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Centralisation of wage bargaining and firms' adjustment to the Great Recession – a micro-based analysis

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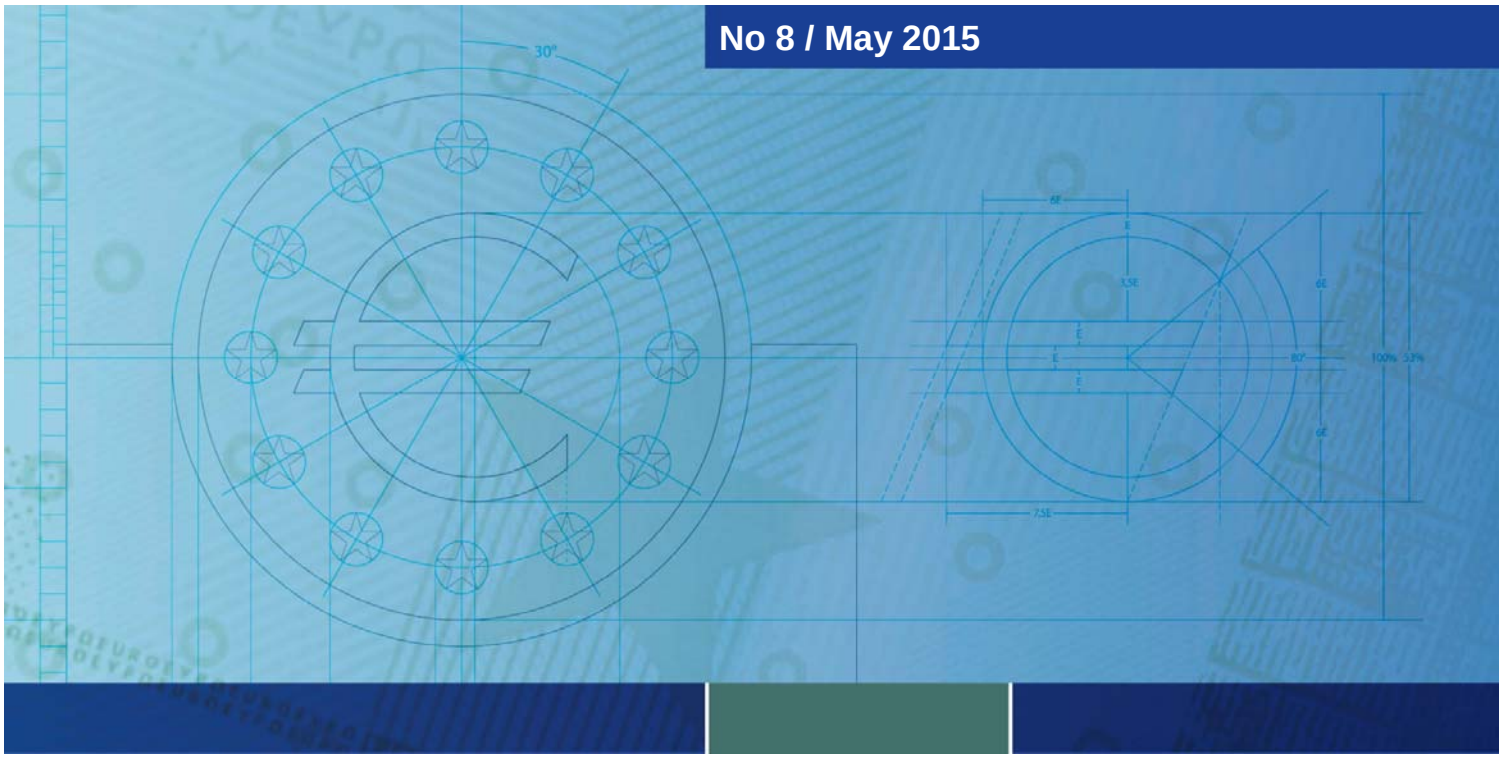


Abstract

This brief aims to investigate to what extent the labour market framework in which firms operate has shaped their response to the Great Recession. We use a novel ECB firm-level dataset, which combines the CompNet and WDN datasets. Given the large cross-country heterogeneity in labour market dynamics throughout the crisis, we exploit the variability in the degree of centralisation of wage bargaining institutions across firms to explain different firm-level cost-cutting strategies following the Great Recession.

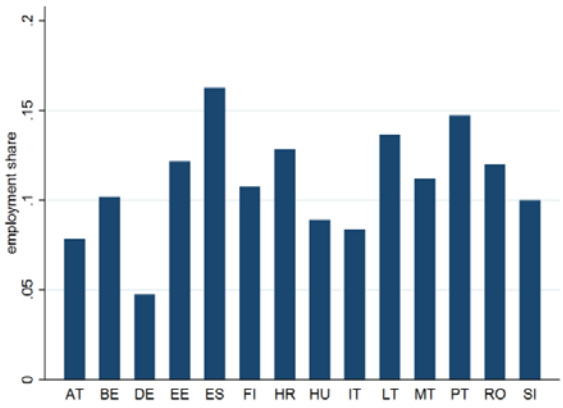
We show that wage bargaining institutions play a statistically significant role in shaping the way in which a negative shock is distributed by the firms across reductions in wages and employee numbers. In particular, we find that labour markets with a higher proportion of firms applying centralised collective bargaining are characterised by a larger share of companies reducing the number of employees. We show that this could partly be due to a higher degree of downward wage rigidities. In addition, our results suggest that the decision of many European countries to move, over the last two decades, from fully centralised bargaining to multi-level regimes did not limit reductions in employment.

1 Introduction

Whether labour market institutions, and wage setting regimes in particular, shape the response of firms to negative economic shocks is a contentious issue in labour economics. Standard economic theory (Nickell and Andrews (1983)) predicts that centralised bargaining institutions are likely to hamper the smooth functioning of labour markets and amplify the negative impact of aggregate shocks on employment by preventing wages from adjusting downwards during economic downturns. Recently, this theme has retaken centre stage in the policy debate as a result of high and persistent unemployment caused by the Great Recession. More specifically, since the start of the economic and financial crisis over five million jobs have been lost, wiping out the gains from almost ten years of strong job creation. However, behind this aggregate data lies a very heterogeneous picture, with structural development of unemployment dynamics differing widely across countries in the euro area (the current unemployment rate in the euro area of 11.3% is the weighted average of national unemployment rates that include a rate of close to 5% in Germany and of 23% in Spain). Indeed, despite a generally strong shock to GDP, in some countries the economic and financial crisis only had a short-term effect, with little overall impact on employment losses, while in other countries it caused a dramatic and persistent increase in unemployment. Against this background, understanding which factors are shaping how the euro area labour markets adjust to aggregate shocks is currently at the core of the policy debate (see Task Force of the Monetary Policy Committee of the European System of Central Banks (2012), and Ad hoc team of the European System of Central Banks (2015)).

Clearly, this cross-country heterogeneity results from a number of factors, including different initial economic conditions. A first factor to consider is the varying sectoral composition of employment (particularly the share of workers employed in construction) in euro area countries (see figure 1). In fact, given that the construction sector was severely affected by the crisis and, unlike other sectors, started to suffer from pronounced downsizing as early as 2007 (see Pissarides (2013); Hoffmann and Lemieux (2014)), differences in the proportion of workers employed in construction partially explain the observed variability in the response of the labour market to the crisis. Another factor driving cross-country heterogeneity in labour market dynamics is the historical trend in unemployment rates, which have been systematically higher in some countries than in others. As figure 2 shows, unemployment rates in the pre-crisis period ranged from around 5% in Austria to above 10% in Spain, Estonia and Lithuania. Finally, and more importantly from a policy perspective, cross-country heterogeneity in unemployment rates reflects the relationship between labour market institutions and the

Figure 1
Employment share in construction (%)



CompNet – average over the period 2004-2006

impact of shocks on employment. More specifically, among the different labour market institutions, a natural explanation for the differences in labour market adjustments is those institutional structures impinging on the adjustment margins and cost cutting strategies of firms, as their heterogeneous functioning creates cross-country differences in the way labour markets respond to aggregate shocks in term of employment.

Figure 2

Unemployment rates (%)

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Belgium	6.9	6.6	7.5	8.2	8.4	8.5	8.3	7.5	7.0	7.9	8.3	7.2	7.6	8.4	8.5
Germany	7.9	7.8	8.6	9.7	10.4	11.2	10.1	8.5	7.4	7.6	7.0	5.8	5.4	5.2	5.0
Estonia	14.6	13.0	11.2	10.3	10.1	8.0	5.9	4.6	5.5	13.5	16.7	12.3	10.0	8.6	7.4
Spain	11.9	10.6	11.5	11.5	11.0	9.2	8.5	8.2	11.3	17.9	19.9	21.4	24.8	26.1	24.5
Italy	10.0	9.0	8.5	8.4	8.0	7.7	6.8	6.1	6.7	7.7	8.4	8.4	10.7	12.1	12.7
Ireland	4.2	3.9	4.5	4.6	4.5	4.4	4.5	4.7	6.4	12.0	13.9	14.7	14.7	13.1	11.3
Lithuania	16.4	17.4	13.8	12.4	10.9	8.3	5.8	4.3	5.8	13.8	17.8	15.4	13.4	11.8	10.7
Austria	3.6	3.6	4.2	4.3	5.5	5.6	5.3	4.9	4.1	5.3	4.8	4.6	4.9	5.4	5.6
Portugal	5.1	5.1	6.1	7.4	7.8	8.8	8.8	9.2	8.7	10.7	12.0	12.9	15.8	16.4	14.1
Romania	7.6	7.4	8.3	7.7	8.0	7.1	7.2	6.4	5.6	6.5	7.0	7.2	6.8	7.1	6.8
Slovenia	6.7	6.2	6.3	6.7	6.3	6.5	6.0	4.9	4.4	5.9	7.3	8.2	8.9	10.1	9.7

Source: Eurostat – annual average

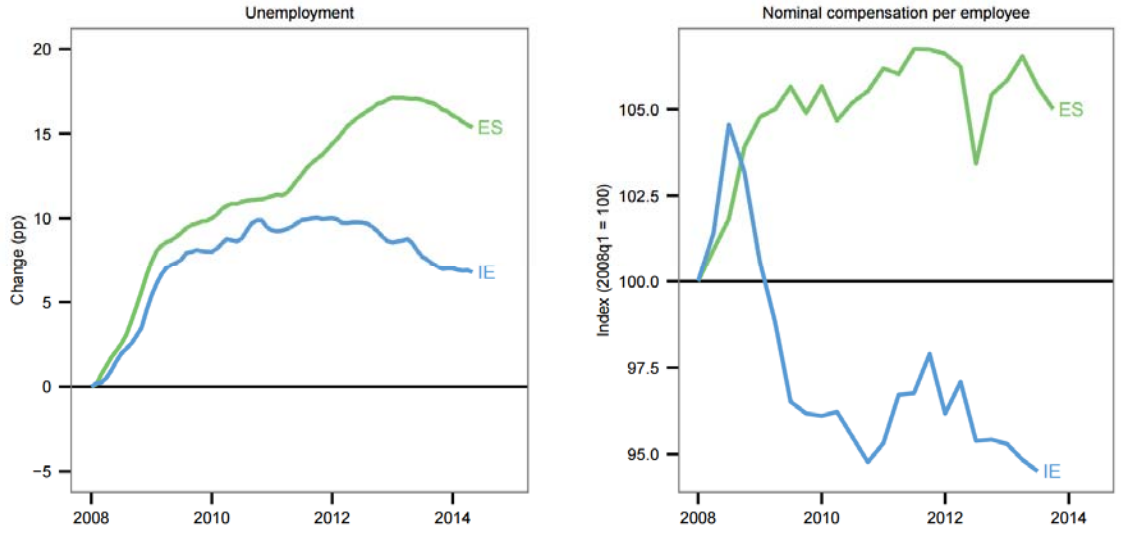
Empirical evidence points to the fact that the economies that have managed to limit job destruction rates during the crisis tend to be characterised by more flexibility in the labour market and, thus, by the ability to promptly adjust to new economic conditions (see, for example, Burda and Hunt (2011)). The relevance of labour market institutions in explaining the impact of the crisis on employment is particularly evident if we compare labour market adjustments within the group of countries experiencing a particularly acute sovereign debt crisis. Although the severity of the crisis has been similar in these countries, employment dynamics have differed depending on the degree of flexibility of their labour market institutions.

This is particularly evident in the case of Spain and Ireland. While both countries witnessed a dramatic increase in employment losses in the construction sector right after the financial crisis hit, they fared quite differently during the sovereign debt crisis (see **Error! Reference source not found.**). The reason for this diverging performance is that the Irish labour market was relatively flexible at the time of the crisis and was further deregulated at the end of 2010 as part of the EU-IMF programme. As a result, Irish unemployment stabilised after an initial large increase and then fell. Conversely, Spain entered the crisis with an inflexible labour market and labour market institutions, and only started undertaking relevant reforms in 2012, meaning unemployment kept rising until 2013. More specifically, the limited capacity of the Spanish labour market to adjust to the crisis was the result of a broadly regulated system of wage bargaining characterised by a high degree of centralisation and the indexation of wages to past inflation (see European Central Bank (2009)). Consequently, as can be seen in **Error! Reference source not found.**, while wages in Ireland started to adjust downward as early as late 2008, Spanish nominal

compensation per employee kept rising until the end of 2011, even though the country at that time was already suffering from a 12 percentage point increase in unemployment.

Figure 3

Unemployment and nominal compensation developments in Ireland and Spain



Source: Speech by Mario Draghi – Annual Central Bank Symposium in Jackson Hole (2013)

As a result, whereas the Irish labour market facilitated some adjustment through prices, the Spanish labour market adjusted primarily through quantities. Wage bargaining institutions are identified as one of the main reasons for the different strategies for cutting labour costs at the firm level in Spain and Ireland, due to the power they have to amplify the impact of a negative shock on employment by limiting downward wage adjustment.

Given the criticism of economists and policy makers regarding centralised bargaining regimes that are responsible for restricting the options firms have to adjust wages in response to new economic conditions, in Spain, as in other stressed countries, a number of these labour market rigidities have been addressed through labour market reforms. As reported by the European Commission (Visser, J. (2013), the Pact for the Euro of March 2011 and the “Six-Pack” of regulations on economic governance adopted by the European Council in October 2011 herald a movement towards reforms that limit extended coverage and multi-employer bargaining and favour company bargaining over central and industry bargaining.

2 Employment dynamics during the Great Recession: exploring the new CompNet database

As documented above, unemployment developments during the economic and financial crisis differ widely across countries in the euro area. In this section, using information from the new CompNet database, we show whether and to what extent firms' growth dynamics vary across countries[1].

Error! Reference source not found. illustrates differences in firms' growth trajectories in Germany and three groups of countries. More precisely, it reports the change in the proportion of firms growing, shrinking or remaining in the same size class[2]. This proportion is calculated using a "transition matrix", a powerful tool reflecting firms' movement along the distribution of size classes over a three-year window. The graphs below cover three-year windows between 2000 and 2012.

The figure shows some interesting facts about firms' growth trajectories. First, the structure of firms' growth dynamics was quite stable during the pre-crisis period. At the same time, the economic crisis significantly altered the growth dynamics in place before its outbreak. However, the response of labour markets in terms of the proportion of downsizing firms varies widely across countries, with the crisis having a particularly strong impact on the labour market functioning of stressed and new EU countries, which experienced a dramatic increase in the share of firms shrinking, mainly at the cost of the proportion of firms growing, while it barely changed firms' growth dynamics in non-stressed countries. An exceptional case is that of Germany, which experienced only a short interruption to the increasing trend in the proportion of firms expanding during the crisis and a complementary increase in the share of firms shrinking. Moreover, while in new EU countries the trajectories altered by the Great Recession have already started to revert to trend, there is no such evidence in the group of stressed countries[3].

Our research links the cross-country heterogeneity in employment dynamics at the firm level to the different functioning of existing labour market institutions. In particular, given the constraints that collective agreements might put on wage

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1 CompNet, the competitiveness research network of the European System of Central Banks, began operation at the end of 2011 with the goal of improving the existing set of indicators of competitiveness via a firm-level data collection exercise relying on firms' balance sheet information. Please refer to Di Mauro, F., Lopez-Garcia, P. and the CompNet Task Force (2015) for detailed information on the newly expanded database of cross-country comparable competitiveness-related indicators and to the CompNet website for general information on the network (https://www.ecb.europa.eu/home/html/researcher_compnet.en.html).

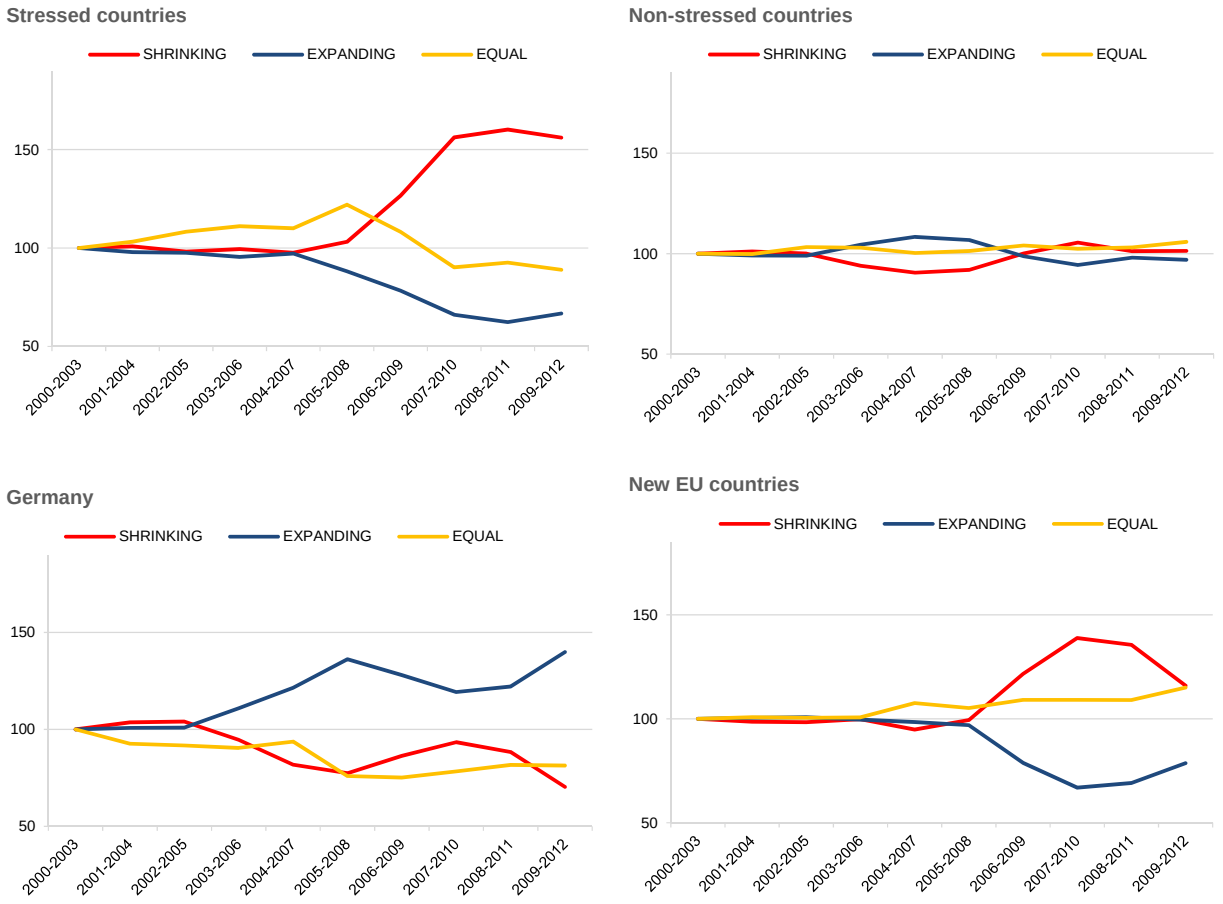
2 Firms are categorised into five size classes, depending on their number of employees: firms with between one and nine employees fall into size class (1), firms with ten to 19 employees fall into size class (2), firms with 20 to 49 employees fall into size class (3), firms with 50 to 250 employees fall into size class (4) and firms with 250 employees or more fall into size class (5).

3 In figure 4, non stressed countries are Austria, Belgium and Finland; stressed countries are Italy, Portugal, Slovenia and Spain; and new EU countries are Estonia, Lithuania and Romania.

adjustments, we explore whether and to what extent the degree of centralisation of wage bargaining institutions shaped the response of firms to the Great Recession by explaining the relative importance of wages and employment adjustments.

Figure 4

Change to number of growing and shrinking firms



Source: CompNet dataset

Before moving to our empirical results, we report the main features of wage bargaining institutions across Europe, highlighting their impact on the heterogeneous restrictions regarding wage adjustment as well as reviewing the main studies relating examining the effect of aggregate shocks on collective agreements and labour market adjustments. We stress the importance of micro data for obtaining robust and significant results and, as a consequence, the added value of a largely unexplored database matching the CompNet micro-distributed dataset with the Wage Dynamic Network (WDN) survey-based dataset at the firm level[4].

[4] The WDN was established in 2006 and its main goal is the identification of the mechanisms underlying wage and labour cost dynamics. For further information on the network, please refer to its website at the following link: https://www.ecb.europa.eu/home/html/researcher_wdn.en.html.

3 Wage bargaining regimes and the WDN dataset

The main goal of collective bargaining institutions is to establish a process of negotiation between unions and employers' organisations to agree upon rules regulating wages and other working conditions. The scope of the agreements depends on country-specific regulations and on the relative bargaining power of unions and employers' organisations. Historically, wage bargaining institutions arose as a stabilising tool and as an instrument to help prevent wage deflation through the setting of a wage floor. However, in many European countries, collective bargaining became the main mechanism through which unions can push for higher wages.

To study the effects of wage setting institutions on economic outcomes, notably wages and employment, the existing literature has focused on some specific features defining wage bargaining structures, such as the degree of centralisation, coordination, union density, and coverage (OECD (1997, 2004 and 2012)). Economic theory (Nickell and Andrews (1983); McDonald and Solow (1981)) and many empirical studies focus on the levels at which bargaining takes place and predict that the degree of centralisation in wage bargaining has an impact on economic performance. The underlying reasoning is that agreements bargained at the firm level are more flexible than those bargained at sector or national level and are therefore likely to give firms a greater margin of adjustment to adapt to new economic conditions.

According to the evidence collected by the WDN, there is some heterogeneity across countries regarding the levels at which bargaining takes place. Sector-level agreements are predominant in western European countries and cover the largest proportion of workers, while wage bargaining systems are highly deregulated and organised at the plant level in CEE countries[5]. However, the levels at which bargaining can take place do not have to be mutually exclusive, and therefore this distinction is only a first approximation of the degree of centralisation of wage setting institutions. To deepen this analysis, a further distinction between single- and multi-level bargaining systems is needed.

In the last two decades, several countries in the euro area have experienced strong development of multi-level bargaining structures, meaning that the same bargaining process can take place at many levels. To account for this further distinction, throughout our analysis we classify countries in two groups: two-tier and non-two-tier countries. Among the sampled countries, the two-tier group is composed of Austria, Belgium, Italy, Portugal and Spain, and is characterised by the possibility of supplementing multi-employer pay agreements (i.e. those taking place either at the national or sectoral level) with single employer ones (i.e. by agreements taking place at the plant level). It is fundamental to note that the negotiations on wage setting

[5] See European Central Bank (2009).

undertaken at the company level only allow for wages to be set higher than those established at the central level, according to the favourability principle. In other words, the multi-employer agreement is taken as a wage floor and the negotiation at the plant level can operate only to improve workers' conditions[6]. Conversely, non-two-tier countries have, by definition, a single-level bargaining structure that can be either fully decentralised (i.e. negotiations take place at the firm level only) or fully centralised (i.e. negotiations take place at the national or sectoral level only). In our analysis Hungary, Lithuania and Slovenia are all defined as non-two-tier countries at the time of the outbreak of the economic crisis (note that, contrary to the rest of the countries included in this group, Slovenia has a largely regulated system where multi-employer bargaining is more common than plant-level bargaining)[7]. Clearly, according to this country classification, multi-level bargaining can only occur in two-tier countries, while fully decentralised bargaining structures only operate in countries that are not defined as two tier. Conversely, in both groups of countries, firms can operate under multi-employer bargaining or not subscribe to any agreement.

Historically, the decision in a number of countries to move towards multi-level regimes during the 1990s was mainly driven by criticism of centralised wage bargaining institutions by the OECD (1994a), these being the most common institutions at that time among European countries. According to these criticisms, multi-employer structures were a major cause of the low degree of responsiveness of the labour market and of the 1980s job crisis (Visser, J. (2013)). The general recommendation of the OECD was to "refocus collective bargaining at the sectoral level to framework agreements, in order to give firms more leeway to adjust wages to local conditions" (OECD (1994b)). Therefore, although individual countries' experiences vary considerably with respect to the historical development of multi-level structures, the common factor behind the spread of firms adopting this type of bargaining regime is the attempt to achieve a more decentralised collective bargaining structure while avoiding a drastic move from fully centralised to fully decentralised structures. Indeed, the current level of decentralisation of countries defined as two-tier can be considered as occupying the middle ground between multi-employer and plant-level bargaining. Although the decision to introduce or expand the presence of multi-level bargaining in the euro area was based on the hypothesis that these new structures could integrate macroeconomic stability with greater decentralisation in wage setting, we will show that the design of these structures seems ill-suited for achieving this goal and that they do not permit adequate adjustments in the face of economic shocks.

[6] Two-level bargaining does not necessarily mean multi-level bargaining, as it is defined in this analysis. There is a distinction between situations in which "opening clauses" are allowed in centralised agreements and the "institutionalised" version of multi-level bargaining. In the first case, the labour legislation allows for derogation from sectoral standards and enables, within certain limits, agreements on working conditions that deviate from the binding sector-level wage agreement. In the second case, plant-level bargaining can coexist with multi-employer bargaining only when the higher pay level agreements are taken as a floor and not as a ceiling. Therefore, in this situation, which is the one present in the group of sampled countries, it is not possible to deviate from the binding industry-level agreements and changes at the plant level are only allowed if they guarantee an improvement of the working conditions already agreed at the central level.

[7] Hungary, however, is included only in the wage equation as we do not have information on the transition matrices for this country.

In the literature, the notion that wage bargaining institutions play a fundamental role in shaping economic outcomes both at the micro and at the macro level has received a lot of attention, at least since the 1980s. Many empirical studies attempt to link cross-country differences in unemployment to the degree of centralisation at which bargaining takes place (for a survey, see Flanagan (1999)). A typical argument in labour economics is that wage setting institutions have the power to amplify the impact of a negative shock on employment by limiting downward wage adjustments. For these specific characteristics, they have recently been identified as an important factor behind the dramatic rise of structural unemployment, especially in the stressed countries (see Bertola et al. (2010) and Ad hoc team of the European System of Central Banks (2015)). The most influential argument relating to collective bargaining and unemployment is the hump-shaped relationship between centralisation of wage setting institutions and real wages, proposed by Calmfors and Driffill (1988). The basis of this relationship is that countries with fully centralised or fully decentralised bargaining institutions (i.e. where agreements take place at the national and firm level respectively) will perform better in terms of employment than countries characterised by an intermediate degree of centralisation (i.e. sector level). This statement is based on the consideration that large and all-encompassing unions are able to recognise their market power and will therefore take an international approach to wage externalities by taking into account both the inflationary and unemployment effects of wage increases. Conversely, trade unions operating at the individual plant level have very limited market power and consequently have their bargaining strength constrained by market forces. Finally, in cases where bargaining takes place at an intermediate level, which in Europe is the most common situation covering the largest proportion of workers, unions can still exert some market power but are likely to ignore the macroeconomic consequences of their actions.

However, irrespective of the estimation approach, drawing inferences about the relationship between collective bargaining institutions and macroeconomic performance is a challenge (for a survey, see Freeman (2007)). In fact, although the theoretical literature assigns an important role to wage bargaining institutions and an extensive empirical literature tries to quantify this role, assessing institutions remains difficult and comparable information at an international level is still limited. The traditional macro stream of literature dealing with the effects of centralisation of wage bargaining institutions on employment and wage outcomes has generally led to inconclusive results as the variation in the level of bargaining used in these papers is exclusively across countries and often comes from ad-hoc studies (and is therefore not comparable across counties). This implies not only that they draw conclusions from very limited data and, thus, a few outliers can significantly bias the results, but also that they only marginally vary over time (see Aidt and Tzannatos (2005)). For example, results obtained in studies using OECD indicators are rarely significant or robust to variations in the specification of the dependent variable, the composition of the sample or the time period considered (see Baker et al. (2005)). Because of the above-mentioned limitations, macro analyses can tell us little about the underlying causal relationship between wage bargaining institutions and economic outcomes.

On the contrary, micro data analyses reveal that bargaining systems matter. For example, using firm-level data from the WDN, Bertola et al. (2010) find that

bargaining at a level higher than that of the firm significantly increases the probability of reducing employment. They conclude that firms covered by centralised wage bargaining structures are more likely to decrease labour costs by cutting the level of employment than by cutting the level of wages due to the higher level of wage rigidities. Similar results are also presented in Cardoso and Portela (2009) and Jimeno and Thomas (2011), which demonstrate that collective bargaining and minimum wage institutions are both related to less wage flexibility at the micro level.

4 Data and results

As the structure of labour markets is increasingly perceived as a determinant of the macroeconomic performance of a country, we use a novel micro-distributed database to assess the role of wage bargaining institutions in shaping economic outcomes, notably wages and employment. More specifically, we exploit the variation of the level at which bargaining takes place across firms in seven countries of the euro area and relate it to different firm-level cost-cutting strategies following the crisis. We are interested in seeing whether, when faced with a negative shock, firms operating in centralised bargaining structures are more likely to reduce labour costs by reducing employment compared with firms operating in decentralised and/or more deregulated systems.

The novel and largely unexplored micro-level dataset used to perform this analysis is the outcome of a merging procedure between the CompNet and WDN databases. The rich structure of both databases allows us to relate the reaction of firms to the Great Recession in terms of variation in employment and wages (inferred from CompNet and absent in the WDN dataset) to self-reported features of labour market environments at the firm level (inferred from the WDN and not present in CompNet). The goal of the matching procedure is to produce a database that can be used to analyse (by exploiting comparable information across countries) firms' growth dynamics by linking them to information on both firms' characteristics and on the relevant features of the labour market environments in which they operate. The new dataset contains information on:

- five different firm size classes, depending on the level of employment – firms with one to nine employees, firms with ten to 19 employees, firms with 20 to 49 employees, firms with 50 to 249 employees and firms with 250 employees or more;
- four macro sectors – manufacturing, construction, trade and market services;[8]
- seven countries: Austria, Belgium, Hungary, Italy, Lithuania, Portugal, Slovenia and Spain.[9]

Two particular features of the dataset need to be stressed. First, while CompNet indicators vary over time between 1995 and 2012, the WDN dataset is a cross-section and relates to the period from 2007 to 2009. However, as between 2006 and the end of 2011 no fundamental changes were observed in wage bargaining

[8] Where "market services" comprises all the following disaggregated sectors in CompNet: transportation and storage, accommodation and food services, information and communication, real estate, professional, scientific and technological services and support activities. These sectors have been aggregated in order to be matched with the market service sector as defined in the WDN. The aggregation process followed the procedure already used by CompNet (defined in CompNet Task Force (2014)).

[9] The group of selected countries results from the merging procedure and represents the number of countries that are present in both datasets. One exception is Estonia which, although present in both samples, is not included in our analysis as it implemented a labour regulation reform in 2009.

institutions in the group of sampled countries (Task Force of the Monetary Policy Committee of the European System of Central Banks (2012)), we can treat the measures of bargaining institutions as time invariant during the time period we consider (i.e. 2006-2012). Second, and in contrast with the majority of previous studies (with the exception of Boeri (2014)), we distinguish between multi-level and single-level bargaining (either at the firm or multi-employer level). In fact, while many empirical studies have already assessed the effects on wages and employment of both fully centralised and fully decentralised bargaining, much less is known about multi-level structures, despite their extensive development in a number of European countries during the last two decades. In this way, we are able to check whether two-tier structures, designed to allow for more decentralisation and higher wage renegotiation than multi-employer regimes, perform better than fully centralised structures.

From a more general point of view, while previous empirical studies using macro variables limit their analysis to aggregate figures of coverage and the degree of centralisation at different bargaining levels, this micro-distributed dataset allows us to account for the nature of firms taking part in the bargaining regime at issue. Consequently, thanks to the use of cross-country, harmonised micro data, we can control for sectoral and firm characteristics in addition to country-specific ones.

The following shows our results regarding the impact of the degree of centralisation of wage bargaining institutions on both employment and wage adjustments.

4.1 Centralisation of wage bargaining and employment reduction

Given that wage bargaining takes place predominantly in the form of collective bargaining in Europe, understanding to what extent the structure of wage bargaining regimes determines the scope of employment reaction to the economic crisis is important from a policy perspective. In particular, we are interested in studying the extent to which a higher degree of centralisation of wage bargaining institutions implied larger firm-level employment reduction during the Great Recession. To answer this question, we ran the following estimation model:

$$SSF_{cszt} = \beta_1 SFB_{csz} + \beta_2 SFC_{csz} + \beta_3 SFD_{csz} + TFP_{cst} + a_c + b_s + c_z + d_t + u_{cszt}$$

where SSF_{cszt} stands for the share of shrinking firms in country c, sector s, size class z at time t, calculated using the transition matrices previously described in Section 2. In order to focus on the period of the crisis we selected the following periods as three-years rolling windows for our empirical analysis: 2006-2009, 2007-2010, 2008-2011 and 2009-2012. The variables SFD, SFC and SFB, varying by size class, sector, and country, represent respectively the share of firms engaging in fully decentralised bargaining, in fully centralised bargaining, and operating in both levels of bargaining according to the principles previously explained. As already pointed out, these variables are treated as time invariant. Finally, a_c, b_s, c_z, and d_t control respectively for country, sector, size and time-specific effects. In particular, country

dummies account for unobserved national effects such as those that could derive from country-specific employment legislation. Sector and firm-size dummies are included in order to control for unobserved technological and market-structure differences across industries and firms of different sizes.

Our results are reported in column 1 of table 1 and show that the share of firms engaging either in multi-level or multi-employer bargaining are significantly and positively associated with the share of firms that reduced in size during the Great Recession. In other words, an increase in the share of firms engaging in these two regimes of bargaining within a cell (as defined by a firm's size class, sector and country) leads to a statistically significant increase in the share of firms reducing employment with respect to our reference group (firms not engaging in any collective agreement). On the contrary, and as expected, the coefficient of the share of firms in decentralised bargaining regimes is not statistically different from that of our base group.

In column 2 we report the results for a second specification where, in addition to the variables already included before, we also control for sectoral total factor productivity (in logarithm). We add this variable to our previous specification because multi-level bargaining is not randomly allocated across firms due to its add-up properties and this prevent us making causal inferences on the relationship between economic outcomes and bargaining regimes. In particular, we know that multi-level structures are more common among more productive and bigger firms – which are in fact more unionised – as it forces employers to pay a wage drift with respect to the level set at the higher bargaining level. We partially control for the possibility of having endogenous sorting of firm across the bargaining regimes by adding to our specification the level of sectoral TFP of the starting year of each rolling window (i.e. from 2006 to 2009) as it is exogenous to the single firm and more structurally determined. The results show that when, on top of controlling for factors such as country, sector and firm size, which are already likely to largely explain the allocation of firms across the different bargaining regimes, we also control for sectoral TFP, our previous findings hold up and remain statistically significant.

These results already point in the direction that multi-level bargaining regimes have a positive and significant impact on the share of downsizing firms. To deepen the analysis and to explore whether multi-level bargaining allows for greater margins of adjustment to shocks with respect to fully centralised structures, we run the same equation as in column 1 and 2 but only for two-tier countries (these results are shown in column 3 and 4). As predicted by the theory, we see that firms not subscribing to any bargaining regime tend to lay off employees less frequently than firms operating in fully centralised systems. On the contrary, engaging in multi-level bargaining seems to have an even stronger impact on employment reduction with respect to fully centralised regimes. We can explain this evidence by referring to the intrinsic nature of multi-level structures, where plant-level bargaining can only generate a "wage drift" with respect to the pay level agreed at the higher level. For this reason, firms in multi-level structures are likely to be characterised by smaller margins of adjustment than firms engaging in either fully centralised or fully decentralised wage bargaining systems.

Table 1 – OLS model

Employment adjustment and centralisation of collective agreements

Share of shrinking firms	(1) All countries	(2) All countries – with sectoral TFP	(3) Two-tier countries only	(4) Two-tier countries only – with sectoral TFP
Multi-level	0.2025*** (0.0459)	0.2160*** (0.0871)	0.0787*** (0.0222)	0.0784*** (0.0232)
Multi-employer	0.1120*** (0.0400)	0.1221*** (0.0442)	(base group)	(base group)
Plant-level	0.0697 (0.0537)	0.0871 (0.0538)	-	-
No collective bargaining	(base group)	(base group)	- 0.1298*** (0.0429)	- 0.1330*** (0.0488)
Sectoral TFP		0.0062 (0.0102)	-	- 0.0095 (0.0104)
Country dummies	yes	yes	yes	yes
Sector dummies	yes	yes	yes	yes
Size dummies	yes	yes	yes	yes
Time dummies	yes	yes	yes	yes
Constant	0.3143*** (0.0191)	0.3412*** (0.0267)	0.1501*** (0.0114)	0.2288*** (0.0494)
Observations	362	343	254	235
R-squared	0.7765	0.7839	0.7641	0.7641

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

In conclusion, this analysis shows that multi-level structures, although designed to allow for more decentralisation in two-tier countries and for higher frequency in wage renegotiation in response to shocks, perform worse than both fully decentralised and fully centralised wage bargaining regimes. More generally, it turns out that the structure of the wage bargaining regime is an important factor in determining the extent of employment reaction to the economic crisis and demonstrating that the evidence we collected is in line with theoretical predictions. In the next section, we complement this evidence by analysing whether the way in which a shock tends to be allocated across wages and employment partly depends on the degree of firm-level wage rigidity under the different bargaining regimes.

4.2 Centralisation of wage bargaining and wage rigidity

In light of the intensity of the crisis, wage adjustments in response to the Great Recession in the euro area have been rather limited. As reported by the Task Force of the Monetary Policy Committee of the European System of Central Banks (2012), “this apparently limited adjustment seems to corroborate evidence [...] about the existence of various obstacles to wage adjustments in European countries. At the same time, there is a large degree of cross-country heterogeneity regarding the speed and size of wage adjustment since the crisis. These heterogeneous

adjustment patterns may partially reflect cross-country differences in exposure to the recession as well as differences in wage bargaining institutions."

Against this background, we have shown that labour markets characterised by a greater proportion of firms engaging in centralised bargaining (both single- and multi-level) are characterised by a higher share of firms reducing employment if confronted with a negative shock. To see whether this evidence could be partly driven by greater wage rigidity, we ran a probit regression relating the probability of firm-level nominal wage reductions to the share of firms operating in the different bargaining regimes. The estimated equation is the following:

$$WV_{cszt} = \beta_1 SFB_{csz} + \beta_2 SFC_{csz} + \beta_3 SFD_{csz} + a_c + b_s + c_z + d_t + u_{cszt}$$

where WV_{cszt} is a dummy equal to one if the variation in the average labour cost per employee from one year to another – starting with the difference between wages in 2009 and wages in 2008 – was negative and equal to zero otherwise. The remaining variables are defined as in the previous equation. The results are presented in table 2 where we also present the results when controlling for sectoral TFP (column 2) and when focusing on the subset of two-tier countries only (column 3 and 4).

Table 2 – Probit model

Wage adjustment and centralisation of collective agreements

Wage reduction probability	(1) All countries	(2) All countries – with sectoral TFP	(3) Two-tier countries only	(4) Two-tier countries only – with sectoral TFP
Multi-level	-1.6879* (0.9681)	-1.8292* (0.9860)	-2.4977** (1.1889)	-3.1214** (1.2783)
Multi-employer	-1.4817* (0.7932)	-1.6630** (0.8099)	-2.0082** (1.0046)	-2.4646** (1.0937)
Plant-level	-1.5505 (1.0005)	-1.6501 (1.0190)	-	-
No collective bargaining	(base group)	(base group)	(base group)	(base group)
Sectoral TFP		-0.3164 (0.2521)	-	- 0.5998 (0.3134)
Country dummies	yes	yes	yes	yes
Sector dummies	yes	yes	yes	yes
Size dummies	yes	yes	yes	yes
Time dummies	yes	yes	yes	yes
Constant	1.9298** (1.1108)	2.9647*** (1.1108)	2.3408*** (0.6854)	4.2605*** (1.1440)
Observations	537	517	320	300
R-squared	0.2762	0.2766	0.1621	0.1720

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Hungary is included in the wage regression but it lacks data for the employment regression. The probit results are robust to removing Hungary.

In line with theoretical models, our analysis shows that engaging in centralised bargaining structures (both single- and multi-level) decreases the probability of

cutting wages during the Great Recession period. These results suggest that centralised bargaining regimes put constraints on wage adjustments and, in turn, induce firms operating under these regimes to react to negative shocks mainly through reductions in employment. On the other hand, firms operating in decentralised bargaining institutions are more resilient to shocks in terms of employment levels, as they are shown to also be able to adjust to changes in economic conditions through wage changes. The same results also hold when we control for sectoral TFP and when we limit our analysis to the sub-sample of two-tier countries only.

5 Conclusions

For our empirical analysis we used a novel dataset that links information on firms' characteristics and growth trajectories from CompNet to information on the labour market environment in which firms operate from the WDN dataset. We found that the way in which the negative economic shock of the Great Recession was distributed across wages and employment was associated with the degree of centralisation of wage bargaining regimes in theoretically sensible ways.

More specifically, our simple empirical analysis found that differences in employment adjustment across countries in the euro area seemed to reflect the degree of wage flexibility entailed in the different bargaining regimes. Our study shows that, once we control for firms' structural characteristics, labour markets with a higher proportion of firms subscribing to centralised collective bargaining are characterised by a higher proportion of firms reducing the number of employees and that this might be partially due to greater wage rigidity.

As already emphasised, these regressions should not be interpreted as offering a causal interpretation. In order to identify a truly causal relationship between the different structures of bargaining institutions and the relative importance of employment and wage adjustment in reaction to shocks, we would need to control for potential firm selectivity effects through a longitudinal database allowing us to identify some sources of exogenous variation in the bargaining regimes. Indeed, as highlighted by Hartog et al. (1997), controlling for the fact that firms subscribing to a specific bargaining regime might not be representative of the overall population will remain a challenge "as long as no (satisfactory) independent variables to control for the endogeneity of the bargaining regime are available". However, while the results previously found concerning the link between the degree of centralisation of wage bargaining structures and economic outcome can be interpreted only in the spirit of correlation analysis, they are robust to controls for factors such as country, sector and size, which are likely to largely explain the allocation of firms across different bargaining institutions.

The objective of this brief is therefore to show that the structure of the labour market, and particularly the degree of centralisation of wage bargaining institutions, seems to matter for the way firms adjust to economic shocks. Thanks to this new dataset we are able to disentangle different bargaining regimes, including multi-level ones, and relate them to firms' growth trajectories in terms of employment and to nominal wage changes throughout the Great Recession. Therefore, in addition to providing insights on the impact of labour market institutions on cost-cutting strategies at the firm level, this brief intends to promote a more extensive use of micro data, especially given the limitation of macro indicators of labour market institutions.

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Competitiveness Research Network

This policy brief presents research conducted within the Competitiveness Research Network (CompNet). The network is composed of economists from the European System of Central Banks (ESCB) - i.e. the 27 national central banks of the European Union (EU) and the European Central Bank – a number of international organisations (World Bank, OECD, EU Commission) universities and think-tanks, as well as a number of non-European Central Banks (Argentina and Peru) and organisations (US International Trade Commission).
The objective of CompNet is to develop a more consistent analytical framework for assessing competitiveness, one which allows for a better correspondence between determinants and outcomes.
The research is carried out in three workstreams: 1) Aggregate Measures of Competitiveness; 2) Firm Level; 3) Global Value Chains. CompNet is chaired by Filippo di Mauro (ECB). Workstream-1 is headed by Konstantins Benkovskis (Latvijas Banka) and Pavlos Karadeloglou (ECB), workstream-2 is headed by Antoine Berthou (Banque de France) and Paloma López-Garcia (ECB), and workstream-3 is headed by João Amador (Banco de Portugal) and Frauke Skudelny (ECB).

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