countries in the periphery of the euro area experienced particularly large rises in unemployment as their respective governments found it necessary to consolidate in the wake of sovereign debt crises and as firms found it necessary to become more competitive. In order to try to address these unemployment and competitiveness problems, a number of countries engaged in structural reforms of their labour markets.

Against the backdrop of continuing adjustment in European labour markets in response to the Great Recession and 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.<sup>2</sup> The WDN survey collected information on wage-setting practices at the firm level.<sup>3</sup> This third wave (WDN3) sampled about 25,000 firms in 25 European countries aiming at 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.<sup>4</sup> Detailed results of the surveys are available in individual reports for each one of the countries participating.<sup>5</sup> This paper summarises the main results of WDN3 by identifying some patterns in firms' adjustments and labour market reforms. It focuses on firms with more than five workers and belonging to the following sectors: manufacturing, energy, construction, trade and transportation, market services and financial intermediation.<sup>6</sup>

More specifically, we seek to lay out the main lessons learnt from the survey both in terms of the general response of European labour markets to the crisis as well as 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, we start in the next section, section 2, 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 by the firms' responses in 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, more specifically, on the extent of downwards nominal wage rigidities, as a potential impediment to cutting

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<sup>2</sup> The first, second and third waves of the WDN surveys are referred to as WDN1, WDN2 and WDN3, respectively.

<sup>3</sup> The WDN survey collects information that enables researchers to examine the effect on wage, employment and price adjustments of firm characteristics as well as of the economic environment and institutional features where the firms operate. An important way that the third wave of the WDN survey adds value is that it also collects information that enables us to evaluate the incidence of the various shocks and the relevance of recent labour market reforms that are deemed to affect labour market adjustments.

<sup>4</sup> Denmark, Finland and Sweden are the only three EU countries that did not conduct the WDN3 survey.

<sup>5</sup> Information about the WDN and country reports referring to the third wave of the survey are available at [https://www.ecb.europa.eu/pub/economic-research/research-networks/html/researcher\\_wdn.en.html](https://www.ecb.europa.eu/pub/economic-research/research-networks/html/researcher_wdn.en.html).

<sup>6</sup> The WDN3 survey also covers non-market services and/or firms with less than five workers in some countries. See Annex 3 for more details on WDN3 features, and Annex 2 for general information on the WDN surveys.

labour costs. Section 6 considers labour market reforms during the period 2010-2013 and focusses in particular on how firms perceived (and reacted) to them. The section also provides information on the remaining labour market rigidities, as identified by the survey. Finally, Section 7 concludes.

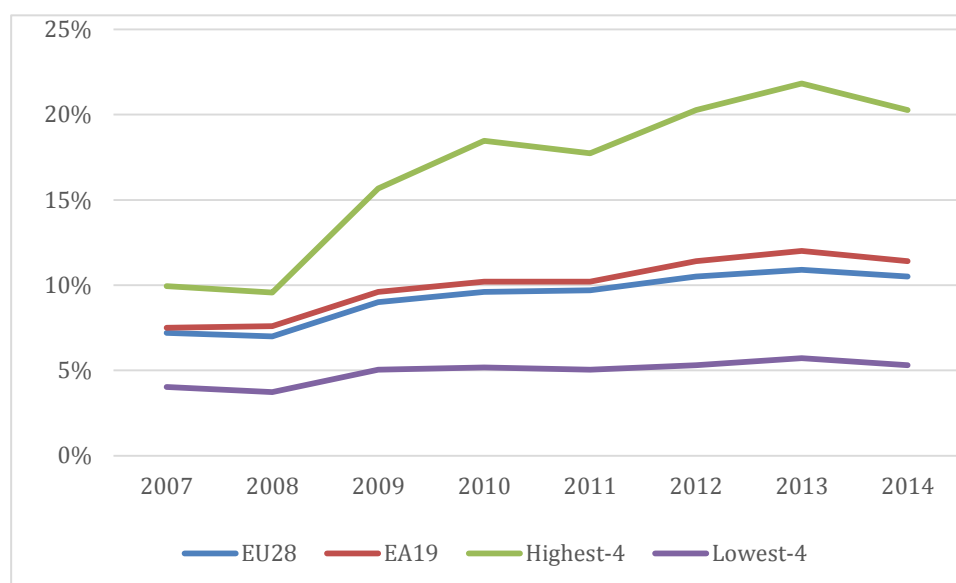
## 2. A taxonomy of the countries participating in WDN3

Neither the crisis nor the incidence of labour market reforms affected all the countries with the same intensity or at the same time. To start comparing survey results in a systematic way it may be useful to provide a brief comparative review of the labour market performance of the countries in our sample. We also propose some country groupings based on the evolution of unemployment and GDP to be used in the rest of the paper to structure cross-country comparisons.

When looking at European labour markets during the crisis the most striking fact is the widening of unemployment differentials across countries. Chart 1 provides the range of unemployment rates in the EU28 during the period 2007-2013 and shows that the range between the average of the unemployment rates in the countries with the lowest rates and that in the countries with the highest unemployment rates increased from around five percentage points in 2007 to around 13 percentage points in 2010 and to 16 percentage points in 2013.

**Chart 1. Unemployment rates in EU countries (2007-2014).**

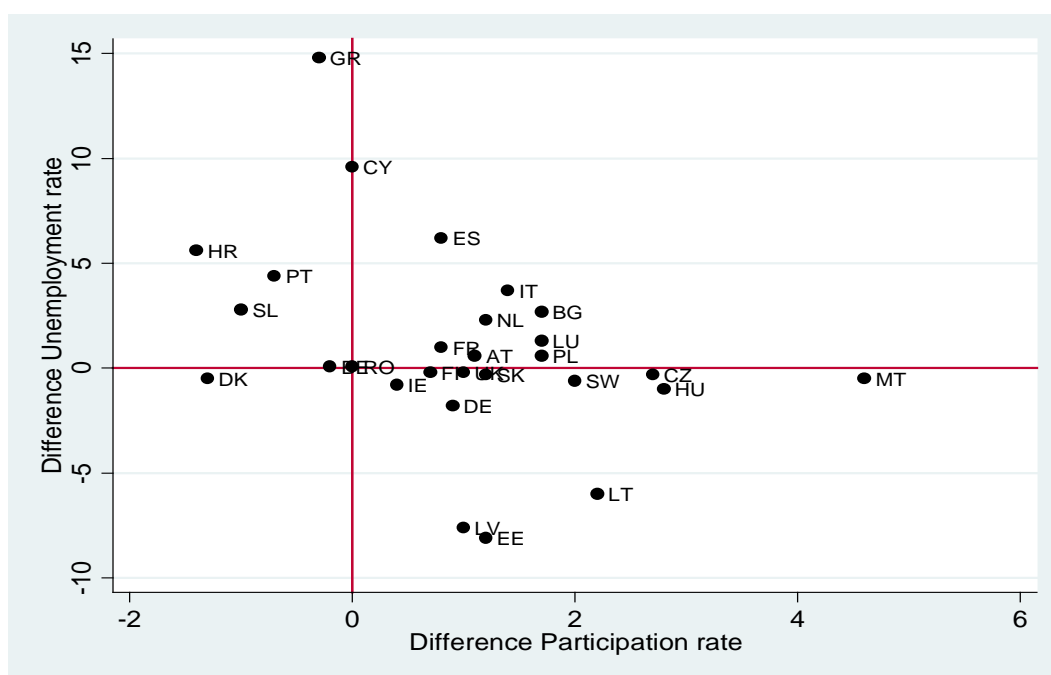
Source: Eurostat. Non-weighted country averages



Cross-country differences in labour market performance during the period 2010-2013, which is the period covered by WDN3, were not only confined to the evolution of unemployment. They are also quite noticeable in the changes in participation rates and in working hours per employee, as shown in Charts 2a and 2b. In most countries the

participation rate increased from 2010 to 2013 (the exceptions being Croatia, Portugal, Slovenia, Denmark, Belgium and Greece). Even in countries with a large rise of the unemployment rate, participation rates went significantly upwards, something that was observed neither in previous recessions in Europe nor in the United States during the Great Recession. As for changes along the intensive margin, working hours per employee increased significantly only in Ireland, Belgium, the United Kingdom and Greece, but among the countries where they fell, there is a wide heterogeneity.

**Chart 2a. Differences in unemployment and participation rate (2010- 2013)**

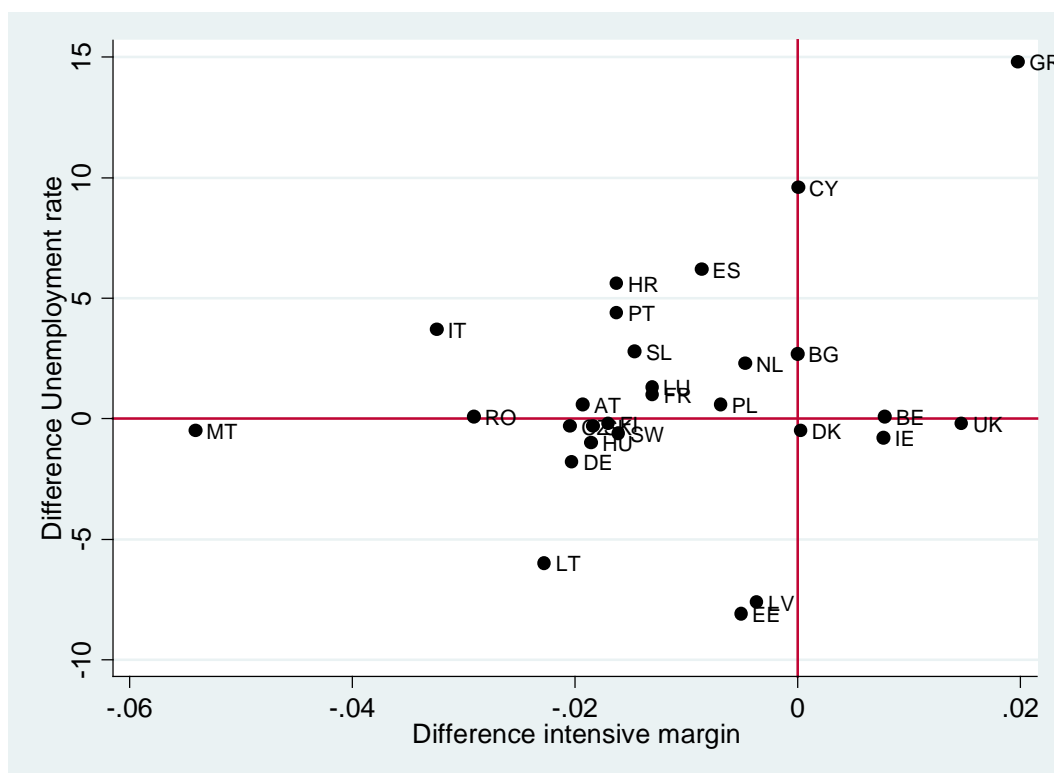


Source: Eurostat, EU-LFS.

Obviously, since not all countries experienced the economic and financial crisis in the same intensity, this divergence should not come as a big surprise. What is more surprising, however, is that the 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 unemployment rate against the changes in output for the 28 EU countries plus the United States as well as for the European Union and Euro Area as a whole, over 2007-2013, as well as over two subperiods 2007-2010 and 2010-2013, which roughly correspond with the two phases of the recent Great Recession and the European sovereign debt crisis. As can be seen, all but a handful of countries experienced falling output and rising unemployment (ie, fall in the top left quadrant) over the earlier period 2007–2010 with four – Estonia, Lithuania, Latvia and Spain – experiencing rises in the unemployment rate greater than ten percentage points. Notice that, 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 subperiods, this coefficient is slightly higher (0.49) for 2007-2010, while for 2010-2013, when most countries were firmly in a recovery phase

with GDP growing and the unemployment rate generally falling but still seven countries were 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 (2010-2013)**



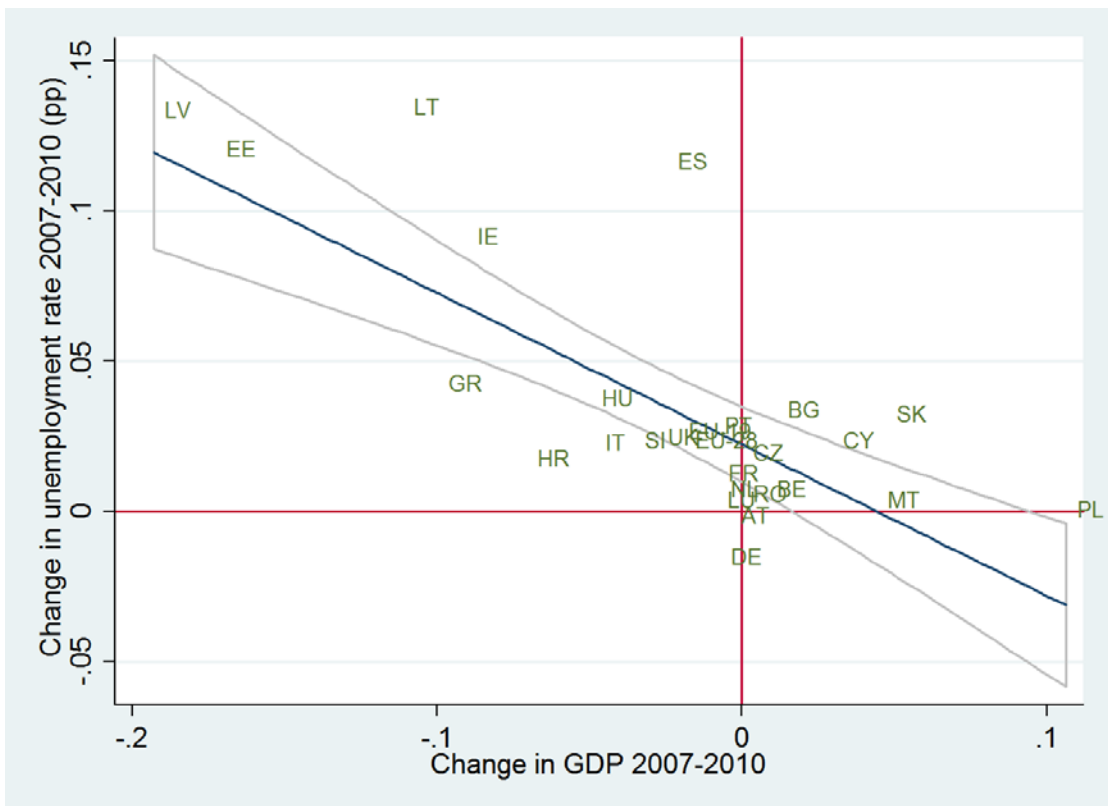
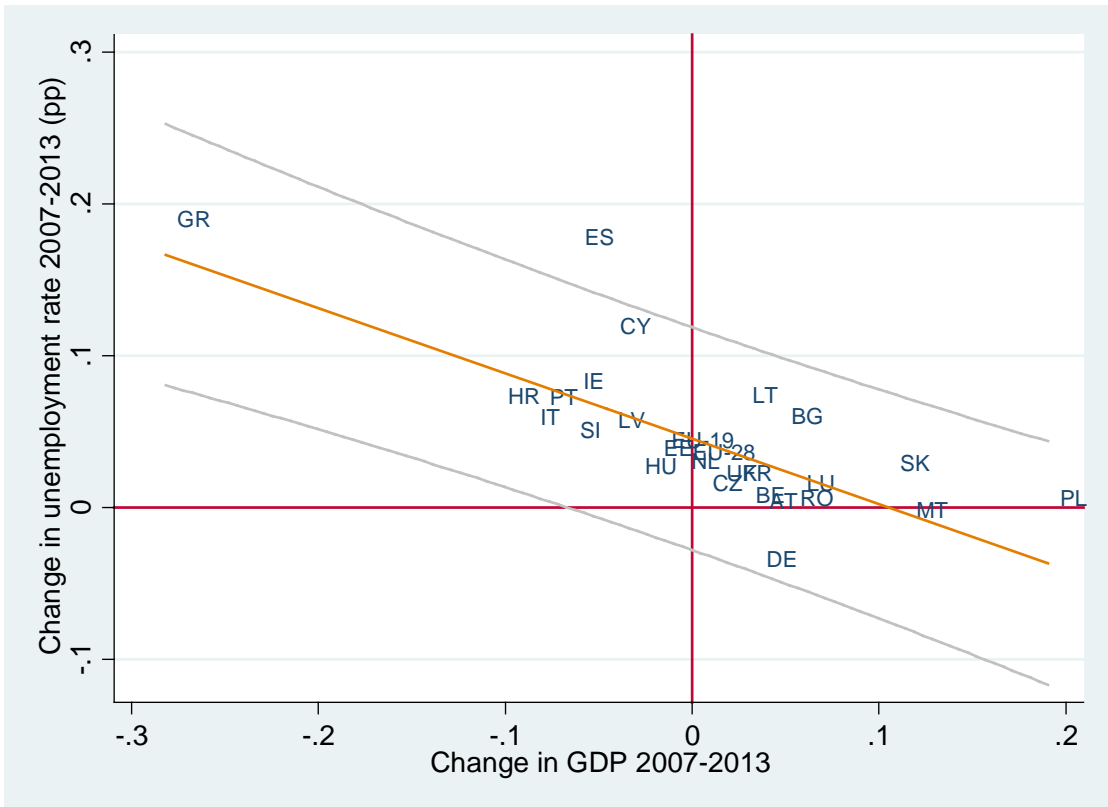
Source: Eurostat, National accounts and EU-LFS.

Thus, Chart 3a led us to propose a simple taxonomy of countries in regards to their unemployment and GDP performance during the European sovereign debt crisis (2010-2013):

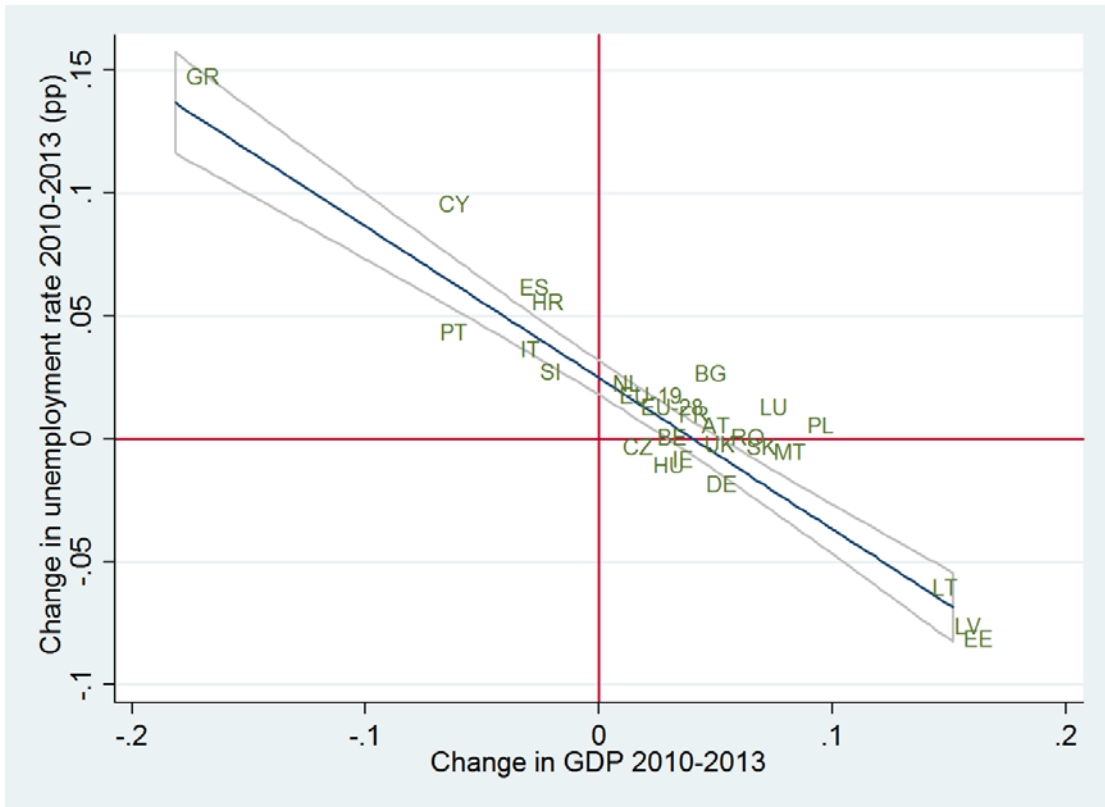
- *Group I:* countries where the unemployment rate decreased and GDP increased (the Czech Republic, Germany, Estonia, Ireland, Lithuania, Latvia, Hungary, Malta, Slovakia and the United Kingdom)
- *Group II:* countries where the unemployment rate increased even though GDP increased (Austria, Belgium,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



**Chart 3a. GDP growth (dGDP) and change in unemployment rates (dU)**



**Chart 3a. GDP growth (dGDP) and change in unemployment rates (dU)**



**Chart 3b. Changes in GDP and in unemployment by country groupings**

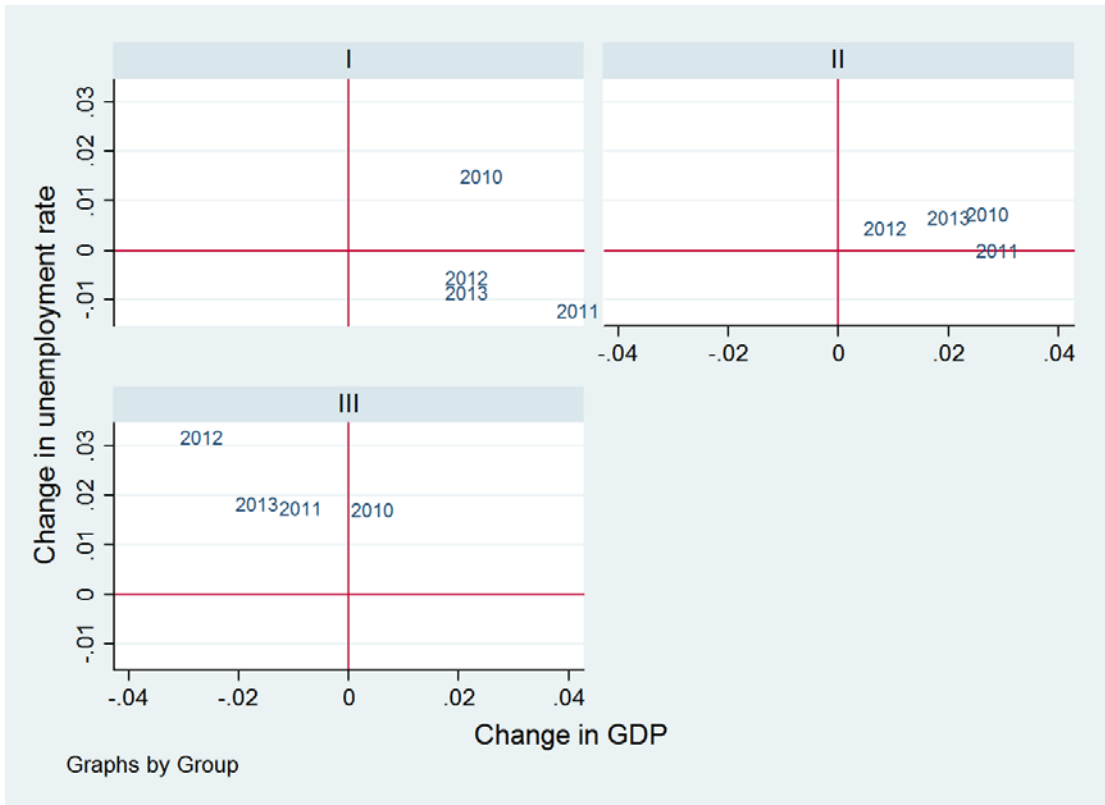


Chart 3b provides the year-to-year average changes in GDP and the unemployment rate by these country groupings. While the differences between the averages of Groups I and II are larger in terms of changes in unemployment than GDP growth, the yearly averages of changes in GDP across countries of Group III are clearly smaller, while the same averages for changes in unemployment rates are much larger than those corresponding to the other two groups.

There are several potential factors that can 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 will differ across countries. Countries may also differ in the margins of adjustment (eg, labour input vs. wages; intensive vs. extensive margin), as labour market institutions conditioning the adjustments are very different across countries, and this will have implications for the speed at which shocks are propagated through the economy and their overall persistence. In the rest of the paper, we will rely on the classification suggested by Chart 3a when we 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 we could have classified the different countries based on, say, labour market institutions or whether or not they were subject to an IMF/EU adjustment programme, we decided to stick to this classification given its simplicity and clarity and the way it summarises the different experiences of these countries between 2010 and 2013.

### **3. Demand shocks and limited access to finance in Europe during 2010-2013**

WDN3 provides qualitative information on firms' perceptions of the nature, size, and persistence of shocks hitting them during the period 2010-2013. (For a subset of some countries this information is also available for the period 2008-2010.) The information on the sources of shocks is wide. 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. For each shock firms must refer to the 'the most significant changes' taking place over the reference period and are required to report 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' and 2 and 4 being, respectively, 'Moderate Decrease' and 'Moderate Increase'.<sup>7</sup>

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<sup>7</sup> In the case of the questions about unavailability of credit and availability of credit at high costs the scale is from 1 ('Not relevant') to 4 ('Very relevant') with 2 and 3 being, respectively, 'Of little relevance' and 'Relevant'.

In what follows, we summarise the average sizes of several shocks as perceived by firms (weighted by employment).<sup>8</sup> We normalise the scale to 0 being ‘No change’, so that negative (positive) values correspond to negative (positive) shocks. The averages for each country are computed after controlling for firm size and sector, considering only firms in the private sector with at least five employees.<sup>9</sup>

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,<sup>10</sup> customers’ ability to pay and availability of supplies (averages by country, after removing size and sector effects). It is evident from the Chart that in Group III countries, in which unemployment increased and GDP decreased, negative demand, negative finance and worsening customers’ ability to pay had a higher incidence. Group I countries instead experienced an expansion in demand and, in general, they also faced improvements in access to finance and in customers’ ability to pay. Group II countries are in an intermediate position for almost all types of shocks. Finally, availability of supplies worsened for all countries (except for the United Kingdom) so it is unlikely that this kind of shock can help us to explain cross-country heterogeneity in labour market adjustments. Of course, these shocks are correlated with each other. In particular, the shock concerning customers’ ability to pay is highly correlated with both access to finance and demand shocks (correlation coefficients equal to 0.37 and 0.44, respectively), while the variable measuring availability of supplies correlates with all other shocks (with a correlation coefficient of around 0.30). Therefore, in the rest of the paper we will focus only on shocks to the level of demand (total) and difficulties in accessing external financing.

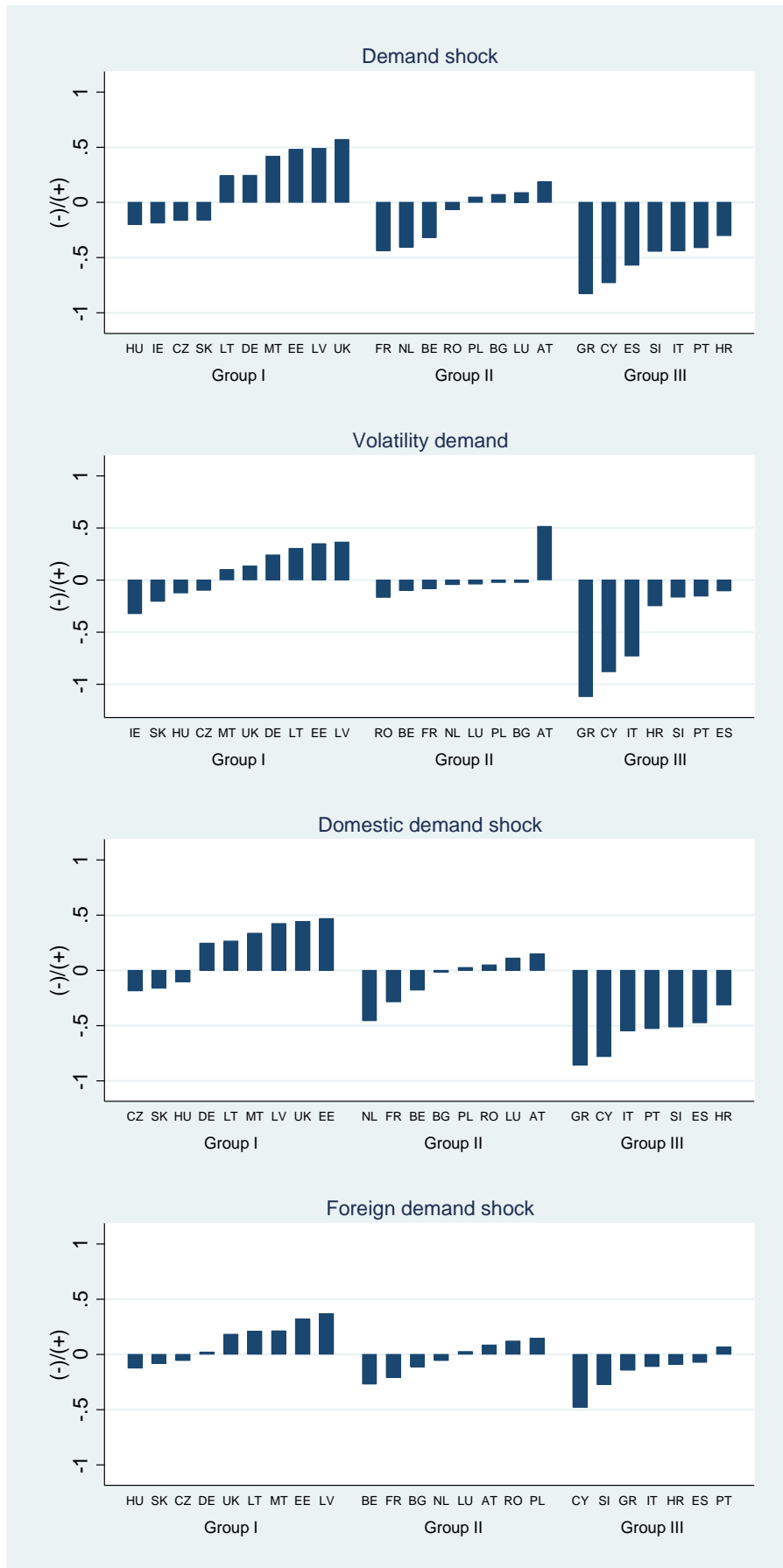
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<sup>8</sup> Means are weighted by the employment weights provided by the survey, except for Ireland for which only basic weights are available.

<sup>9</sup> This cut off is likely to be important in some countries where a reasonable proportion of firms have fewer than five employees. But, even where this is the case, such firms represent a small proportion of total employment and so the results are likely to be robust to this issue.

<sup>10</sup> Financing costs are just an indirect measure of the shock received by firms. In a 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.

**Chart 4. Shocks as perceived by firms**



**Chart 4. Shocks as perceived by firms  
(continued)**

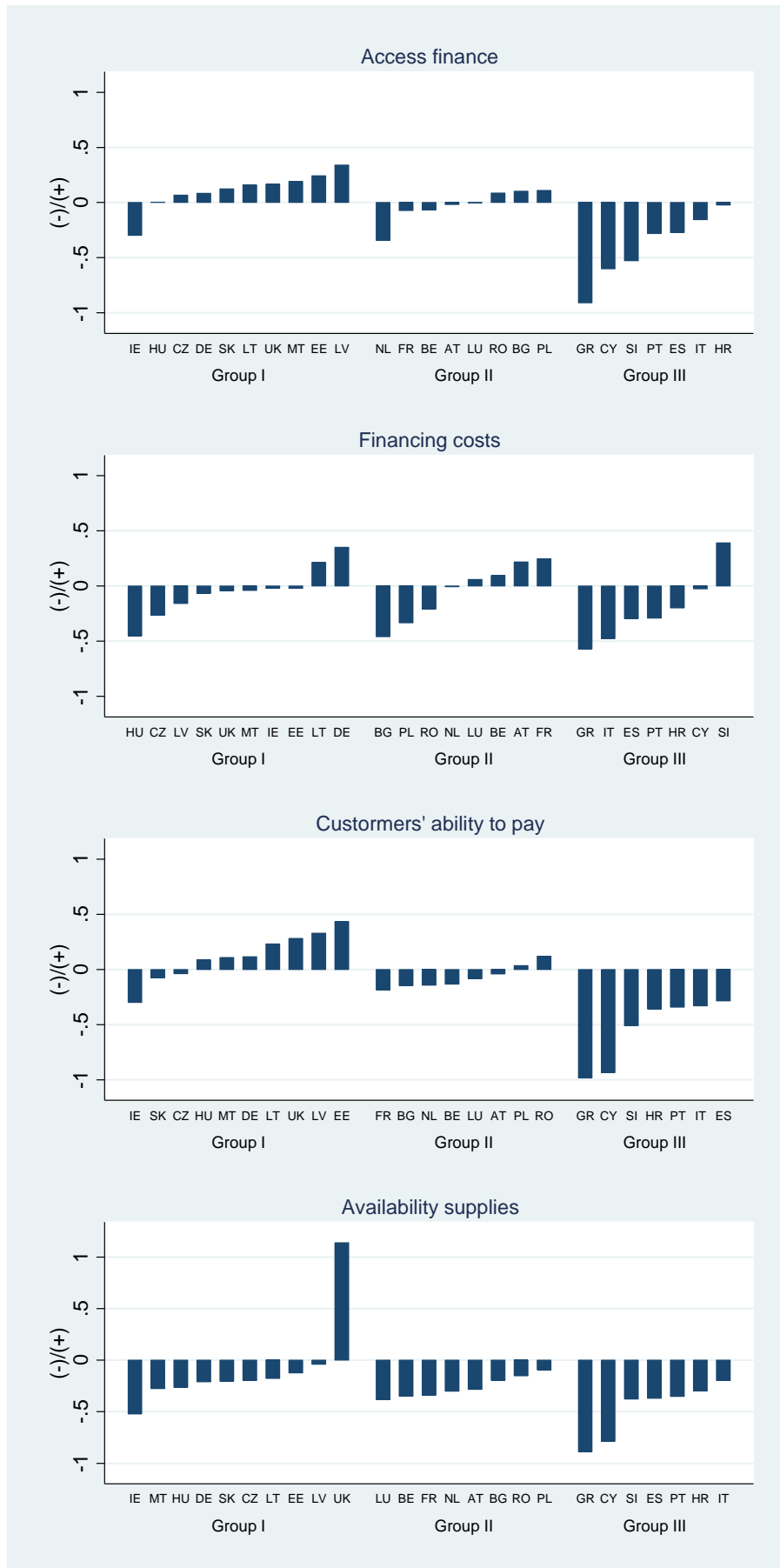
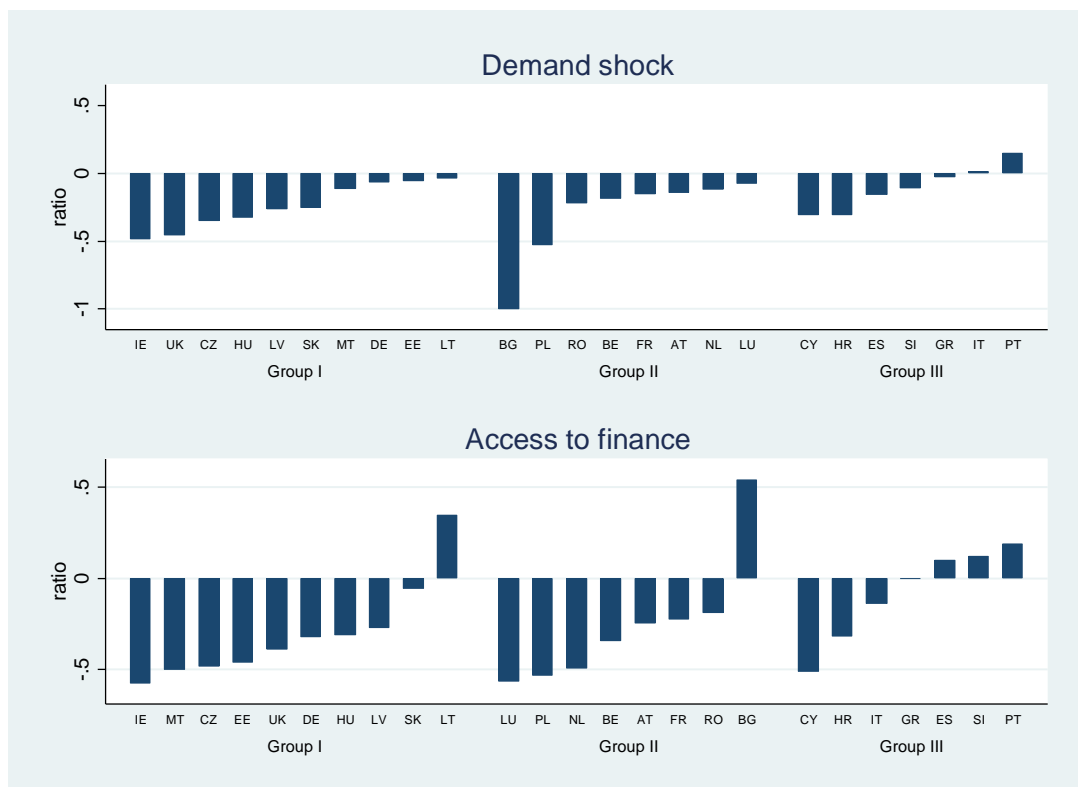


Chart 5 provides some information on the incidence of negative shocks to demand and access to finance across firm size and sectors. We look at two size classes – large firms, ie, 50+, and small firms, ie, 5-50 – and three sectors: industry (NACE Rev. 2 sectors C through E), construction (NACE Rev. 2 sector F), and private services (NACE Rev. 2 sectors G through N and S). For each subgroup we calculate the average probability of reporting a negative shock to demand and access to finance. The upper part of Chart 5 reports the deviation from unity of the ratio of the average probabilities of suffering the corresponding shock in large vs. small firms. Positive values signal that the ratio is larger than one, ie, that the shock is more frequent among large firms. The other two panels of Chart 5 compare the incidence of shocks in the service sector vis-a-vis the industrial sectors and in the service sector vis-a-vis construction. Chart 5 clearly shows that negative shocks mostly affected small firms, and firms in the construction sectors. This is somehow expected, as these firms are more exposed to domestic demand weakness and 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. By sector, firms in the industrial sector were affected by credit constraints in most Group III countries while the opposite is observed in Group I countries.

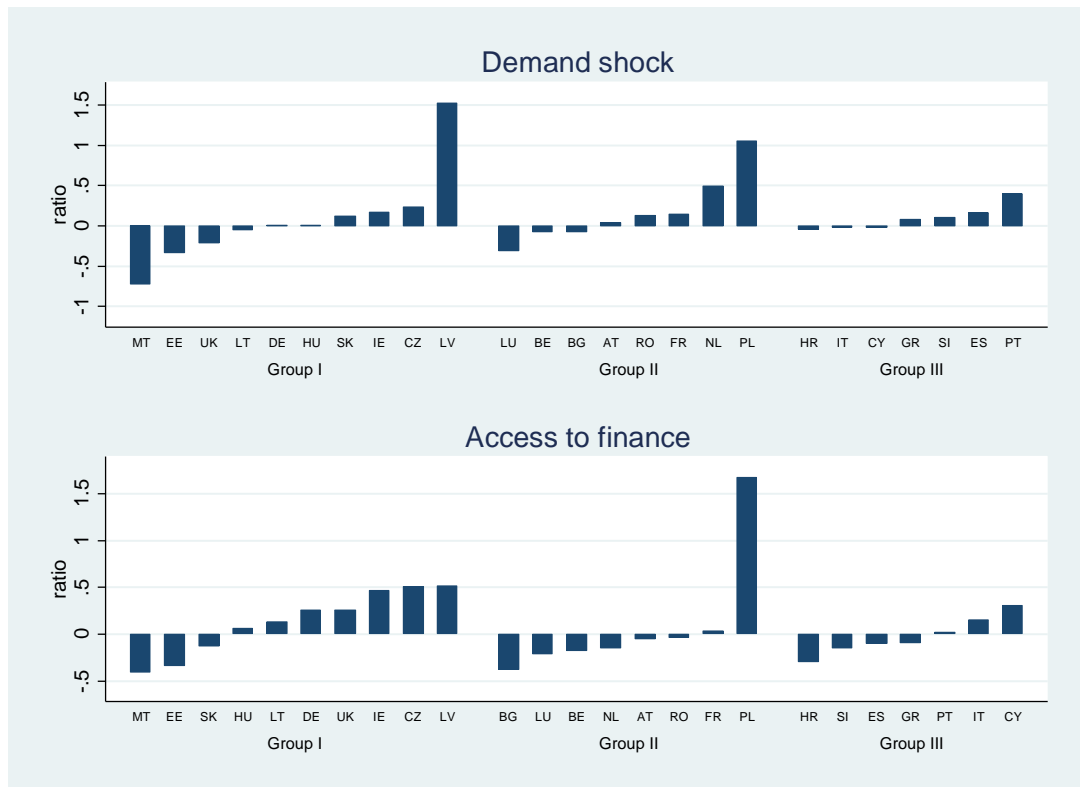
**Chart 5. Shocks and firms' composition**  
**Large vs. small firms (Total Economy).**

Difference between the ratio of the average probability of large firms suffering the indicated shock over that of small firms and unity. Values higher than 0 signal that the probability is higher for large firms than for small ones.



**Chart 5 (continued).**  
**Services vs. Industry (excluding construction).**

Difference between the ratio of the average probabilities of suffering the indicated shock in service and industrial sectors, and unity. Values higher than 0 signal that the probability is higher for firms in the service sector than firms in the industrial sector.

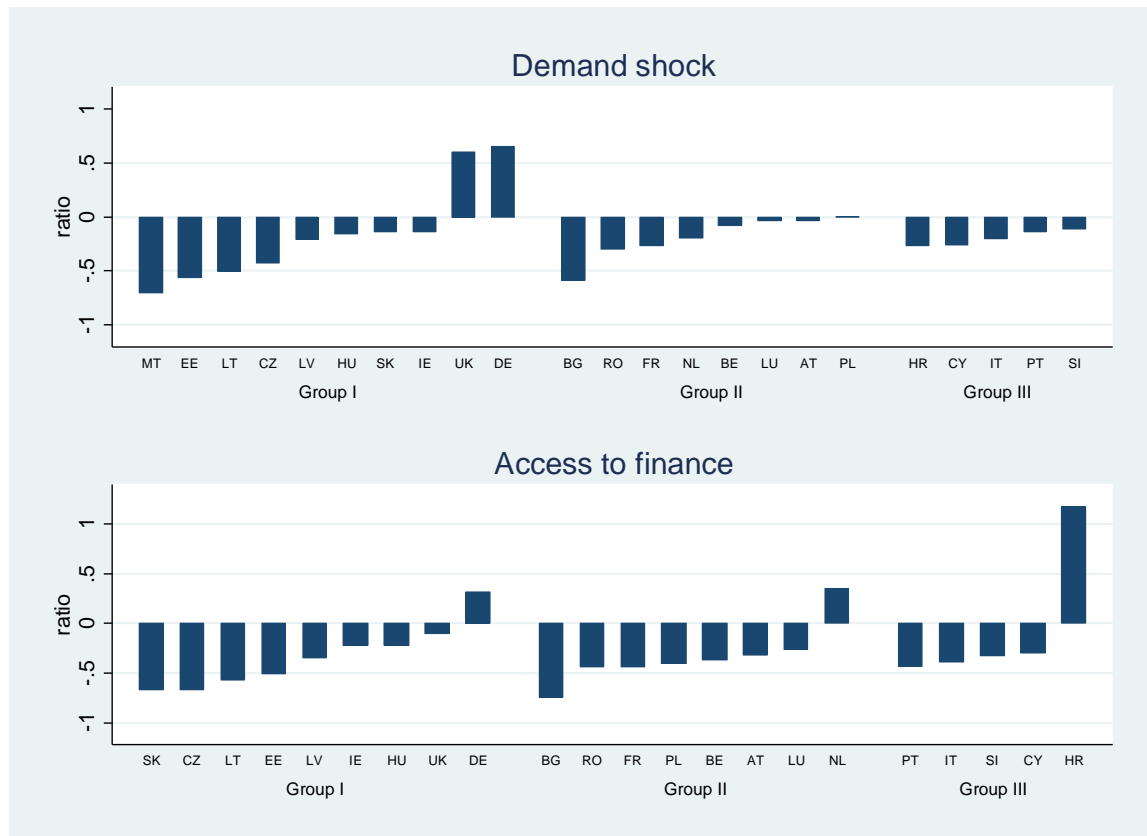


Source: WDN3



**Chart 5 (continued).**  
**Services vs. construction.**

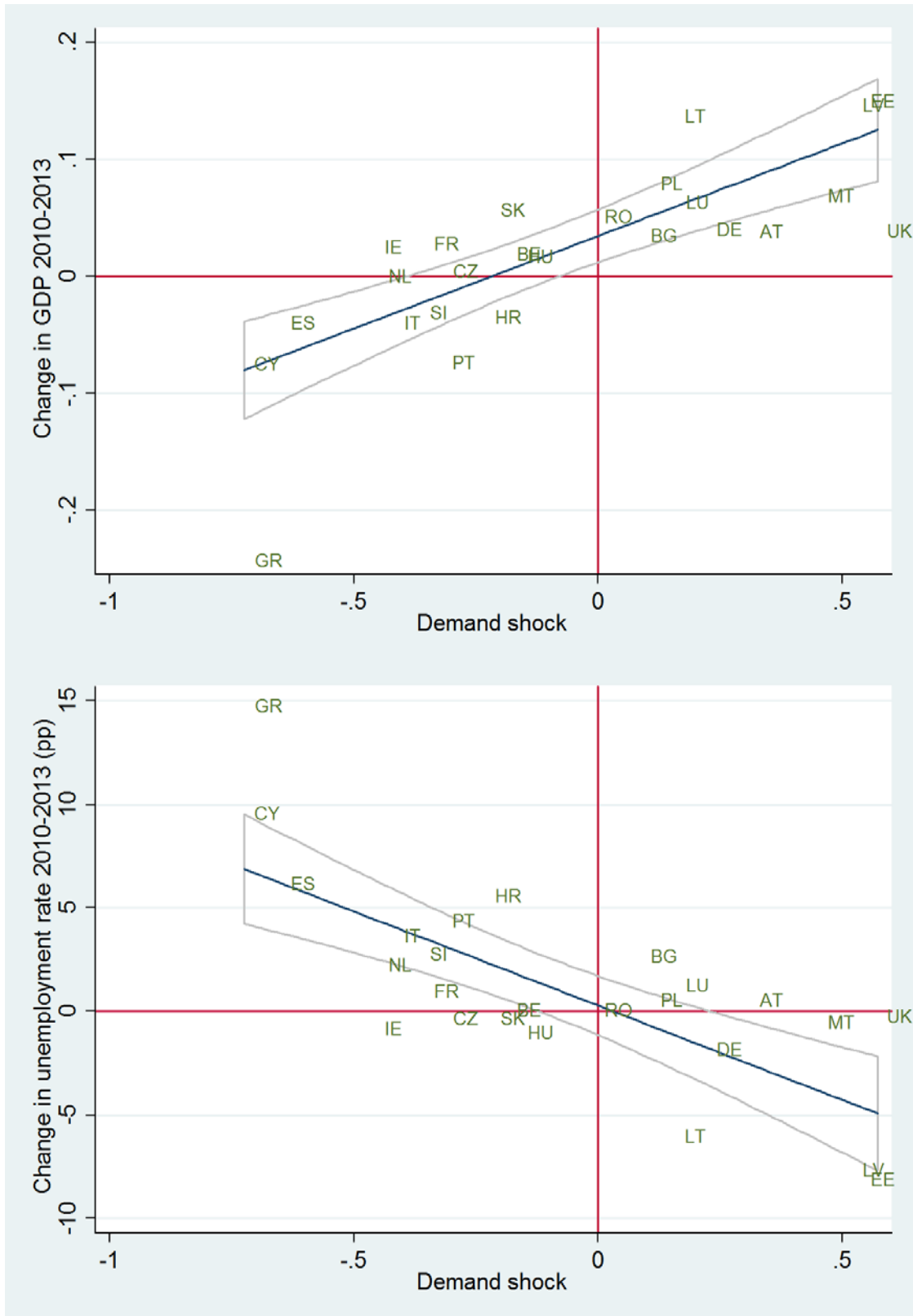
Difference between the ratio of the average probabilities of suffering the indicated shock in services and construction sector, and unity. Values higher than 0 signal that the probability is higher for firms in the service sector than firms in the construction sector.



Source: WDN3

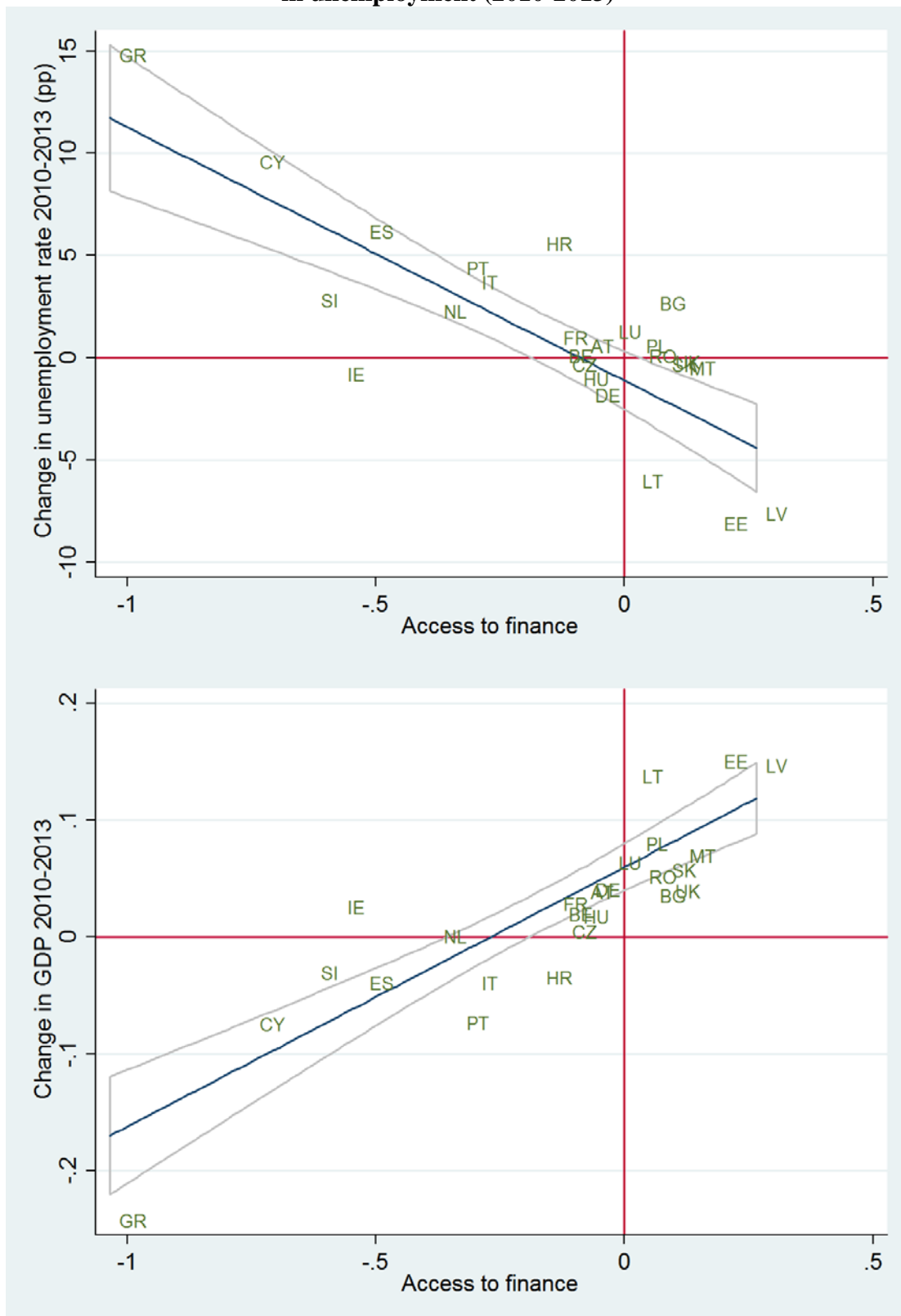
A concern is that this qualitative information regarding firms' perceptions of economic conditions is not useful, since it is often not related to the actual change in economic conditions. In the case of the information provided by WDN3 we frequently found a strong correlation between measures of shocks and actual changes in GDP and in unemployment across countries. Chart 6 provides these correlations for two different types of shocks: demand and access to external finance (measured as described above). Additionally, Table 1 provides the results from simple OLS cross-country regressions of these two macro variables on the WDN3 measures of shocks, which suggests that indeed there is 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 unemployment. These correlations also suggest that the microdata of the survey can be used to explain at least part of the cross-country heterogeneity observed in Europe during the crisis. (See also Boeri and Jimeno (2016).)

**Chart 6a. Firms' perceptions of the demand shock and changes in GDP and in unemployment (2010-2013)**



Source: Boeri and Jimeno (2016), based on WDN3

**Chart 6b. Firms' perceptions of access to external finance and changes in GDP and in unemployment (2010-2013)<sup>(1)</sup>**



Source: Boeri and Jimeno (2016), based on WDN3.

<sup>(1)</sup> The index measuring access to external finance has been multiplied by -1 and higher values indicate lower difficulties in accessing to finance.

**Table 1. Changes in GDP and in unemployment rates (2010-2013) and shocks**

	Unemployment		Adjusted R-squared	GDP		Adjusted R-squared
	Coefficients			Coefficients		
	Slope	Constant		Slope	Constant	
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 parenthesis

#### 4. Firms' reaction to the shocks: Labour cost adjustments

The size, intensity and variety of shocks affecting European firms between 2010 and 2013 caused deep changes in the economic structure of countries and 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. In this paper we focus on the analysis of firms' reactions in terms of labour cost. WDN3 provides unique data for this purpose. It can also be viewed as an important source of information to evaluate many other relevant issues, like 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 moment of collecting the data, 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 cost, namely employment (including working hours) and wages with a focus on the incidence of layoffs as employment adjustment mechanism,<sup>11</sup> whereas the next section is devoted to wage adjustment.

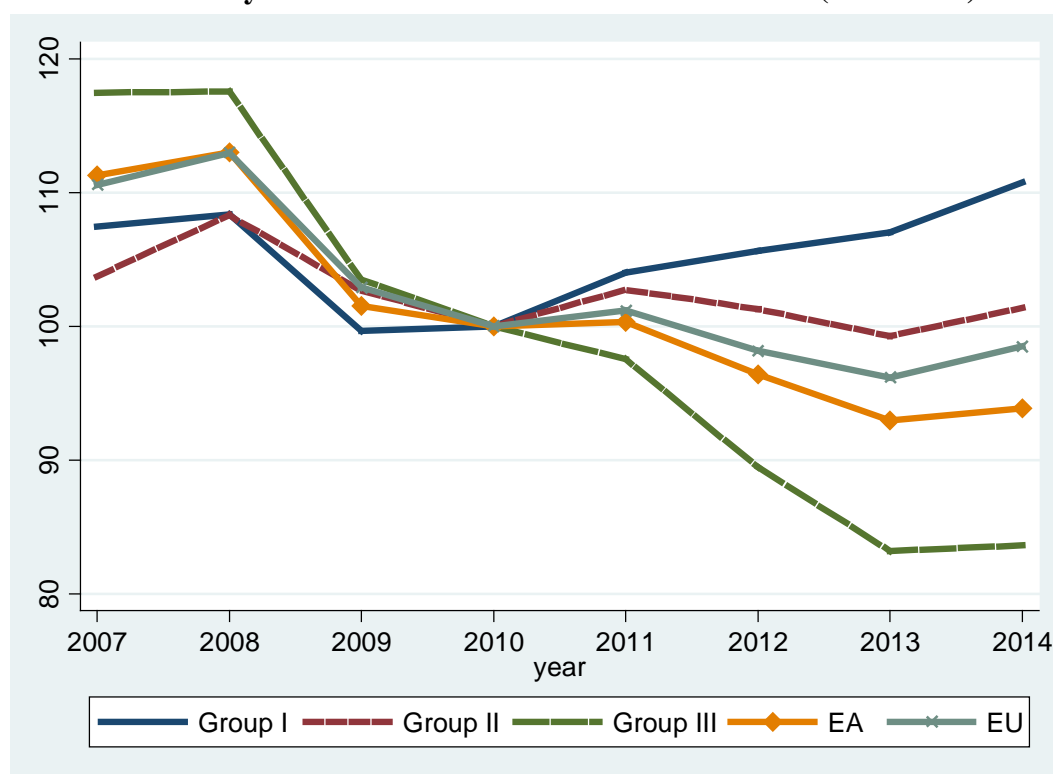
##### 4.1. Labour cost adjustments: A macroeconomic view

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. Hours adjustment is not influenced by changes in the participation rate or in the intensive use of labour and can offer a direct measure of the reduction of labour input in European private-sector firms. Once again the figure confirms the high degree of heterogeneity across country groups: Group III countries severely reduced labour input

<sup>11</sup> For a detailed analysis of credit restrictions and labour costs, see also Bodnár *et al.* (2016).

from 2010 to 2013 (before it stabilised in 2014). In countries classified as ‘Group I’, after an increase in 2011 labour input stabilised. Group II countries registered a modest fall.

**Chart 7. Dynamics of hours worked in EU countries (2007-2014)**

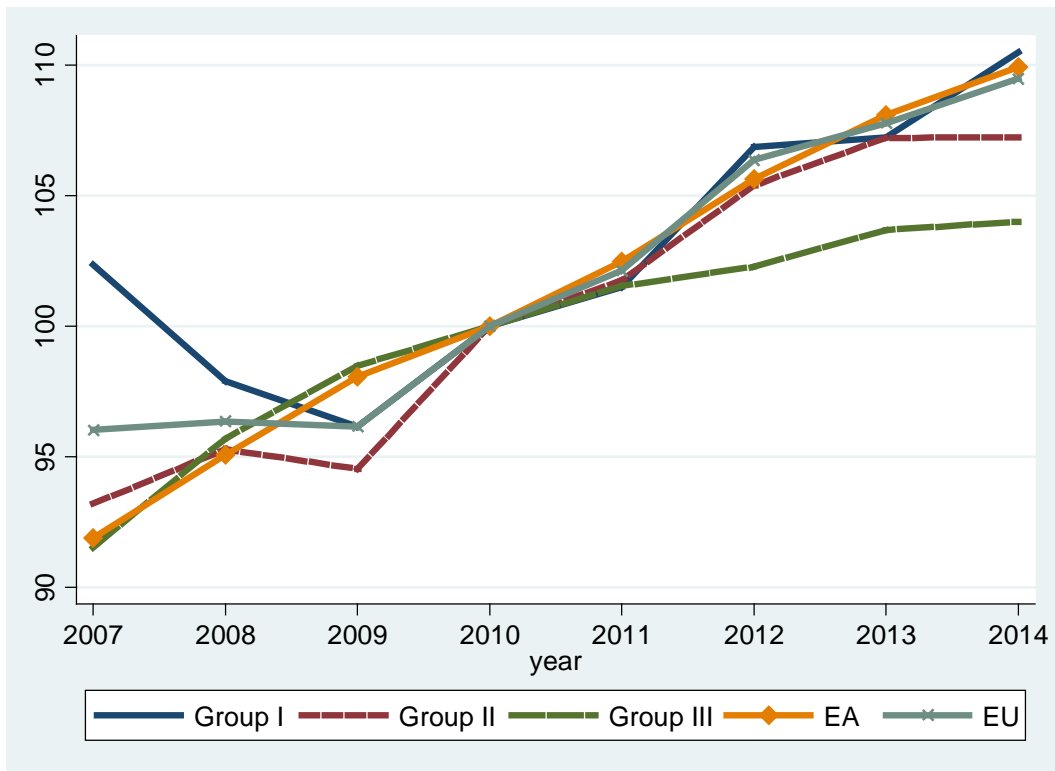


**Source:** Eurostat. **Note:** Each data point is an index calculated by setting the value recorded in 2010 equal to 100.

The dynamics of nominal and real hourly wages during the period that we are considering were, in contrast, rather homogeneous across countries (Charts 8a and 8b), although Group III countries show a weaker wage evolution after 2011. Nominal hourly wages rose continuously until 2013, with the exception of 2008-2009 when they declined in Group I countries (because of some policies undertaken in the Baltic countries), in the United Kingdom and in Ireland. Real wages – ie, nominal hourly wages deflated by HICP – stagnated almost everywhere after 2010.<sup>12</sup> 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 European labour market. This hypothesis will be more closely investigated in the next section. The potential impact of downward nominal wage rigidities is discussed in section 5.

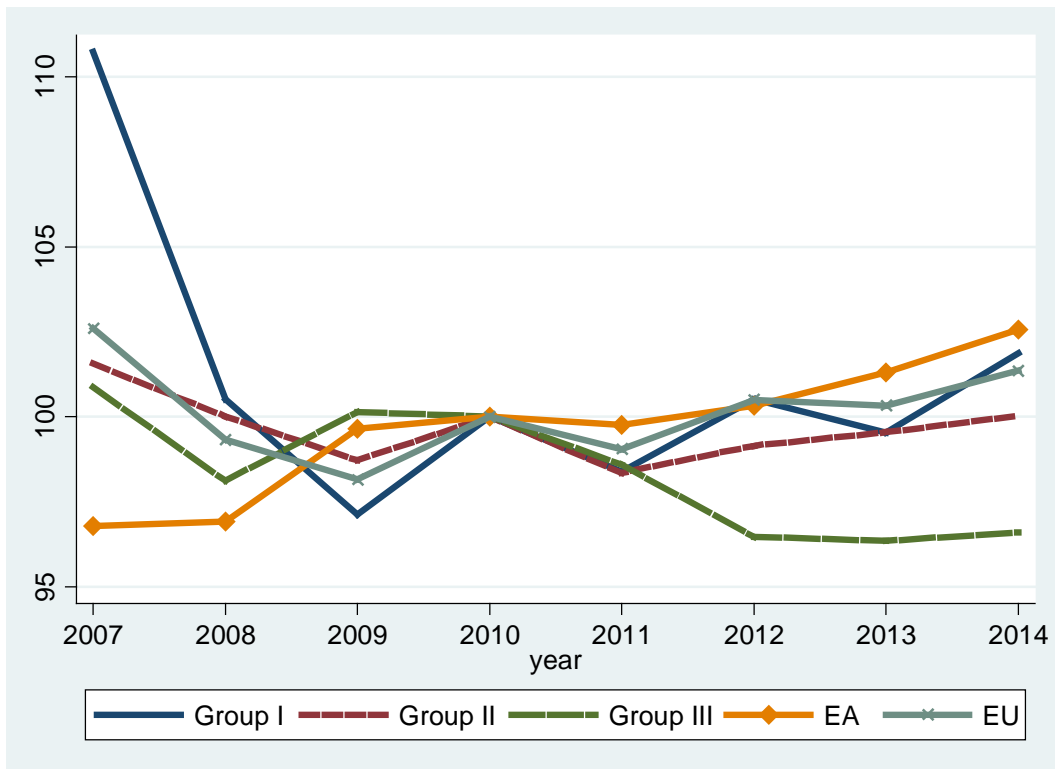
<sup>12</sup> A remarkable exception is Germany where real wages have increased significantly since 2010.

**Chart 8a. Dynamics of nominal hourly wages in EU countries (2007-2014)**



**Source:** Eurostat. **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 (2007-2014)**



**Source:** Eurostat. **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 allows us to check empirically whether these adjustments (quite strong for labour input, rather 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 required to report whether, during the period 2010-2013, they registered: (a) a strong reduction; (b) a moderate reduction; (c) no change; (d) a moderate increase; or (e) a strong increase.

For each component of labour costs we ran a linear regression, where the dependent variables are dummies indicating a strong or moderate decrease in the corresponding outcome. We include sector and size dummies, dummies for country groups, and two dummies indicating a strong/moderate negative shock to demand and strong/moderate difficulties to access finance. Shocks are also interacted with the dummies indicating the country groups. The results concerning employment adjustments are reported in Table 2; those about 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 accessing finance.<sup>13</sup>

First, as expected, demand shocks are highly correlated with negative adjustments in permanent employment (ie, 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. Difficulties in access to finance have an additional positive impact on adjustment of permanent workers (column 2), even if the size of the effect is smaller than for demand shocks. This first piece of evidence suggests the size of the shock played a role in explaining the more intense reaction of employment in Group III with respect to Groups I and II. Demand and credit shocks are also positively correlated with the probability of reducing temporary workers and hours per employees. Interestingly firms in Group II countries, ie, countries where unemployment continued to grow after 2010, have a lower probability of reducing labour input on the intensive margin in response to a demand shock. This might explain why in these countries the probability of reducing labour input on the extensive margin was relatively high.

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<sup>13</sup> In this simple exercise, we do not take into account potential interactions between different types of labour input adjustment after a shock

**Table 2. Changes in labour input and shocks. Linear regressions**

	(1)	(2)	(3)	(4)	(5)	(6)
	Reduction in permanent workers		Reduction in temporary workers		Reduction in hours per employee	
Demand shock	0.211*** (8.802)	0.202*** (8.326)	0.127*** (6.052)	0.117*** (5.574)	0.137*** (7.066)	0.131*** (6.751)
Dem.shock*Group II	0.110*** (3.337)	0.104*** (3.080)	0.008 (0.265)	0.012 (0.388)	-0.057** (-2.350)	0.066*** (-2.747)
Dem.shock*Group III	-0.016 (-0.305)	-0.036 (-0.710)	0.028 (0.532)	0.002 (0.047)	0.006 (0.136)	-0.009 (-0.210)
Access finance		0.060** (2.222)		0.068*** (2.859)		0.042** (1.993)
Access fin.*Group II		0.013 (0.310)		-0.037 (-1.038)		0.033 (1.037)
Access fin.*Group III		0.046 (0.816)		0.060 (1.069)		0.036 (0.723)
Observations	23215	23215	23215	23215	23215	23215

Robust z-statistics in parentheses; \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. Weighted regressions (wl).

**Table 3. Changes in wages and shocks. Linear regressions.**

	(1)	(2)	(3)	(4)
	Reduction in base wage		Reduction in flexible wage component	
Demand shock	0.075*** (5.924)	0.070*** (5.790)	0.133*** (7.304)	0.127*** (6.881)
Dem.shock*Group II	-0.034** (-2.015)	-0.034** (-1.970)	-0.006 (-0.241)	-0.013 (-0.493)
Dem.shock*Group III	-0.085*** (-2.781)	-0.092*** (-2.891)	0.012 (0.272)	-0.018 (-0.422)
Access finance		0.039*** (2.931)		0.043** (2.266)
Access fin.* Group II		-0.015 (-0.699)		0.021 (0.666)
Access fin.* Group III		0.006 (0.210)		0.090* (1.761)
Observations	23215	23215	23215	23215

Robust z-statistics in parentheses; \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. Weighted regressions (wl).

Heterogeneity across groups of countries emerges clearly also when we consider adjustments in base wages. Compared with countries in Group I, firms in ‘increasing unemployment’ countries (Group II and especially Group III) are less likely to adjust base wages in case of a demand shock. In particular Group III countries did not cut wages at all, signalling the presence of downward wage rigidities. The response of firms to an increase in the difficulty of accessing finance is instead homogenous across groups: flexible wage components were adjusted more homogeneously 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 conditional on having reported a negative shock to demand or access to finance. In the last column, we report the average number of instruments used.

Of course, 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 the groups of countries.

Concerning the use of each instrument, 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 as compared to the other two groups. It is important to note, however, that individual layoffs are more prevalent than collective layoffs across all countries (apart from Italy), even in countries where firing costs are high.

Temporary layoffs are not present in all countries, but tend to be more used by firms in Group II and Group III countries. Only a few countries allow for subsidised reduction of hours: this is the case of Germany where this method was used by one out of three firms hit by a shock and by Italy, where the share reached 65.4%. Finally, a large share of firms in almost all countries stopped new hires.<sup>14</sup> If we look at the propensity to use the different instruments, we can conclude that 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 service sector, where human capital is less firm-specific, firms more often laid off workers instead of adjusting the intensive margin of labour.

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<sup>14</sup> This means that firms were not benefitting 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. Adjustments of employment.**  
**Proportion of firms experiencing a negative shock to demand or access to finance that used each instrument (2010-2013)**

	Collective layoffs	Individual layoffs	Temporary layoffs	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 hires	Reduction of agency workers and others	Average number of instruments used
Group 1										
CZ	18.2	59.7		9.0	19.0	47.1	13.9	64.9	27.3	2.6
DE	9.0	43.4		35.0	28.5	32.3	16.6	51.0	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	11.0	6.7	12.5	22.1	13.6	35.5	12.2	1.6
IE	18.8	36.0	17.3	16.8	35.0	18.8	5.6	52.3	17.8	2.2
LT	2.0z	20.3			9.4	19.9	2.0	28.2	7.8	0.9
LV	11.3	38.6			33.3	17.3	1.9	39.0	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	13.0	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 2										
AT	15.1	33.9	15.6	5.3	32.5	2.6	2.8	55.0	41.0	2.0
BE	9.6	43.2	47.2	6.1	12.9	30.6	18.9	71.3	41.1	2.8
BG	26.0	56.2	36.7	14.3	11.8	23.5	7.6	59.5	10.4	2.5
FR	20.5	38.0	5.8	13.5	26.7	46.6	5.7	73.9	51.2	2.8
LU	3.9	39.0	5.7	7.1	13.8	33.2	8.3	52.5	41.4	2.0
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	25.0	53.7	15.6	11.8	30.5	34.7	12.1	65.7	20.5	2.7
Group 3										
CY	22.7	37.4	13.2	4.4	25.0	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	7.0	62.0	24.4	1.9
HR	24.2	47.0	9.0	3.5	22.8	43.4	36.0	43.4	28.9	2.6
IT	40.4	23.0		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	47.0	19.7	51.2	20.1	2.3
Averages										
Group 1	16.5	49.1	2.9	27.4	24.2	29.2	11.7	50.9	20.7	2.2
Group 2	17.1	43.3	11.5	9.3	20.9	45.6	10.4	68.6	43.9	2.7
Group 3	26.7	36.6	19.2	39.6	26.3	49.1	16.9	62.6	35.2	3.0

Source: WDN3.

## 5. Wage adjustments

The data collected by the three waves of the WDN survey make it possible to analyse whether the practices of wage adjustment have changed during the economic crisis. We focus 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.<sup>15</sup>

### *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, obtaining a good overview of collective bargaining is difficult given the scarcity of comparable information.<sup>16</sup> 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 that enables us 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 on 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 remarkably across our three groups of countries. The countries belonging to 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.<sup>17</sup> It is noteworthy that these differences are not only apparent when comparing the group averages but apply to almost all individual countries belonging to each group, with only a few exceptions such as Bulgaria and Poland, which, while being in Group II, have very low bargaining coverage and collective bargaining agreements are mostly signed at the firm level.

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<sup>15</sup> A number of papers use WDN3 data examine in detail wage adjustment issues and their relationship with institutions and incidence of shock. See Marotzke *et al.* (2017), Lamo *et al.* (2016), Babecky *et al.* (2016).

<sup>16</sup> An exception is the database in Visser(2016) For the euro area see also ECB (2012) and du Caju *et al.* (2008).

<sup>17</sup> The indicator of centralisation is the incidence of collective bargaining agreements that are signed outside the firm, ie, at the sectoral, national or occupational level (second and sixth columns, Table 5).



**Table 5. Collective bargaining coverage, WDN1 and WDN3, by countries**

	WDN1 (2007)				WDN3 (2014)			
	Share of firms with collective bargaining agreements (%)			Collective bargaining coverage (% of employees)	Share of firms with collective bargaining agreements (%)			Collective bargaining coverage (% of employees)
	Firm level	Outside the firm	Firm level or outside		Firm level	Outside the firm	Firm level or outside	
<b>Group I countries</b>								
Czech Republic	51.4	17.5	54.0	50.2	30.6	10.0	39.0	33.2
Germany					16.1	47.2	56.9	48.3
Estonia	10.4	3.4	12.1	8.7	10.1	2.0	11.3	8.2
Hungary	19.0	0.0	19.0	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	16.0
Malta					31.0	0.5	31.0	23.8
Slovak Republic	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	44.0	35.3
<b>Group II countries</b>								
Austria	23.4	96.2	97.8	94.5	27.4	88.0	98.8	80.4
Belgium	35.3	97.9	99.4	87.8	30.8	63.0	72.0	94.4
Bulgaria					21.8	7.0	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	57.0	43.7	25.1	33.4	54.9	54.0
Netherlands	30.1	45.4	75.5	67.6	51.5	54.6	79.7	90.0
Poland	21.4	4.7	22.9	19.3	17.9	1.0	20.9	20.9
Romania					69.4	7.7	73.0	71.6
Total, group II					33.1	56.6	72.5	76.0
<b>Group III countries</b>								
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	31.0	77.3	95.2	96.3
Greece	20.9	85.8	93.4	91.0	26.2	42.8	60.1	71.4
Croatia					35.4	23.3	45.2	47.1
Italy	42.9	99.6	99.6	97.0	60.4	89.0	99.5	99.0
Portugal	9.6	58.8	61.9	55.3	13.0	62.2	66.3	62.5
Slovenia	25.7	74.3	100.0		57.9	75.9	86.9	79.4
Total, group III					39.3	78.9	91.1	90.8
Total (WDN3)					26.8	50.02	63.7	60.7
Total (WDN1)	33.3	64.6	76.0	67.4	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-response. Total (WDN1) refers to the averages across countries that participated in WDN1.

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 2007–2009 (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 likely 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 tendency. The average incidence of union agreements across the surveyed countries has been stable, and collective bargaining coverage has increased between 2007 and 2013. However, the average trends are masking strongly divergent developments across individual countries. Collective bargaining coverage has substantially declined in some countries (eg, Ireland and the Czech Republic) while it has increased in others (eg, 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 the 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 of the countries (Greece, Spain and Italy).

## **5.2. Frequency of wage changes**

One of the most relevant features of wage-setting for macroeconomic analysis is the degree of wage inertia. Wages are sticky and react with lags to economic shocks. This inertial wage behaviour is an important factor influencing the employment and output adjustments to, for instance, demand and productivity shocks and the transmission of monetary policy, among other important macroeconomic issues. (See Altissimo *et al.* (2006).) The frequency of wage changes provides a measure of the extent to which wages are sticky. This measure is often used in the literature and policy analysis.<sup>18</sup> WDN3 explicitly asked firms about the frequency of base wage changes for their main occupational group. Respondents could choose from the following options: more than once a year; once a year; once every two years; less frequently than once every two years; and never/don’t know. A similar question was included in WDN1 in 2007. This

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<sup>18</sup> The frequency of wage changes is an essential ingredient in the calibration of standard DSGE models with staggered adjustment mechanisms that are widely used for monetary policy analysis. (See, among others, Woodford (2003), Gali *et al.* (2003) and Smets and Wouters (2003).)

enables us to compare firms' behaviour during the period 2010-13 with that during the economic stability period prior to 2007. Tables 6a-b summarise the replies, grouping the potential answers into: (1) more frequently than once a year, (2) once a year, (3) less frequently than once a year, and (4) never/not applicable.

**Table 6a. Frequency of wage changes, WDN1 and WDN3, by countries**

Country	WDN1				WDN3			
	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 (%)
<b>Group I countries</b>								
Czech Republic	11.5	64.1	23	1.4	1.3	28.6	53.9	16.2
Germany	-	-	-	-	2.6	38.5	54.8	4.0
Estonia	19.9	64.4	10.5	5.2	3.0	39.7	50.4	6.9
Hungary	2.6	75.0	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	44.0	7.5	6.4	9.8	19.9	46.6	23.6
Malta	-	-	-	-	7.3	92.7	0.0	0.0
Slovak Republic	-	-	-	-	3.0	46.3	39.5	11.2
United Kingdom	-	-	-	-	0.8	71.1	25.4	2.7
Total, group I					2.0	49.6	42.7	5.7
<b>Group II countries</b>								
Austria	6.8	84.2	5.9	3.1	2.6	82.6	12.2	2.6
Belgium	22.0	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	7.0	93.0	-	-	21.0	46.2	24.3	8.4
Netherlands	10.8	70.1	17.0	2.1	8.2	51.4	30.4	10.0
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
<b>Group III countries</b>								
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	-	-	-	-	3.0	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	38.0	34.1
Slovenia	27.2	65.6	5.9	1.3	3.7	23.5	49.0	23.8
Total, group III					2.6	31.4	46.1	19.9
Non-Euro-Area	14.0	59.5	23.2	3.3	2.0	57.1	34.5	6.4
Euro-Area	11.4	59.5	26.4	2.7	5.0	43.9	41.6	9.6
Total	12.1	59.5	25.6	2.9	4.0	48.0	39.6	8.6
Total (WDN1)	-	-	-	-	5.3	45.3	37.5	11.9

**Sources:** Druant *et al.* (2012); authors' calculations on the basis of WDN1 and WDN3.

**Notes:** Figures are weighted to reflect overall employment and rescaled to exclude non-response. Total (WDN1) refers to the averages across countries that participated in WDN1 in 2007. In the WDN1 data, the split between frequencies of wage changes has to be

interpreted differently for Greece and Cyprus, as the options never/don't know were not allowed in the Greek and Cypriot questionnaire. Results for Greece, Cyprus and Luxembourg are not included in the WDN1 aggregate.

In the countries in our sample, firms most typically change wages once a year (see Table 6a). Around 88% of firms in the 25 EU countries of our 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 it more frequently than once a year. We observe a higher frequency of wage changes 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 of 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 strata of firm size is roughly 5%.

**Table 6b. Frequency of wage changes across sectors, WDN3 (2010-2013)**

Sector	More frequently than once a year (%)	Once a year (%)	Less frequently than once a year (%)	Never/not applicable (%)
Manufacturing <sup>(a)</sup>	3.9	47.9	39.8	8.6
Electricity, gas, water <sup>(b)</sup>	0.6	38.7	49.4	11.4
Construction <sup>(c)</sup>	7.7	40.7	41.7	10.0
Trade <sup>(d)</sup>	3.3	48.5	38.2	9.9
Business Services <sup>(e)</sup>	4.1	48.1	40.2	7.6
Financial Intermediation <sup>(f)</sup>	1.8	63.5	30.5	4.1
Total	4.0	47.8	39.4	8.6

Size	More frequently than once a year (%)	Once a year (%)	Less frequently than once a year (%)	Never/not applicable (%)
5-19 Employees	3.4	35.2	47.4	14.1
20-49 Employees	3.9	40.0	44.6	11.5
50-199 Employees	3.7	48.0	40.3	7.8
200+ Employees	4.5	55.7	34.0	5.9
Total	4.0	47.8	39.4	8.6

**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 L through N; (f) NACE Rev. 2 sector K.

The frequency of wage changes was lower during 2010-2013 than in the pre-crisis period, displayed 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.<sup>19</sup> The estimated average duration of wage spells (ie, the number of months for which wages remain unchanged) in 2007 was 15 months, while during 2010-2013 the average duration among the surveyed firms in the whole sample of 25 countries was 17 months.<sup>20</sup> This general reduction in the frequency of wage changes is observed basically in every country, and is most noticeable in France, the Czech Republic, Estonia, Slovenia and Spain.

The large cross-country differences in the frequency of wage changes during 2010-2013, and the reduction in frequency relative to the pre-crisis period, can be attributed to institutional features.<sup>21</sup> 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 be calling for a wage reduction, 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.<sup>22</sup>

### **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. Therefore few cuts together with a large amount of freezes are 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.<sup>23</sup> 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 distributions of wage changes across individual workers (eg,

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<sup>19</sup> See Druant *et al.* (2012) for evidence on the frequency of wage changes in the pre-crisis period using data from WDN1.

<sup>20</sup> 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 to the pre-crisis period.

<sup>21</sup> 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).

<sup>22</sup> See Lamo *et al.* (2016)

<sup>23</sup> Tobin (1972) claimed that if nominal wages are downwardly rigid, a certain amount of positive inflation may be needed to ease firm real wage adjustment (ie, inflation may 'grease the wheels' of the economy).

Dickens *et al.* (2007)) or sectors (eg, 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.

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 them to adjust employment rather than wages, thus contributing to job destruction.<sup>24</sup>

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 even if increasing nominal wages raises 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.<sup>25</sup>

The WDN survey, in its three waves, 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 had led firms to adjust labour in response to the shocks during 2008-2009, and the current report provides evidence on DNWR for the period of 2010-2013, drawn from WDN3.

Although all three waves of the WDN survey collected information on wage cuts and freezes from similar and comparable questions, the duration of the reference period for this block of questions differed across waves. In WDN1 it was asked whether wages were cut or frozen during the five-year period prior to the survey, ie, mid-2002 to mid-2006 (we refer to it as 2002-2006), which was a period of economic stability. 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, 2010–2013.

Since the reference periods have different lengths, the incidence of wage cuts and freezes cannot be directly compared across surveys. We display both annual cuts and

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<sup>24</sup> Besides 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 the firms' cash flows more sensitive to aggregate shocks and riskier.

<sup>25</sup> In fact, 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).

freezes and also the percentages of firms that have cut and frozen wages at least once during the period 2010-2013. The reference period of 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 surveyed countries in each WDN wave.

**Table 7a. Percentage of firms having cut wages over the period 2002-2013, by country**

Country	WDN1	WDN2	WDN3				
	2002-2007*	2008-2009**	2010-2013***	2010	2011	2012	2013
<b>Group I countries</b>							
Czech Republic	8.4	9.0	6.8	3.4	3.0	2.9	3.1
Germany	-	-	3.5	1.6	1.3	1.1	0.9
Estonia	3.0	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	-	10.0	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	1.0
<b>Group II countries</b>							
Austria	3.0	1.5	3.0	2.3	2.3	2.7	2.5
Belgium	3.1	1.0	1.4	0.9	0.0	0.0	0.5
Bulgaria	-	-	6.0	2.1	2.0	2.9	4.3
France	2.5	2.1	1.2	0.0	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	4.0	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
<b>Group III countries</b>							
Cyprus	-	1.8	37.5	0.6	4.1	9.0	33.7
Spain	0.06	2.8	7.5	1.5	1.0	3.4	4.2
Greece	-	-	54.6	8.3	17.5	35.4	28.0
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	1.0	-	6.7	1.8	3.9	4.6	3.8
Slovenia	2.5	-	13.0	4.0	3.6	6.7	7.7
Total, group III	-	-	8.0	1.6	2.2	4.2	4.7
Non-EA countries	5.1	7.2	5.1	2.7	1.5	1.6	1.6
EA countries	1.3	2.2	4.3	1.4	1.3	1.9	2.0

Total	2.3	3.1	4.5	1.8	1.3	1.8	1.9
Total (WDN1)			4.3	1.2	1.2	2.0	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-response. Figures for Malta have been excluded from the table. \* at least once over the period 2002-2007 (defined as such, due to the structure of the WDN 2007 survey per se), \*\*at least once over the period 2008-2009 (defined as such, due to the structure of the WDN 2009 survey per se), \*\*\*at least once over the period 2010-2013 (consisting of firms that replied 'yes' at least once to the relevant question, posed separately for years 2010, 2011, 2012, and 2013). Total (WDN1) refers to the averages across countries that participated in the WDN 2007 survey.

**Table 7b. Wage cuts and shocks over the period 2002-2013, 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
<b>Group I countries</b>				
Czech Republic	6.8	10.6	17.7	17.0
Germany	3.5	4.3	7.6	0.0
Estonia	12.4	23.5	11.0	31.1
Hungary	1.2	2.5	3.7	11.9
Ireland	23.1	28.7	31.0	33.3
Lithuania	10.0	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	17.0
Total, group I	4.8	5.7	10.0	18.6
<b>Group II countries</b>				
Austria	3.0	2.2	2.6	0.0
Belgium	1.4	0.8	2.1	0.0
Bulgaria	5.0	11.9	21.8	14.4
France	1.2	2.0	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	3.0	4.2	3.3
<b>Group III countries</b>				
Cyprus	37.5	45.0	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	70.0
Italy	2.3	2.6	4.6	11.4
Portugal	6.7	9.2	14.6	16.0
Slovenia	13.0	17.0	23.9	25.6
Total, group III	8.0	10.2	13.4	21.7
Non-EA countries	5.1	6.3	11.0	17.3
EA countries	4.3	5.7	8.90	12.4
Total	4.5	5.8	9.2	13.4

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

**Notes:** Figures weighted to reflect overall employment and rescaled to exclude non-response. 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 2008–2009 are provided in Fabiani *et al.* (2015).<sup>26</sup> 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 2010–2013 ranged from 1.3% to 1.9% of firms.<sup>27</sup> This indicates that wage cuts became only moderately more common after the Great Recession than in the pre-crisis period, but less than in 2008–9. There is, however remarkable 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 from group III, in contrast with those in group II where wage cuts were particularly rare. The evidence on cuts complemented with the evidence on wage freezes reveals the prevalence of DNWR in the 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.<sup>28</sup> 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.<sup>29</sup> See Chart 9 for country information.

**Chart 9. Percentage of firms having frozen wages over the period 2002–2013, by country**

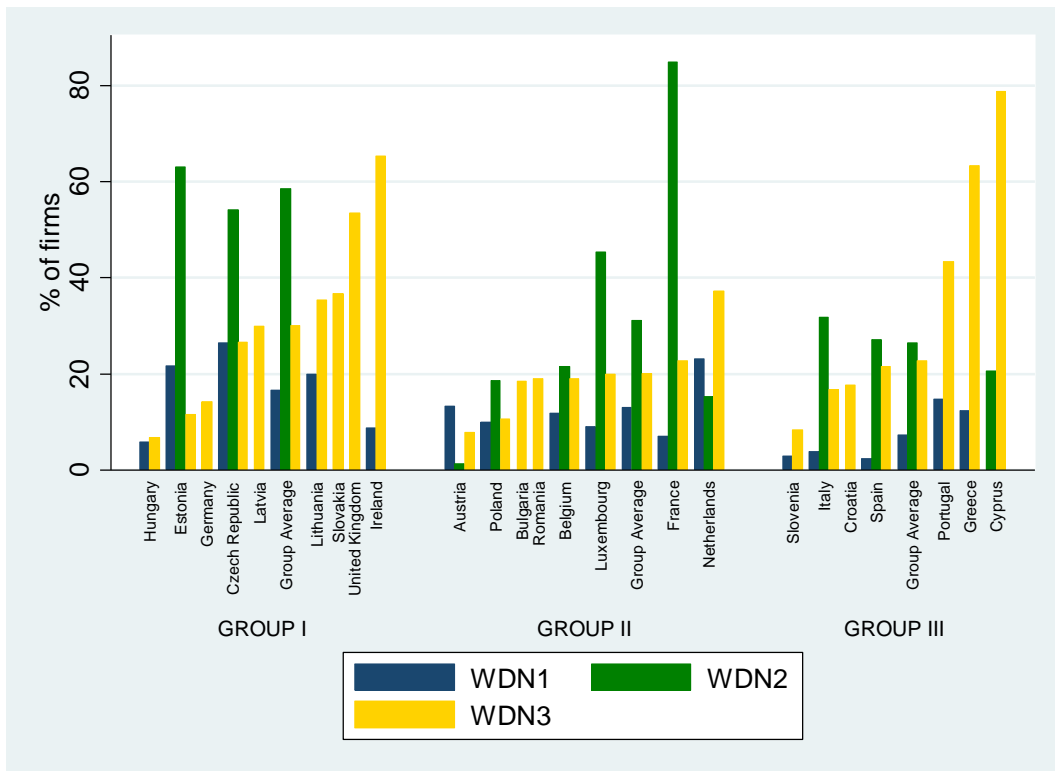
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<sup>26</sup> Cuts were severe as well in other countries that were not included in the WDN2 sample, eg, Latvia, Lithuania and Ireland.

<sup>27</sup> 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.

<sup>28</sup> Indeed, it is likely that negative demand shocks shifted to the left the wage change distribution.

<sup>29</sup> Another 35% of firms indicated their intention to freeze wages in the future.



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

**Notes:** Figures are weighted to reflect overall employment and rescaled to exclude non-response. WDN3 figures for Ireland are unweighted.\* at least once over the period (mid) 2002-mid 2007 (defined as such, due to the structure of WDN1), \*\*at least once over the period mid-2008-mid-2009 (defined as such, due to the structure of WDN2), \*\*\*at least once over the period 2010-2013 (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 WDN 2007

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

To assess in a synthetic manner the extent of downward nominal wage rigidity (DNWR) we combine the evidence on wage cuts and wage freezes using the measure proposed by Dickens *et al.* (2007). This measure is based on the assumption that every employee whose nominal wage was frozen would have had a nominal wage cut in the absence of DNWR. The Dickens *et al.* (2007) measure of DWR is:

$$\text{DNWR} = \frac{f}{f+c}$$

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 a firm to cut their wages, ie, the fraction of workers subject to DNWR. In the absence of DNWR there would be no wage freezes and  $\text{DNWR} = 0$ , whereas if all wage cuts were prevented then  $\text{DNWR} = 1$ .

The above-proposed measure is 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 for a certain percentage of workers even in the absence of DNWR. To assess this proportion of optimal freezes in the absence of DNWR one would need to know 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, we use the conservative measure of DNWR shown above.<sup>30</sup>

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

The comparison of pre-crisis years with the post-Great-Recession period (2010–2013) implies that DNWR has become a more binding constraint for the firms.<sup>31</sup> The average value of the Dickens *et al.* measure of DNWR on the basis of WDN1 was 0.81. By contrast, during the years 2010–2013 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 surveyed countries the average wage growth declined in 2010–2013 compared to the pre-crisis

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<sup>30</sup> The simulations which are based on the assumption that under complete flexibility wage changes are normally distributed show that the bias in the Dickens *et al.* measure is relatively small and declines when the estimates approach 1. The adjusted measures of DNWR where it is assumed that only 50% of wage freezes represent prevented cuts yield similar analytical implications to the ones that are based on the original measures provided in Table 8.

<sup>31</sup> Recent studies also support this; see for example Anderton *et al.* (2016), and Anderton and Bonthuis (2015).

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.

**Table 8. Downward nominal wage rigidity, measure by Dickens et al (2007)**

	Downward nominal wage rigidity					
	WDN1 (2002 – 2006)	WDN2 (2008-2009)	WDN3			
			2010	2011	2012	2013
<b>Group I countries</b>						
Czech Republic	0.89	0.93	0.89	0.90	0.90	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	0.90	0.88
Latvia			0.79	0.95	0.92	0.94
Lithuania	0.81		0.86	0.96	0.92	0.93
Slovak Republic			0.83	0.96	1.00	0.96
United Kingdom	-	-	0.84	0.85	0.77	0.71
Total, group I	-	-	0.85	0.86	0.81	0.78
<b>Group II countries</b>						
Austria	-	-	0.70	0.99	0.96	0.90
Belgium	0.90	0.98	0.90	1.00	1.00	0.99
Bulgaria	-	-	0.96	0.92	0.90	0.85
France	0.82	0.98	1.00	0.99	1.00	0.99
Luxembourg	0.87	1.00	0.99	0.96	0.99	0.99
Netherlands	0.99	0.91	0.99	1.00	0.99	0.98
Poland	0.74	0.87	0.95	0.95	0.95	0.93
Romania	-	-	0.91	0.94	0.90	0.87
Total, group II	-	-	0.96	0.98	0.98	0.97
<b>Group III countries</b>						
Cyprus	-	-	0.98	0.95	0.87	0.66
Spain	0.99	0.94	0.90	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 countries	0.86	0.95	0.88	0.90	0.87	0.86
Total (WDN1)	-	-	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 2010–2013 differ across the three country groups that we use in the current report. The measure remained mostly stable in this time period in the countries belonging to the first two groups. By contrast, it declined gradually throughout these years for most of the group III countries (the only exception being Portugal). The largest declines took place in the countries that were the most severely affected by the sovereign debt crisis, ie, Greece and Cyprus.

The evidence from WDN surveys 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 2008–2009 and to Greece and Cyprus in 2010–2013.

WDN2 did not cover most of the Group I countries and therefore the measures of DNWR for the Great Recession period are mostly missing. The coverage of the WDN3 survey starts with the year 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 during the following years. (This was the case in Estonia, Ireland, Latvia, Lithuania, the Slovak Republic, and the United Kingdom.) Based on this evidence it is likely that DNWR also declined in these countries during the Great Recession. (We only have evidence for Estonia that this was the case.)

The WDN-based assessment of DNWR supports the findings of earlier empirical studies, which have also shown that (nominal base) wage cuts are very rare.<sup>32</sup> Moreover, earlier studies have 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 (eg, Agell and Lundborg (1995)). The evidence based on the WDN surveys makes it possible to encompass also the countries that were under severe stress. We show that in the case 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?***

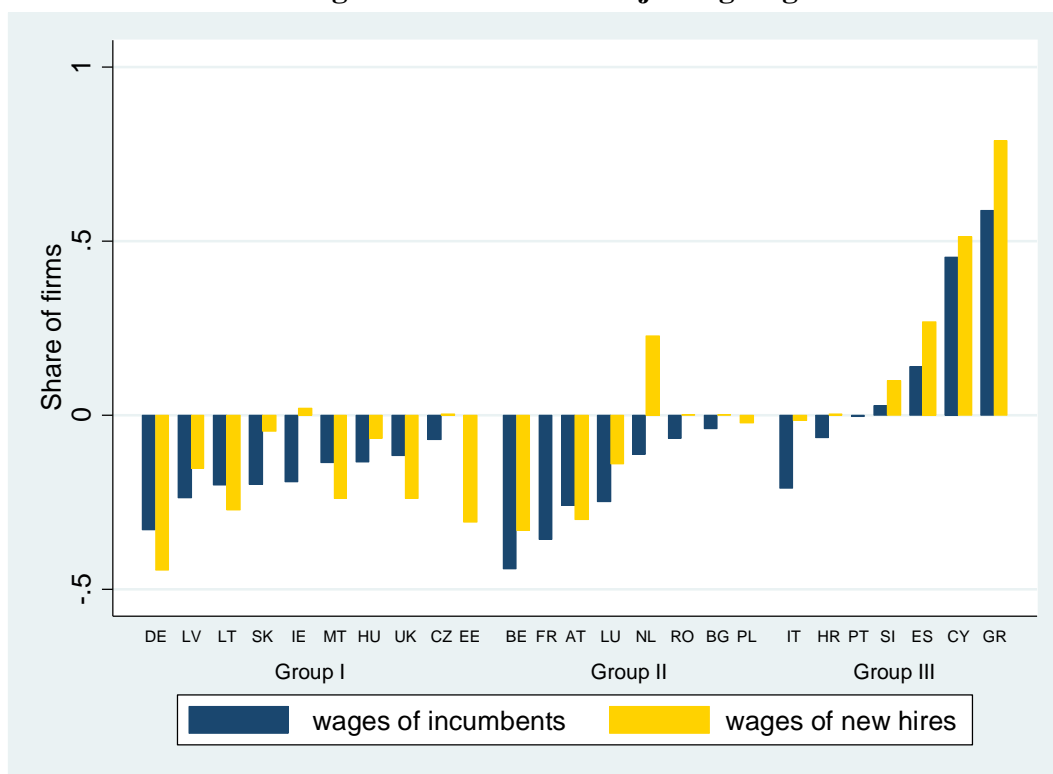
The WDN3 survey collected information from firms on whether the adjustment of labour costs via various margins was easier or more difficult in 2013 compared with the situation in 2010. Among other margins the survey also asked the firms to assess the adjustment of wages. The answers to this question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

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<sup>32</sup> This is shown eg, by Blinder and Choi (1990), Altonji and Devereux (1999), Bewley (1999), and Babecky *et al.* (2010, 2012).

Chart 10 provides an overview of the perceived change in the ease of adjusting wages across the sampled countries.<sup>33</sup> This graph displays the difference between the share of firm managers in whose opinion it became easier vs. more difficult to adjust wages in 2013 compared to 2010. The next section gives a full picture of these perceptions. Here we abstract from those firms that find it equally easy/difficult to adjust wages and focus on these firms that observe a change in difficulty. 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 vs. 2010 is larger than that of firms that found it easier. These answers are in accordance with the rest of the evidence from the WDN surveys (discussed in the previous sections), which showed that due to the moderation of wage growth and low inflation (real) wages have become more difficult to adjust.

**Chart 10. Perceived change in the easiness of adjusting wages from 2010 to 2013**



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

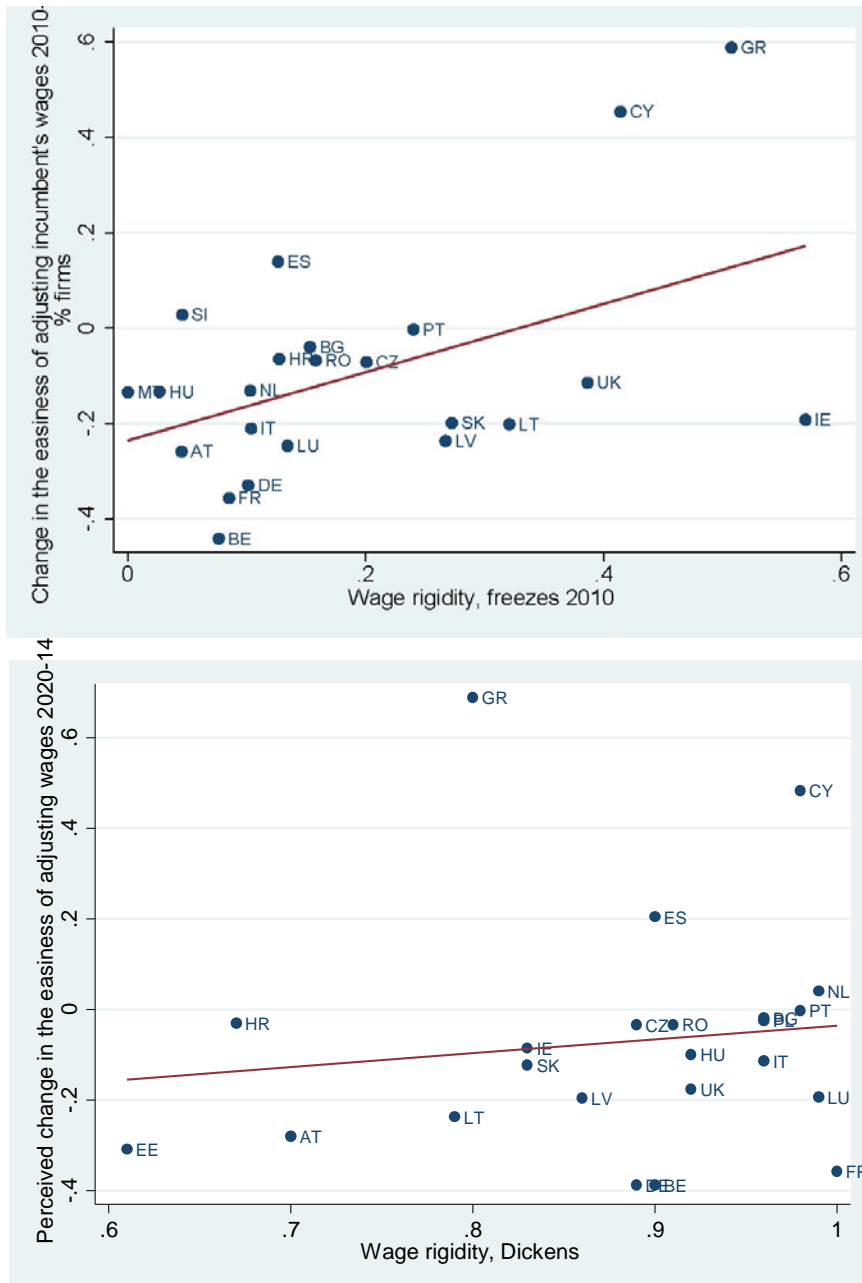
**Notes:** The figures show the percentage point difference between the proportion of firms indicating that it has become easier to adjust wages of incumbent workers (pay lower wages to new employees) and the share of firms saying that this has become more difficult.

In contrast, the share of firms from group III countries that found it easier to adjust wages in 2013 vs. 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 prevalent in Greece and Cyprus and Spain, and to a lesser extent also in Slovenia. Also in this case, firms' perceptions are correlated with other measures of wage rigidity based on the WDN

<sup>33</sup> A more detailed analysis of these perceptions adjusting both wages and employment is provided in the next section.

surveys. In particular, the Dickens measures of DNWR indicated that downward nominal wage rigidity declined in this time period in most of the countries belonging to group III and especially in Greece and Cyprus.

**Chart 11 Wage rigidity in 2010 vs. perceived change in the easiness 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 (indicators in Chart 10). The more rigid were wages at the beginning of the period the larger was the percentage of firms that perceive it easier (relative to these that find it more difficult) to adjust wages

in 2013, compared to 2010 (see Chart 11). This suggests a potential role for structural reforms lowering the initial rigidity and thus facilitating the adjustment. The next section explores in detail whether labour market institutions are perceived as constraints against or facilitators for adjusting to shocks, and in particular the role of the labour market reforms implemented during the 2010-2013 period.

## **6. Labour market reforms and remaining rigidities**

As we said earlier, 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 labour market institutions and employment policies as either constraints on or complements for adjusting to shocks. Moreover, in those countries where significant labour market reforms were implemented during the 2007-2010 period, there is also information on how firms perceive the main consequences of these reforms and on the remaining rigidities that they consider to continue distorting 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. Following the categorisation of countries we presented above, Table 9 gives the main changes in labour market institutions and employment policies that were implemented during the periods 2007-2010 and 2010-2013. We restrict the contents of the table 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 measures adopted also differed. If we could somehow provide a rough categorisation of measures/reforms we could say that during the initial phases of the crises, ie, 2007-2010, many countries adopted measures that aimed at maintaining employment and providing a safety net for the vulnerable. As the crisis progressed in those countries characterised by continuously disappointing labour market outcomes and structural inefficiencies more in-depth reforms were adopted with the aim of making labour markets more efficient – so reducing unemployment – and increasing competitiveness.

As Table 9 shows, in the Group I countries, where the unemployment rate seems to have been very little affected by the crisis, initially policy action involved measures to support the income of those affected, eg, extension of unemployment benefits (Latvia) and measures to maintain employment, eg, employment subsidies for new jobs (Slovakia), incentives to employers to employ younger workers (Lithuania) and recruit and train long-term unemployed (United Kingdom). Measures to enhance the use of short-time work (Germany) and training schemes to increase the employability of the

unemployed and enhance the skills of short-time workers during their period of short-time work were also adopted in some countries (Germany and Ireland).

**Table 9. Major labour market reforms across the EU**

	2007-2010	2010-2014
<b>Group I</b>		
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
Estonia	MW: increases in 2007 and 2008. EPL: Reform in 2009. UB: Increase in contributions in 2009.	CB: widening of opting-out clauses MW: increases in 2012, 2013 and 2014. UB: Decrease in contributions in 2013.
Germany	EP: Training programs for unemployed and short-term workers CB: Before the crisis (2004-2008), many collective agreements provided for working time corridors, working time accounts, and opening clauses for times of crisis. 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 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	CB: Extensions of CB agreements made easier CB: Sector specific minimum wages further disseminated by introducing generally binding minimum wages in further industries.
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
Ireland	UB: Duration and replacement rates reduced EP: Activation and re-skilling of the unemployed. Various training schemes for workers made redundant and short-time workers.	UB: Further reductions MW: Reduced
Latvia	UB: Extension	CB: Extension of sectoral agreements EPL: Extension of Atypical Contracts EP: Incentives to job creation and subsidies to new hires MW: Increases in hourly rate in 2011 and 2013
Lithuania	EP: Entrepreneurship scheme for the unemployed and incentives to employ younger workers. UB: Decrease of the replacement rate	EP: Voucher system for the training of the unemployed and new opportunities for vocational training. MW: Change in procedure for the determination of the minimum wage. EPL: Increasing the flexibility of temporary work agencies and temporary expansion of the valid reasons for fixed-term contracts.
Malta	EP: Initiatives to attract and retain people in the labour market, especially females.	EP: Initiatives to attract and retain people in the labour market, especially females.
Slovakia	MW: New indexation mechanism, giving social partners room to negotiate the increase. EPL: Adopting a more precise definition of dependent employment and limiting the renewal of fixed-term employment contracts. EP: Subsidies for new jobs.	EPL: Restrictions on maximum duration of fixed-term contracts and maximum number of renewals of fixed-term contracts. EPL: Reduction of dismissal costs. EP: Employers are offered a subsidy for full-time jobs offered to unemployed under 29 years old and over 50 years old.
UK	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. MW: minimum wage for an employee aged 22 or over rose from £5.52 in 2007 to £5.93 in 2010.	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. UB: In 2013, the government launched the Universal Credit, which represented a major reform of the benefit system, affecting in

## Group II

### Austria

UB: Strengthening activation policies  
EP: Youth employment packages and training provision to support employers and employees during short-time work.

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%.

EP: Young entrepreneur fund, hiring subsidies for elder workers and grants for the low skilled to access training.

### Belgium

UB: Temporary increased  
EPL: Extension of temporary lay-offs to employees (2009).  
Temporary reductions in working time schemes

UB: Reduced progressivity (first temporary, since 2012 permanently). Limitation of early exits from labour market  
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).  
EP: Allocating funds to programs seeking to encourage employers to create jobs (2008) and employment subsidies to employers for green jobs to be offered to unemployed (2010).  
EP: Measures to encounter 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).  
EP: Introduction of a new reason for terminating employment: if the employee receives a pension. (2010)  
EP: Supporting employers with 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 programs for the employed in order to improve their career development. (2009, 2010).  
EP: Extension of traineeship period for the youth that have no work experience and have completed their professional training the last 24 months (2010).

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).

EPL: Suspending the ability of an employer to terminate the employment of a worker that has acquired the right to a pension (2012)

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: Training and provision of grants to unemployed to start their own business (2012, 2013).

EP: Subsidised employment and training for people under the age of 29, people with disabilities and unemployed parents with children (2012)

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).

### France

EPL: Introduction of a new contract breach (*rupture conventionnelle*) which depends on both parts' agreement (2008).  
UB: Reform of the general scheme for social benefits to improve work incentives  
CB: Improving trade unions representation in negotiations (2008).

EPL: Creation of a personal account containing rights to train (2013). Easing firms' recovering by negotiations on wages and work time (2013-2015). Subsidies to hiring young workers under permanent contracts (2013).

UB: Higher social contributions on very short-term contracts (2013)

### Luxembourg

MW: Creation of an independent expert committee to limit minimum wage increases  
EPL: Changes in short-time work schemes (*extension of coverage, maximum duration and enhancement of entitlements*)  
EP: Extension of employment support contracts targeted at young workers. Financial aid to hire long-term unemployed: has been temporarily scaled up in 2010, until 2013.  
EPL: Unification of "blue-collar" and "white-collar" statutes.  
CB: The indexation scheme was (temporarily) changed on several occasions.

EPL: Extension and scaling up of short-time work provisions introduced in the previous period.

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 shall get a reasonable offer (job, apprenticeship or training) within four months of registration with the national employment agency ADEM.

UB: benefit entitlement linked to the compliance with obligations (such as the early registration at the public employment services, the active job-search or the acceptance of suitable job offers). Mutual obligations and rights are formalised in binding contracts.  
UB: Duration and replacement rates temporarily increased.

CB: In autumn 2010, the 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 twelve months had to elapse between two automatic wage hikes. This measure introduced a de facto cap of 2.5pp for the contribution of the wage indexation to year-on-year nominal wage growth. Fundamental reshaping of the public sector wage setting mechanism.

UB: Duration reduced

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.

EP: Improvement of activation and integration of the unemployed and of employment services in general

EP: Incentives for hiring young and older unemployed

EP: New regulation governing the length of unemployment

### Netherlands

EP: Increase of employment subsidies  
EPL: Extension of the duration of fixed-term contracts for youth

### Poland

UB: Increased  
EP: Action in the area of life-long learning and measures to improve the economic activity and employability of the unemployed and inactive.

	<p>EP: Programmes increasing the participation rate of persons over 50 (2008); cancellation of early pensions (2009).  EP: An anti-crises 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).</p>	<p>benefits has been introduced to rationalise the system. Instead of a flat benefit rate paid during the whole period, now payments are higher in the first 3 months after registration and then decrease by about 21%. The maximum period of payments has been reduced from 18 to 12 months but the minimum period has remained unchanged (6 months). (2010)</p>
<b>Romania</b>	<p>UB: Unemployment benefit duration increased while the eligibility criteria for the unemployment benefit were tightened and the unemployment benefit decreased.  EP: Increased financial support to employers offering training</p>	<p>UB: More control of refusal of job offers.  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.</p>
<b>Group III</b>		
<b>Croatia</b>		<p>EPL: Simplification of procedures for collective layoffs.  Flexibilisation of fixed-term and permanent contracts and working hours.</p>
<b>Cyprus</b>	<p>EP: Various training programs for the unemployed and the youth.</p>	<p>EP: Employment subsidies and various training programs.  MW: Suspension of wage indexation in the private sector  CB: Reductions of public sector employees wages</p>
<b>Greece</b>	<p>EP: Incentives to firms to hire unemployed people.  EP: Various training programmes and programmes of subsidised employment (2007-2009).  EP: Efforts to reduce early retirement, ie, by reducing the pension received by those retiring early -before the age of 60 (2008).</p>	<p>EPL: Lowering the threshold for collective dismissals (2010). 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 (2010-2011).  CB: Suspension of the extension of occupational and sectoral collective agreements to non-signatory parts 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 crises 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. Also, previously self-employed and currently unemployed workers can claim monthly unemployment benefits.  EP: Training programmes and employment subsidies for the youth (2011-2012-2013).  EP: Reduction in the employer's social security contributions (2012)</p>
<b>Italy</b>	<p>CB: Reform in 2009 (by social partners)</p>	<p>EPL Reform in 2012; Reform of temporary employment in 2014;  CB: Reform in 2013-14 (by social partners).  EP: Jobs Act in 2014 to support people looking for a job, reduce the type of contracts and make employment rules simpler.</p>
<b>Portugal</b>	<p>EPL: Reduction in the notice period for collective dismissals and the maximum duration of fixed-term contracts</p>	<p>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 to the regulation introduced in 2012.  MW: Freeze.  UB: Changes in entitlement rules.  EP: Flexibilisation of working schedules</p>
<b>Slovenia</b>	<p>EP: Improvements of training and employment services</p>	<p>UB: Increase in coverage and replacement rates  EPL: Shorter notice period and a reduction in severance payments and introduction for redundancy pay for fixed-term contracts (2013).  MW: The statutory minimum wage increased from 597 to 734 euros gross per month, or by 22.9 percent (2010)</p>
<b>Spain</b>	<p>UB: Extension</p>	<p>EPL: Changes in definition of fair economic dismissals in 2010 and 2013 and reduction of severance payments in 2013.  Introduction of new contract for firms with less than 50 employees in 2013. Increase of flexibility in working hours.  CB: Changes in extension rules and widening of opting-out clauses  EP: Incentives to job creation and subsidies to new hires</p>

**Note:** Brief description of changes of Labour Legislations regarding Collective Bargaining (CB), Employment Protection Legislation (EPL), UB (Unemployment Benefits) and Minimum Wages (MW) and implementation of Employment Policies (EP).  
**Source:** WDN and LABREF Database

The Group II countries also reacted moderately in terms of measures at the initial phase of the crisis. Measures to maintain employment such as short-time work schemes (Belgium and Luxembourg) and reduce the cost to the employer, eg, temporary changes in the indexation scheme in Luxembourg, were adopted. Many countries also activated various employment subsidies (Romania, the Netherlands, Luxembourg and Austria), training programs for the unemployed and the low skilled (Austria and Bulgaria) and increased unemployment benefits (Belgium and Poland).<sup>34</sup>

In the first two groups of countries measures that could be categorised as more structural were also adopted, ie, measures changing the level of employment protection (Estonia, Romania and the Czech Republic), the structure of and the 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).<sup>35,36</sup> The adoption of measures of a more structural nature that made the adjustment of employment by firms easier for some of the countries of this group is also confirmed by the evolution of the relevant employment protection (EPL) index of the OECD (Table 10). For instance, the EPL index for Estonia has been significantly reduced 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.<sup>37</sup> Of course, for the Southern European countries, the reforms were to a large extent associated with the adjustment programmes that accompanied the loans they required given their difficult fiscal positions.<sup>38</sup> Ireland, a Group I country, was under an adjustment programme as well. However, since its labour markets were already rather flexible before the crisis (eg, the level of employment protection as measured by the EPL index presented in Table 10 is among the lowest ones) the range of measures adopted were in no way similar to those of the other programme countries. In contrast to the other programme countries, the EPL index for Ireland actually increased. In Cyprus, a Group III country

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<sup>34</sup> Luxembourg temporarily increased the duration and replacement ratio of unemployment benefits in the second period.

<sup>35</sup> 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). Also, while the general trend was towards a lower centralisation of wage setting, some countries took measures that introduced sectoral minima in the wage setting process, ie, extension of sectoral agreements in Latvia and the introduction of binding minimum wages in many industries in Germany.

<sup>36</sup> Most of the structural measures were taken in the second period. Exceptions are the changes in employment protection in Estonia and collective bargaining structure in France that took place in the first period.

<sup>37</sup> In Italy the most significant reforms took place in 2013-2014, 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.

<sup>38</sup> Cyprus, Greece, Ireland, Spain and Portugal were under an adjustment program at some moment during the 2010-2013 period.



also under an adjustment program, the labour market measures taken referred mainly to employment subsidies, training schemes and suspension of the wage indexation scheme in the private sector.

**Table 10. Strictness of employment protection [individual dismissals -regular contracts] OECD EPL indices**

	2008	2009	2010	2011	2012	2013	change (2008- 2013)
<b>Group I</b>							
Czech Republic	3.1	3.1	3.1	3.1	2.9	2.9	-0.2
Germany	2.7	2.7	2.7	2.7	2.7	2.7	0
Estonia	2.7	2.7	1.8	1.8	1.8	1.8	-0.9
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
Latvia					2.7	2.7	
Slovak Republic	2.2	2.2	2.2	2.2	1.7	1.8	-0.4
United Kingdom	1.3	1.3	1.3	1.3	1.3	1.1	-0.2
<b>Group II</b>							
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
France	2.5	2.4	2.4	2.4	2.4	2.4	-0.1
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
<b>Group III</b>							
Spain	2.4	2.4	2.4	2.2	2.2	2	-0.4
Greece	2.8	2.8	2.8	2.2	2.2	2.1	-0.7
Italy	2.8	2.8	2.8	2.8	2.8	2.7	-0.1
Portugal	4.4	4.4	4.1	4.1	3.6	3.2	-1.2
Slovenia	2.7	2.7	2.7	2.6	2.6	2.6	-0.1

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 10 shows, the reduction in the EPL index is remarkable 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 opting-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.<sup>39</sup> Measures to reduce labour costs and increase employment were also adopted, ie, sub-minimum wages for the youth in Greece, subsidies for new hires in Spain, a reduction in employers' social security contributions in Greece and a freeze in the minimum wage in Portugal.

<sup>39</sup> In 2012 in Portugal a change in the regulation required that the subscribing employer associations accounted for at least 50% of the workers of the sector in order for the collective agreements to extend to all sector employees. However, in June 2014 the introduction of an alternative criterion that is virtually fulfilled by all employer associations makes the extension of collective agreements much easier compared to 2012. Specifically, if the most demanding criterion of representing at least half of the workers in a given sector is not met then the alternative criterion of covering a number of associated firms consisting of at least 30% of micro, small and medium enterprises (firms up to 250 employees) needs to be fulfilled; see Martins (2015).

Given the wide-ranging reforms that have taken place in some countries it would be interesting to know what are 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 (eg, EPL index of the OECD). These indicators are very useful as they are objective and do not depend on personal judgment. However, firm managers can provide information about the impact of the legislation on their actual ability to adjust. Adopting this approach, WDN3 asked firms whether it has been easier or more difficult to perform a set of actions in 2013 compared to 2010. More specifically firms were asked whether:

- It has 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 would give us an indication of whether it has become easier or more difficult for firms to adjust their labour input.
- It has become easier or more difficult to hire employees.
- It has become easier or more difficult to move employees to other job positions or other locations; this set of questions would give us an indication of whether it has become easier or more difficult for firms to reorganise their labour input.
- It has become easier or more difficult to lower the wages of incumbent workers and offer new hires a lower wage; this set of questions would give us an indication as to whether it has become easier or more difficult for the 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 12-15 present the proportion of firms answering that it has become less difficult or much less difficult to perform each of the above actions.<sup>40,41</sup> 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.<sup>42</sup> Similarly, in Greece 63% and 80% of firms report that it has become easier to lower the wage of incumbents or offer new workers lower wages, respectively. In Spain and Cyprus a significant proportion of firms state that it has become easier to adjust their wage bill. The proportion of firms reporting that it has become easier to adjust labour

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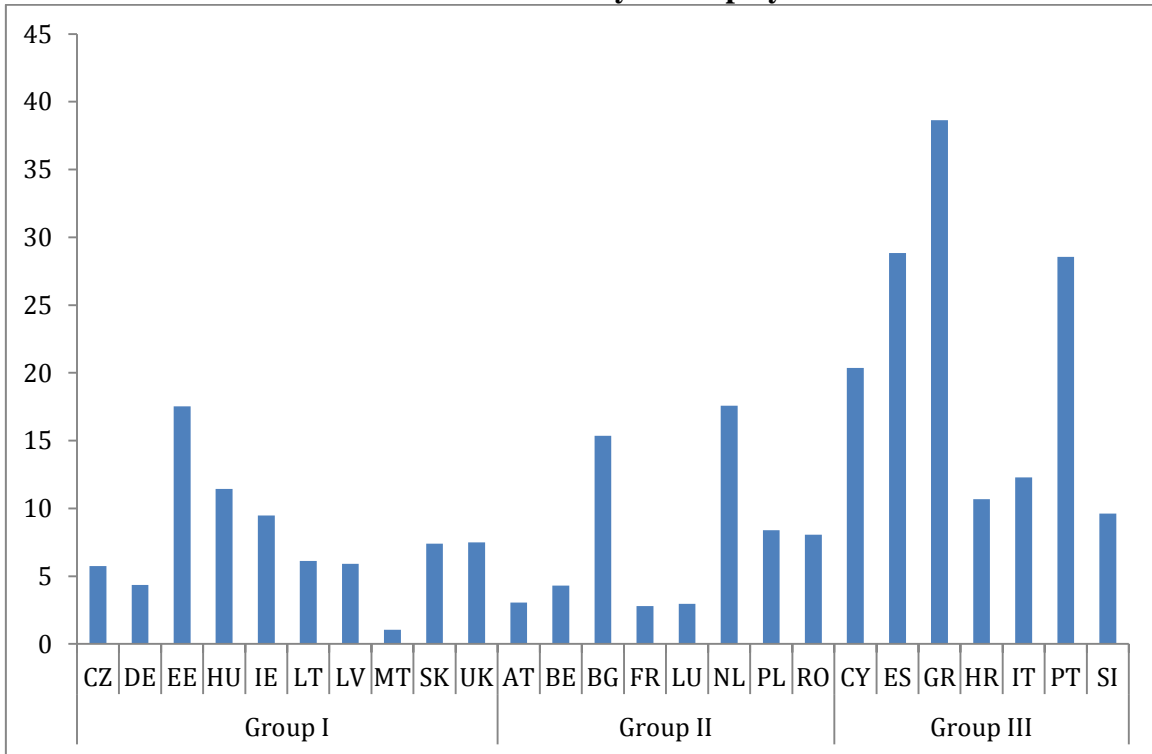
<sup>40</sup> Through the paper firms with less than five employees are excluded from the analysis. In Cyprus, a Group III programme country around 27% of firms belongs to this category. The above presented figures for Cyprus are not much different when we include in the analysis firms with less than five employees. The differences are in the range of one to three percentage points.

<sup>41</sup> The question was slightly different in the Slovenian questionnaire and is not fully comparable as it included an extra option.

<sup>42</sup> 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 for each individual channel is presented in Table A1 in the Appendix.

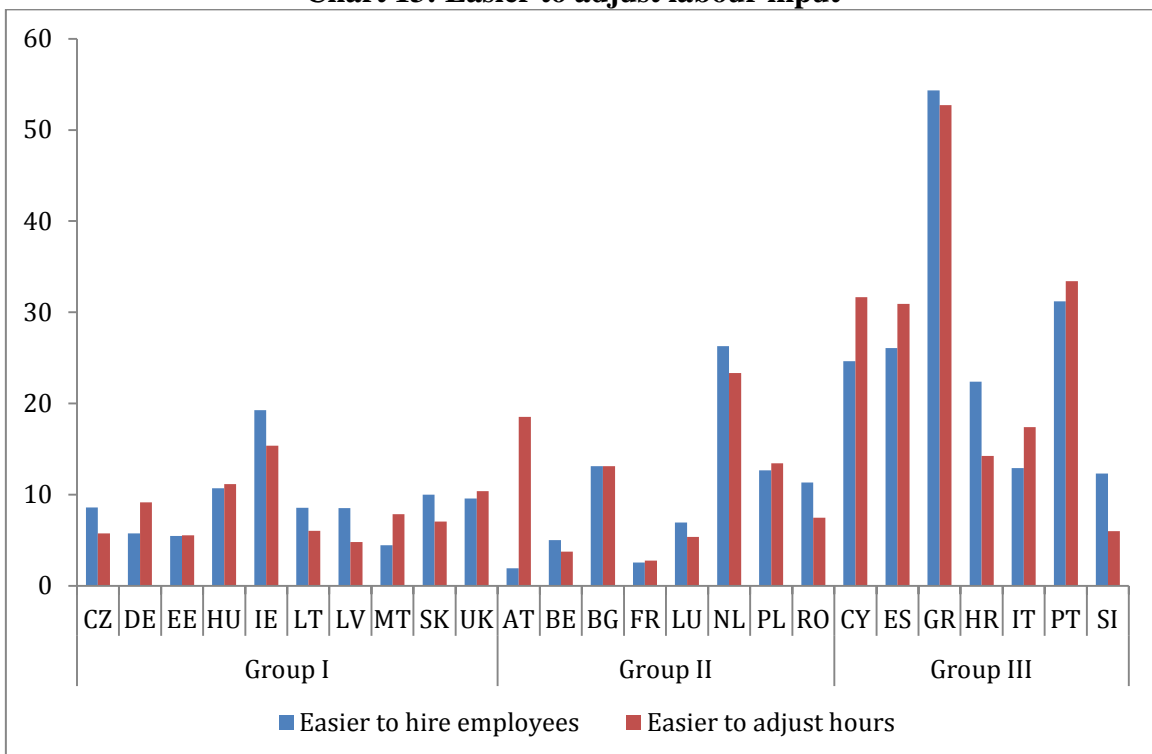
input and reorganise the firm by moving employees to other places and positions is also significant in these countries.

**Chart 12: Easier to lay off employees**



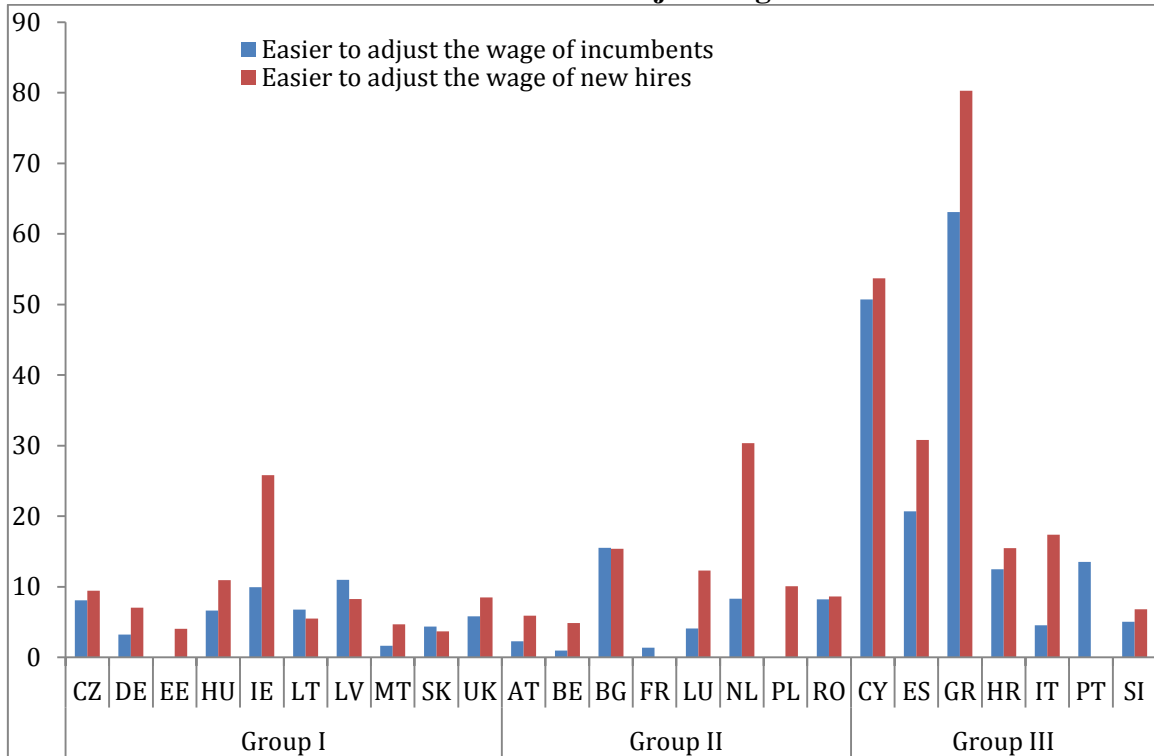
Source: WDN3. Figures weighted to reflect overall employed.

**Chart 13: Easier to adjust labour input**



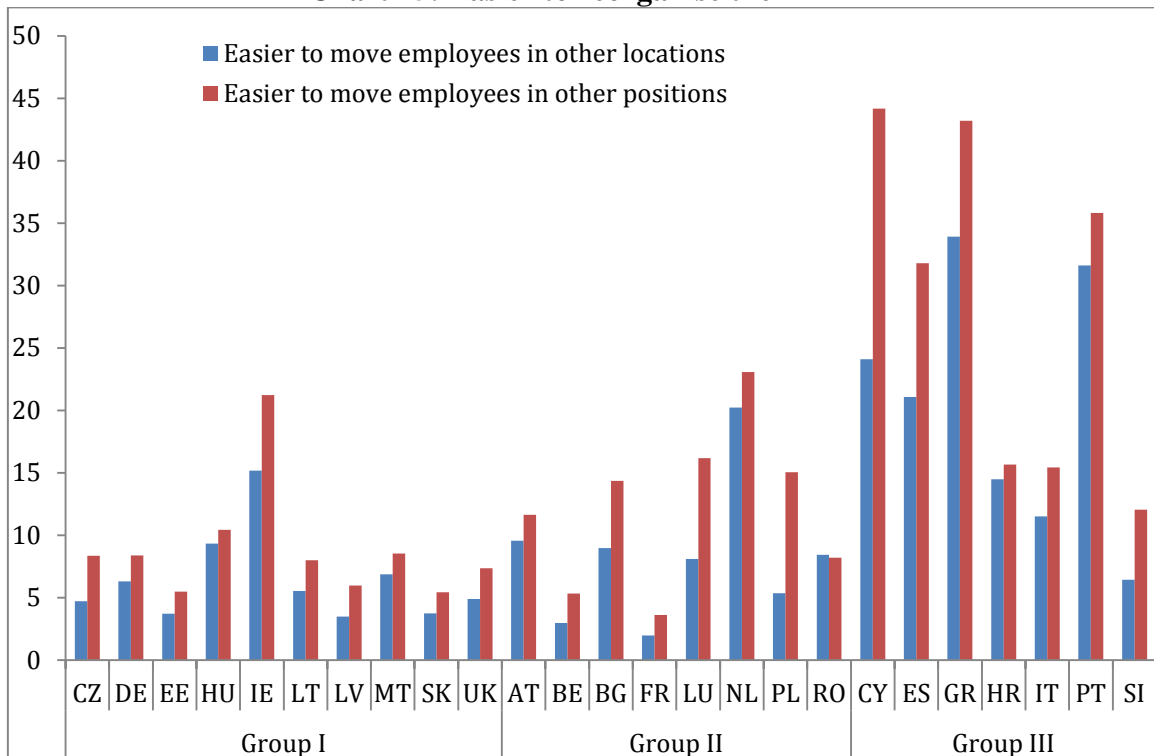
Source: WDN3. Figures weighted to reflect overall employed.

**Chart 14: Easier to adjust wages**



Source: WDN3. Figures weighted to reflect overall employed.

**Chart 15: Easier to reorganise the firm**



Source: WDN3. Figures weighted to reflect overall employed.

For most of the countries of Groups I and II the proportion of firms reporting that it has become easier to perform a certain action is around or lower than 20%. In these countries, though, many firms consider adjusting working hours to be much easier comparatively to other strategies. Many of these firms also find it comparatively easier to reorganise labour input by moving employees to other locations and job 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 (Tables A2 and A3 in the Appendix).

For the Group III countries for which a significant proportion of firms say that it has been easier to adjust labour input and wages we analyse whether the perception of firms differ across sector and size categories. Table 11 shows that the proportion of bigger firms (more than 200 employees) perceiving it easier to adjust labour input and wages using the above measures is consistently lower for all adjustment channels. It may be the case that bigger firms had always had the ability to adjust their labour input and wage bill using various margins of adjustment and reforms may have not made a big difference for them. As for the analysis by sector, Table 12 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 11: Firms perception about labour market reforms: It has been easier to: (% 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 hires a lower wage
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 and more	16	18	21	14	21	8	21

**Source:** Third wave of the WDN. Figures weighted to reflect overall employed.

**Table 12: Firms perception about labour market reforms: It has been easier to: (% of firms in Group III countries) – Distribution by sector**

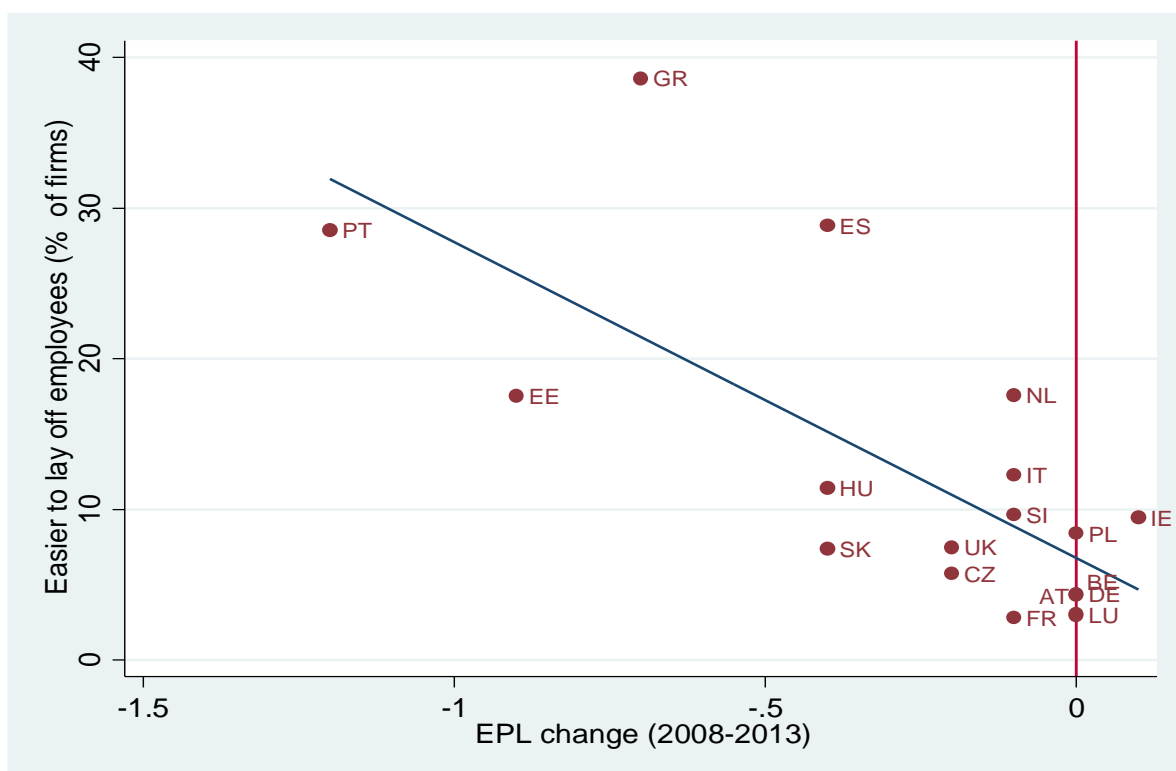
	Lay-off employees	Hire employees	Adjust working hours	Move employees to other locations	Move employees to other positions	Adjust wages of incumbents	Offer new hires a lower wage
Manufacturing	19	20	22	16	22	10	22
Electricity, gas	8	10	15	11	13	9	14
Construction	22	23	22	26	24	17	22
Trade	21	21	28	14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

**Source:** Third wave of the WDN. Figures weighted to reflect overall employed.

As said earlier the perceptions of the managers answering the questionnaire reflect their opinion about reforms and are based on their actual experience. It would be interesting

though to check the consistency of these perceptions using some other objective indicators. The EPL index constitutes one such indicator for the case of lay-offs. We therefore try to see whether perceptions about the ease of laying off employees have any relation with the evolution of the EPL index. Chart 16 shows that in countries like Greece, Estonia, Portugal and Spain where the reduction of EPL is high firms perceive it comparatively much easier to lay-off employees. Similarly, in countries like Greece and Cyprus where wages have adjusted significantly firms perceive it comparatively much easier to adjust wages of incumbents and offer newly hired employees a lower wage.

**Chart 16: EPL change and perceptions about the ability to lay off employees**



Another question, which however was not included in all countries' questionnaires, prompted firms to indicate the factors influencing their answer to the question on how easy it now is 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. change in the behaviour of the trade unions and d. change in the behaviour of the individuals. Answers to this question are available for ten countries (the Czech Republic, Estonia, Spain, Greece, Croatia, Hungary, Italy, Luxembourg, Poland and Romania).

Table 13 shows the modal answer, ie, the most frequently cited reason for the firms answering that it has become easier to perform an action. For those Group III countries that have significantly reformed their labour markets, ie, 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. Also, 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 the Group I and Group II countries when it comes 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 13: Most frequently cited reason for the ability to perform the following actions**

Group		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 hires a lower wage
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
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
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. 1=Reform of laws, 2=Law enforcement, 3= Changes in the behaviour of unions, 4= 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 rather broad and does not restrict attention to the regulatory framework *per se* (ie, payroll taxes, hiring and firing costs) but also collects information on other factors that may influence firms' decisions regarding hiring, such as the impact of economic uncertainty on hiring, the impact of skill shortages etc.

More specifically firms were asked to rank in terms of relevance (ie, 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 14a 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 14a) and the other to the regulatory framework (Table 14b). Only two reasons get the highest relevance score (very relevant) by the majority of firms and only 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 14a. 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
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. 1=Not relevant, 2=of little relevance, 3= Relevant, 4= 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 for which unemployment increased during the crisis, ie, 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 ie, 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. Also, high payroll taxes are one of the concerns in some of the countries that saw an increase in unemployment. Thus, we would expect employment 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 14b. 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. 1=Not relevant, 2=of little relevance, 3= Relevant, 4= Very relevant

\* Two relevance score cited most frequently

The above case is further strengthened by the information presented in Table 15 which shows that in many countries the majority of firms that experienced a decrease in demand assign uncertainty and high-payroll taxes the highest relevance score.

Tables 14a and b further show that firing costs and high wages are considered as relevant by the majority of firms in many countries. Firing costs and high wages are two obstacles that relate to labour market regulation. Many countries during the recent crisis took significant steps towards reducing firing costs. As said earlier, Estonia and Greece are two countries for which the EPL index decreased significantly. Indeed, as Table 14b shows the majority of firms in these countries consider firing costs as being of little relevance. While in countries like Spain, France, Italy and Portugal firms think that firing costs constitute a relevant obstacle to hiring. Also, in Cyprus and Greece, countries where wages were significantly adjusted, the majority of firms consider high wages as being of no relevance.

**Table 15. Obstacles to hiring -Most frequent ranking of reasons (Modal answer) by firms suffering a demand shock**

		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. 1=Not relevant, 2=of little relevance, 3= Relevant, 4= Very relevant

\* Two relevance score cited most frequently

The availability of relevant skills gets the second highest relevance score by the majority of firms in many countries (Table 14a). Since this obstacle relates to other structural policies as well, countries aiming at increasing or maintaining employment should consider the role of the educational system in this.

To sum up, the majority of firms currently consider uncertainty as a very relevant obstacle to hiring. However, as the economic situation improves countries aiming at improving their employment outlook would need to consider also 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, and of labour market reforms undertaken during the crisis period and of remaining rigidities after those reforms. These comparisons are constructed from the information provided by WDN3 that collected information on a wide variety of firm characteristics and their employment and wage changes throughout the 2010-2013 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 make it infeasible to cover all the results that are contained in the survey. Indeed, we would urge researchers to make use of this data once it becomes publicly available.<sup>43</sup> The wealth of information makes it also difficult to summarise even the main results presented in this paper in a brief concluding section. Nevertheless, from the main results presented here we conclude 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 labour market reforms introduced in some countries during the crisis period, that made it comparatively easier for firms to adjust, some obstacles still remain influencing firms decision to hire.

We hope that these broad and general messages provide a starting point for further research on the WDN3 data, both focusing on particular countries – building on the country reports written by members of the Wage Dynamics Network<sup>44</sup> – and with an international perspective, building on some of the cross-country comparisons presented in this paper.

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<sup>43</sup> Currently the data is only available to researchers working on projects in collaboration with members of the Wage Dynamics Network.

<sup>44</sup> The country reports for Belgium, Bulgaria, Croatia, the Czech Republic, Cyprus, Estonia, France, Germany Italy, Latvia, Lithuania, Malta, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, and UK area available on [http://www.ecb.europa.eu/pub/economic-research/research-networks/html/researcher\\_wdn.en.html](http://www.ecb.europa.eu/pub/economic-research/research-networks/html/researcher_wdn.en.html).

## Annex 1

**Table A1: Firms perception about labour market reforms: It has been easier to:  
(% of firms)**

		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. Figures weighted to reflect overall employed.

**Table A2: Firms perception about labour market reforms: It has been equally difficult to:**  
(% of firms)

		Lay-off employees	Hire employees	Adjust working hours	Move employees to other locations	Move employees to other positions	Adjust wages of incumbents	Offer new hires a lower wage
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. Figures weighted to reflect overall employed.

'Lay-off employees' denotes the average proportion of firms finding it equally difficult to lay-off employees collectively, individually, temporarily, and for disciplinary reasons.

**Table A3: Firms perception about labour market reforms:  
It has been more/much more difficult: (% of firms)**

		Lay-off employees	Hire employees	Adjust working hours	Move employees to other locations	Move employees to other positions	Adjust wages of incumbents	Offer new hires a lower wage
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. Figures weighted to reflect overall employed.

'Lay-off employees' denotes the average proportion of firms finding it more/much more difficult to lay off employees collectively, individually, temporarily and for disciplinary reasons



## Annex2: 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 the firms were operating. It was launched by the Wage Dynamics Network, an 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.<sup>45</sup> 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 from a period of economic stability and relatively stable growth, namely 2002-2007. During summer 2009, ten NCBs conducted a more focused follow-up survey specifically with the aim of understanding firms' reactions to the initial stage of the crisis (2008-2009). This was the second wave of the WDN survey (WDN2).<sup>46</sup>

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 (2010-2013). 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

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<sup>46</sup>Fully harmonised WDN1 data is available for Austria, Belgium, the Czech Republic, Estonia, France, Greece, Hungary, Italy, Ireland, Lithuania, the Netherlands, Poland, Portugal, Slovenia and Spain. WDN2 was conducted in the following countries: Austria, Belgium, the Czech Republic, Estonia, France, Italy, the Netherlands, Poland and Spain.

misinterpretations of the questions. Moreover, responses may be influenced by the specific macroeconomic environment prevailing at the time of the survey.

### ANNEX 3: WDN3 Survey – Main characteristics of the national surveys

Country	National Central Banks	Sectoral coverage (NACE Rev. 2 category)	Firms' size ( Number of workers)	Final sample size (Number of firms)	Response rate	Who conducted the survey
BE	Banque Nationale de Belgique	C, F, G, H, I, J, L, M, N, K, R, S	>=1	991	21.0%	Banque Nationale de Belgique
BG	Bulgarian National Bank	C, F, G, H, I, J, L, M, N, R, S	>=5	528	59.0%	Private company
CZ	Czech National Bank	C, F, G, H, I, J, L, M, N	>=10	1011	20.0%	Czech National Bank
DE	Deutsche Bundesbank	C, D, E, F, G, H, I, J, L, M, N, K, O, P, Q, R, S	>=1	2454	24.5%	ifo institute
EE	Eesti Pank (Estonia)	C, D, E, F, G, H, I, J, L, M, N, K, R, S	>=1	500	13.8%	Private survey company "TNS Emor"
IE	Central Bank of Ireland	C, D, E, F, G, H, I, J, L, M, N, K, O, P, Q, R, S	>=1	1569	5.0%	IPSOS-MRBI
GR	Bank of Greece	C, G, H, I, J, L, M, N	>=5	402	1.0%	Bank of Greece
ES	Banco de España	C, D, E, G, H, I, J, L, M, N	>=5	1975	64.8%	External company
FR	Banque de France	C, F, G, H, I, J, L, M, N	>=5	1156	24.0%	Banque de France
IT	Banca d'Italia	C, D, E, F, G, H, I, J, L, M, N, K	>=5	1102	29.4%	An external data provider
CY	Central Bank of Cyprus	C,F,G,H,I,J,K,L,M	>=3	182	11.0%	Central Bank of Cyprus
LV	Latvijas Banka	C, F, G, H, I, J, L, M, N, K	>=10	557	27.0%	Market and social research agency FACTUM
LT	Lietuvos bankas (Lithuania)	C,F,G,H,I,J,L,M,N,K	>=5	515	6.0%	External company BERENT Research Baltic
LU	Banque centrale du Luxembourg	C, F, G, H, I, J, L, M, N, K	>=1	674	13.5%	LISER (formerly CEPS/INSTEAD)
HR	Croatian National Bank	C, F, G, H, I, J, L, M, N	>=5	301	7.0%	Market research agency Ipsos Puls
HU	Magyar Nemzeti Bank (Hungary)	C, F, G, H, I, J, L, M, N, K	>=5	2032	58.0%	IMG Hungary
MT	Central Bank of Malta	C, D, E, F, G, H, I, J, L, M, N, K, O, P, Q, R, S	>=10	178	66.0%	Central Bank of Malta
NL	De Nederlandsche Bank	C, F, G, H, I, J, L, M, N, K, O, P, Q, R, S	>=5	727	77.0%	TNS-IPO
AT	Oesterreichische Nationalbank	C, F, G, H, I, J, L, M, N	>=5	784	20.0%	OeNB(Oesterreichische Nationalbank) in cooperation with WIFO (Austrian Institute of Economic Research)
PL	Narodowy Bank Polski	C, D, E, F, G, H, I, J, L, M, N, K, O, P, Q, R, S	>=1	1200	27.9%	National Bank of Poland
PT	Banco de Portugal	C, D, E, F, G, H, I, J, L, M, N, K, O, P, Q, R, S	>=10	1282	28.0%	Banco de Portugal
RO	National Bank of Romania	C, F, G, H, I, J, L, M, N	>=20 *	2043	88.0%	National Bank of Romania in cooperation with the Romanian National Institute of Statistics
SI	Banka Slovenije	C, D, E, F, G, H, I, J, L, M, N, K	>=5	1285	43.0%	Banka Slovenije
SK	Národná banka Slovenska	C, D, E, F, G, H, I, J, L, M, N	>=5	621	7.7%	National Bank of Slovakia
UK	Bank of England	C, F, G, H, I, J, L, M, N, K, R, S	>=1	654	3.6%	Bank of England

\* Over 60% of Romanian firms in the sample have more than 200 employees

**Note:** Sectors are grouped as follows :

WDN3 Sector category	NACE Rev. 2 category
1 Manufacturing	C
2 Electricity, gas, water	D, E
3 Construction	F
4 Trade	G
5 Business services	H , I, J, L, M,N
6 Financial intermediation	K
7 Non-market services*	O , P, Q
8 Entertainment and other services*	R

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