The Efficacy of Hybrid Collective Bargaining Systems: An Analysis of the Impact of Collective Bargaining on Company Performance in Europe

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Abstract

Individual and company bargaining has increasingly supplanted sector and country collective bargaining leading to increasingly perforated and multi-layered national collective bargaining systems. In this paper, we develop a comprehensive categorization of bargaining and argue that both the bargaining level and the degree of integrative interaction between bargaining units matters for efficacy. This idea is tested using representative company level data for the European Union. We find that the efficacy of coordinated sector and multi-level systems is higher than for all other forms of bargaining. Policy implications are discussed as these results challenge current attempts to reform collective bargaining in Europe.

I. Introduction

Interest in the efficacy, i.e. the functioning and impact, of different *collective bargaining systems*, i.e. different processes and institutional structures of collective bargaining, on the productivity of companies has (re-)gained both political and academic interest in recent years. This interest was triggered by the advent of the economic crisis in 2008, since the ability of some forms and structures of collective bargaining to provide flexibility for companies to maintain or increase their productivity and competitiveness was questioned in some countries (see, e.g., Addison 2015; Marginson and Welz 2015).

Particularly in the European Union (EU), political interest in the efficacy of collective bargaining systems increased after the adoption of the Europe 2020 strategy in 2010, which aims at promoting "smart, sustainable and inclusive growth" for the EU member states. A part of this strategy aims at fostering the productivity of European companies to enable them to compete successfully in the world market. While Europe 2020 does not directly refer to collective bargaining, several countries received recommendations to review their bargaining systems to ensure that labor costs, i.e. wages and working time arrangements, *support competitiveness and productivity growth* (see, e.g., European Commission 2011). Furthermore, political interest in the efficacy of collective bargaining increased in recent years after the European Commission, the European Central Bank (ECB) and the International Monetary Fund (IMF) included reforms of collective bargaining systems on the agenda of their Memoranda of Understandings (see, e.g., Marginson 2015; Marginson and Welz 2015), which are also reflected in policy and institutional reform recommendations for countries outside the EU (see, e.g., IMF 2015). In fact, reforms of collective bargaining systems were the predominant policy recommendations given by European and international organizations (see Adascalitei et al. 2015). Due to this increase in the political relevance of collective bargaining systems, *academic interest* has also gained momentum in recent years.

In academia interest increased as in many European countries “well known” *national* collective bargaining systems, which were characteristic of European countries for the second half of the 20th century (see, e.g., Crouch 1993), transformed into perforated, multi-layered, and complex systems of collective bargaining, i.e. *hybrid systems*. From a national perspective, these new systems of collective bargaining are characterized by the presence of different collective agreements, e.g. national, sectoral, and company agreements, within one country. It became a common characteristic in several countries that no agreement applies for some companies while other companies are covered by collective agreements on different levels and for some companies multiple collective agreements apply simultaneously. In addition, these systems are not stable over time as the type of collective agreements that apply might change due to reforms of collective bargaining systems. In any case, little is known about the efficacy of these systems of collective bargaining.[1] In this paper we provide a comprehensive and in-depth investigation of the relationship between collective bargaining systems and company performance using cross-European micro data on the company-level. We depart from the existing literature in a number of ways.

Firstly, previous research traditionally concentrated on the effects of collective bargaining at different levels, essentially looking at the effects of collective bargaining at company, sector or national level (see, e.g., Cameron 1984; Calmfors and Driffill 1988; Calmfors 1993). A relatively small number of papers (see, e.g., Soskice 1990; Traxler 1995; Traxler, Blaschke, and Kittel 2001) also considered the degree of coordination between different bargaining units at the same or between different levels. Regarding the latter, the previous literature has also mainly focused on the interaction between two levels such as the existence of individual

[1] See, e.g., Eurofound (2014) and European Commission (2014) for a comprehensive overview of the transformation of national collective bargaining systems in Europe.

bargaining between employers and employees in addition to collective bargaining (see, e.g., Dell'Aringa and Pagani 2007; Plasman, Rusinek, and Rycx 2007; Daouli et al. 2013, Boeri 2014).

Less attention was given to "hybrid" systems of collective bargaining, in which different collective bargaining arrangements can exist for different companies and sectors within a country, and multiple levels and forms of interactions between bargaining units exists.

Given that political interest has also increased and any reforms of collective bargaining systems should be based on informed decisions and evidence-based (see, e.g., Carlin 2012) it is a timely exercise to assess the efficacy of the "hybrid" systems that have emerged over the last three decades in many European Union member states. However the efficacy of such "hybrid" systems was analyzed so far in the context of single countries' transformations, characteristics and experiences (see, e.g., Granqvist and Regnér 2008; Daouli et al. 2013; Dustmann et al. 2014). This fact hinders any attempt at generalization, which is needed for any policy recommendations for other countries. Therefore, in contrast to the previous literature, this paper assesses and compares the effect on company productivity of different forms and processes of determining wages and working conditions which exist in the European member states. We do this on the basis of a fine-grained categorization which uses the three levels (company, sector, country) at which collective agreements were struck, the interaction of different bargaining units at the same level and between different levels, as well as whether different collective agreements are exclusive (i.e. there is only one agreement which is relevant for a company) or inclusive (i.e. different collective agreements on different sectors might apply to one company). In addition we consider and differentiate as to whether there is any form of coordination and inclusive interaction between collective bargaining units.

Secondly, almost all seminal studies on the effects of collective bargaining which have covered a number of different country systems and allowed generalizations of their results were predominantly macro-oriented (see, e.g., Calmfors and Driffill 1988; Soskice 1990; Traxler 1995; Flanagan 1999). In these studies hypotheses were tested using broad categorizations of country collective bargaining systems on the basis of the predominant level (and eventually degree of coordination) in a country. Consequently, any "hybrid" aspects of collective bargaining systems were either omitted, captured in a fuzzy manner, or just partly considered. In addition to this, sample sizes were often small, leading to problems with statistical power. In contrast, the quantity of data used in this analysis allows us to consider the wide heterogeneity and complexity of different bargaining systems that exist within countries and which is missed by purely macro studies that categorize countries based on the dominant bargaining regime. Therefore, in comparison to previous studies, our results provide a much more detailed micro-picture of how different bargaining regimes relate to firm productivity, permitting a more finely-grained empirical and theoretical analysis.

The article is organized into six parts. In the first section we provide an overview of the heterogeneity of collective bargaining systems in the EU. We then review the relevant literature on the efficacy of collective bargaining systems and derive our theoretical arguments and hypotheses. Afterwards, we present the methodological and empirical strategy for testing the hypotheses and then consider the results. The paper concludes by discussing the implications of our study in the context of current attempts to reform collective bargaining in the EU.

II. The Diversity of Collective Bargaining Systems in the EU

There are commonalities as well as wide differences across the EU member states in how wages and working conditions are set (see, e.g., Aumayr-Pintar et al. 2014; European Commission 2014). On the one hand, all countries have some elements of collective bargaining in addition to individual agreements, which is hardly surprising given that the principle of free, independent and voluntary collective bargaining is a cornerstone of the governance of labor in the EU (see European Commission 2014). On the other hand, there are substantial differences among countries both in terms of the coverage of collective agreements and in the specific processes and institutional structures of collective bargaining in different countries.

Collective bargaining coverage in the EU ranges from under 20 percent of employees in countries such as Lithuania, Latvia and Poland to over 80 percent in countries such as Italy, Denmark, Netherlands, Slovenia, Sweden, Finland, France, Austria and Belgium. In the latter two countries, collective bargaining coverage is almost 100 percent (for detailed country data and information see European Commission 2014). Countries also differ in the institutional structure of collective bargaining. First, countries differ in the "traditional" and dominant *level* of collective bargaining, i.e. whether the majority of covered employees fall under company (decentral), sector (intermediate) or national (central) collective agreements.[2] In the majority of countries, sector agreements are predominant, while in a few (i.e. Belgium and Finland) national and in others (i.e. Ireland, Romania, Czech Republic, Greece, Hungary, Latvia, Lithuania, Poland, Malta, and the UK) company agreements are predominant. Second, countries also differ with respect to the degree of *coordination and governability* of collective bargaining in case different bargaining units exist.[3] We refer to "coordination" when looking

[2] A distinct level at which collective bargaining takes place is defined as dominant, according to the definition of the European Commission (2014), if at least 2/3 of the total number of employees covered by any collective agreement fall within this level.

[3] A collective bargaining unit usually consists of two parties: employers and employees representative organizations. Such units can exist on different levels. Employee organizations are usually trade unions organized either on a company, sector or national level. On the employer side, employer organizations usually exist on a sectoral or national level, while a company's management would be responsible for company-level agreements. In some countries, bargaining units also include state representatives. For an overview see Aumayr-Pintar et al. (2014), European Commission (2014).

at the interaction between bargaining units at the same level (*horizontal interaction*), such as one sector's agreement serving as reference for agreements in other sectors (for example, wage leadership) and use "governability" to describe the interaction between units at different levels (*vertical interaction*), such as whether company level agreements can diverge from sector agreements under specific circumstances and/or within specific ranges and for distinct issues. In some studies the term coordination is used for both types of interaction (see, e.g., Kenworthy 2006; European Commission 2014). However, similar to Traxler (1995) and Brandl (2012) we differentiate between the two dimensions as they represent two distinct forms and aspects of a collective bargaining system which are formed by different interaction structures and mechanisms which operate independently from each other.

In terms of coordination, we refer to a bargaining system as *un*coordinated if different units on the same level, i.e. horizontally, act independently from one another. This system is prevalent in the majority of European countries and essentially implies that each unit negotiates for itself without considering agreements made in other units. We refer to a coordinated system of collective bargaining, if units *interact* in an *integrative* way with other units either in formal cooperation meetings or via informal norms, such as sectoral wage leadership. Both the formal and informal institutional and procedural coordination mechanisms differ between countries but exist in a number of EU member countries such as Austria, Belgium, Denmark, Finland, Germany, the Netherlands and Sweden.

In terms of governability, we call a system non-governed if units on different levels in a multi-level bargaining system[4] act independently from one another. However if there is some form of integrative interaction between different levels we will refer to a governed system. These exist in Austria, Belgium, Denmark, Finland, France, Germany, Luxembourg, the Netherlands, Sweden and Slovenia. Similar to coordination, countries differ in the

[4] We use the term multi-level bargaining as in some systems multiple (i.e. two or three) levels exist on different dependent or independent "tiers" or "layers".

institutional form, processes and scope of governability. In some countries, the scope of lower- level bargaining is determined by higher-level agreements. For example it is common in some countries that higher-level agreements are used to set wages, but leave many other working conditions to be negotiated at a lower level. Another example of a governed system is one where higher-level agreements define specific corridors for negotiations of wages at lower levels. Such types of governed systems are characteristic of Nordic countries. We also consider a system to be governed when there is state intervention in bargaining, which is characteristic of France. Another form of governability is that central peak trade union and employers' associations define rules and regulations for their constituent organizations, for example whether derogations from higher level collective agreements at lower levels such as company level agreements deviating from sectoral agreements are allowed or whether lower levels can opt out of collective agreements. The purpose of such derogations is to enable lower level bargaining flexibility, but details again differ between countries. Austria and Germany for example usually allow derogation only in cases when individual companies face (well defined) economic hardship. Another example of differences between countries is the extent to which *in melius derogation* is permitted i.e., lower level deviations from agreements which are worse for employees. Regulations on in melius derogations are common in many EU countries. Even in these countries it is often possible to derogate for working conditions, either because it is more difficult to judge which side is favored by a certain change or because derogation in favor of the employer side, i.e. *in pejus*, is allowed.[5] For an overview of the integrative interaction of collective bargaining units and the respective country classification outlined here and used in the analysis see Aumayr-Pintar et al. (2014) and

[5] An example for the latter can be found in the Germany system of collective bargaining. For example it is possible for normal working hours to be increased to 45 hours at company level but the conditions on when and how this is possible are defined on the sectoral level. For details see Eurofound (2016).

European Commission (2014). For detailed information on the coordination and governability mechanisms and institutions see Traxler et al. (2001).

III. The Effects and Performance of Different Systems of Collective Bargaining

A major focus in the literature has been the efficacy of collective bargaining systems, i.e. the ability of systems to produce beneficial outcomes, such as for example low unemployment, inflation and labor cost growth and high economic and productivity growth, via wage and labor cost moderation.[6] A key issue in theoretical discussions has been the extent to which collective bargaining takes the economy's and society's wider interests into account when negotiating for wages and working conditions. For example, excessive wage increases signed by a collective bargaining unit for its domain,[7] i.e. for a group of workers, are generally considered to be beneficial for the workers covered by the collective agreement, but might

[6] In the following we will outline the theoretical debate on the relationship between different collective bargaining systems and productivity growth of companies by referring to seminal and recent literature. In this literature different outcome indicators are used (e.g. wage growth, unemployment growth, inflation, etc.). However, all these different indicators, including productivity growth, are in general two sides of the same coin and are usually considered to be beneficial. In order not to switch back and forth in the theoretical debate with different indicators we are using the term beneficial outcomes as a synonym for the variety of outcome indicators.

[7] A collective bargaining unit usually consists of two parties, i.e. the employers and the employees. Depending on the domain, e.g. for a specific company, sector, region, or country, employers and employees are represented by different organizations, e.g. sector employers' organization and union on the sector domain or peak level trade unions and employers' association for the national domain. In some collective bargaining systems the state is also included as a third party. When state authorities are involved in collective bargaining, this is predominantly found in bargaining at the national domain. For detailed information on the composition of different bargaining units in the EU member states see Aumayr-Pintar et a. (2014), Eurofound (2015), Marginson and Welz (2015).

create externalities for others such as inflationary pressures on the whole economy and/or make it harder for unemployed workers to be hired. This is particularly true if the bargaining unit is wide ranging and a high share of the workforce is covered and affected by the agreement. Earlier literature focused mainly on the level at which bargaining takes place. One early theoretical argument in favor of bargaining at higher, more centralized levels, such as whole nation-states, has been that a wider range of interests are covered by the agreement simply because a larger number of workers (in extreme cases the whole work force of a country) are covered by it. This implies that all the costs and benefits of the collective agreement are internalized and there is no way to externalize any costs to other units or parties in the economy (see, e.g., Traxler and Brandl 2009). For example, in this case a union would also de facto negotiate for unemployed workers, effectively internalizing their interest in the negotiation. Thus, the higher the level at which collective bargaining takes place, the more likely the mutual interests of all members of the economy are achieved (see Cameron 1984; Bruno and Sachs 1985).

Calmfors and Driffill (1988) challenged the previous theoretical reasoning. They convincingly argued that in decentralized bargaining systems, where bargaining takes place at a company level, competitive pressure between companies would ensure market efficient outcomes from collective bargaining. In particular, market pressures ensure wage moderation in the sense that labor costs do not increase unsustainably thus keeping a company's productivity developments in line with market developments. Consequently, Calmfors and Driffill (1988) argue in favor of a non-linear (hump-shape) relationship between the degree of centralization and beneficial bargaining outcomes, where both centralized and decentralized bargaining systems lead to an appropriate level of wage restraint. Bargaining at intermediate levels such as sectors leads to less beneficial outcomes because at competitive pressures between sectors fall short to overcome the cartelizing effect that sectoral bargaining exerts. This enables the costs of excessive wage increases to be spread across other sectors to the whole economy and society, while the benefits, in the form of higher wages, are only felt by the sector employers and employees.

As this appealing theoretical idea did not fully match with empirical evidence (see, e.g., OECD 2004), the later literature in addition started to recognize the importance of coordination between bargaining units for the efficacy of collective bargaining systems to achieve beneficial outcomes. For example, Soskice (1990) argued that a system where lower level collective bargaining is coordinated can work as a functional equivalent to centralized collective bargaining and is associated with similar beneficial outcomes, as different units at the same level, say sectors, are coordinating their mutual interests and goals in bargaining and are not externalizing the costs to other units. Research on the coordination of collective bargaining also started to consider further contextual factors, such as the interaction of collective bargaining with other policy areas, for example monetary policy, or the organizational structure of bargaining units involved (see, e.g., Calmfors 1993; Iversen 1998). In particular the form and degree of horizontal and vertical *integrative interaction* between different bargaining units, i.e. the extent to which bargaining units take into account the interests of the economy and society as a whole was increasingly considered in theoretical debates.

The theoretical arguments on the sectoral cartelizing effect of collective bargaining hold mainly in the context of a closed economy. For open economies, especially in tandem with a fixed exchange rate as in the European Monetary Union, the situation becomes more complex as only some bargaining units might now be able to externalize costs. For example, sheltered sectors or companies might be able to externalize some of the costs while sectors exposed to international competition have to bear the burden of the bargaining costs of the sheltered sectors. There is evidence that (uncoordinated) sectoral collective bargaining in some countries with an open economy is indeed associated with an inferior efficacy (see, e.g., Traxler et al. 2001). But, as argued by Traxler and Brandl (2012), the efficacy of sectoral and multi-level bargaining systems in open economies is not necessarily inferior but depends on the ability of bargaining units to pursue a strategy of mutual interest. They argue that the efficacy rationale of multi-unit bargaining systems is mainly an organizational coordination and governability question between different units. Faced with interest cleavages between different units, e.g. sectors and companies, which are asymmetrically exposed to international competition and sector or company specific "shocks", there is the need to unify conflicting interests so that long-term mutually beneficial interests are optimized. This implies choosing a strategy and form of integrative interaction between units that serves as a functional equivalent to central level bargaining and favors all or at least the majority of bargaining units. In order to develop a functional equivalent to central level bargaining, an integrative interaction between units at different and/or at the same level via a coordination and governability of collective bargaining is needed. However, an integrative interaction in both horizontal and vertical directions can be procedurally, institutionally and organizationally different in different countries and periods. For example, integrative interaction between sectoral bargaining units materializes in pattern bargaining such as in Austria and partly in Germany where one sector sets a pioneer agreement that serves as an anchor and reference for (all) other sectors. Another example of an integrative interaction between different units is when state authorities are governing, i.e. imposing, the scope and range of collective bargaining issues and outcomes for units at different levels such as partially exists in countries such as Belgium and France. A further form of integrative interaction, which is characteristic of some Nordic countries, is central level peak employers' and union associations governing the scope and range of collective bargaining at lower levels.[8] Even though the institutional and legal framework of an integrative interaction of bargaining units differs across countries,

[8] For details on different forms of integrative interaction between collective bargaining units in advanced economies see for example Traxler et al (2001), Brandl (2012), European Commission (2014).

what matters is that it materializes in a functional equivalent of centralized collective bargaining and is associated with the same theoretically beneficial effects.

In the following we will derive a classification of collective bargaining systems which exists in the member states of the EU and analyze their efficacy in terms of their ability to achieve beneficial economic outcomes. The categorization will differentiate, first, between different levels of collective bargaining, second, whether multiple levels exist simultaneously and third if bargaining units at the same and/or on different levels are interacting in an integrative way or not. On the basis of this classification we are able to test the hypothesis of whether company level bargaining, integrative multi-unit bargaining, and national level bargaining systems are associated with a higher efficacy as compared to all other systems.

IV. Data and Modelling Strategy

In our empirical analysis we focus on three key aspects of collective bargaining systems: the level of bargaining (where we distinguish between national, sectoral and company-level bargaining), the degree of horizontal coordination and the degree of vertical governability of bargaining. The definition of low and high governability follows Traxler et al. (2001) and Brandl (2012) who define and differentiate bargaining systems on the basis of the legal, associational, formal and informal framework of collective bargaining regarding the ability to govern the outcome of bargaining by different units at different levels. Systems with high governability are characterized by the ability of higher level bargaining units, usually peak and central-level employers' organizations and trade unions, to impose restrictions and rules on the outcome and topics of lower level bargaining. In general, the efficacy of governability depends on legal and associational defined regulations but also procedural on the number of units. Basically, any form of integrative interaction becomes increasingly difficult the more bargaining units exist. Our definition of coordination follows the concept of Kenworthy

(2001) which is augmented by Aumayr-Pintar et al. (2014) and which differentiates between bargaining systems on the basis of the legal, associational, formal and informal framework of collective bargaining regarding the ability to coordinate the outcome of bargaining by different units at the same level.

The data we use for the classification and analysis come from the 2013 wave of the European Company Survey (ECS), see Eurofound (2015). The ECS collect company-level data based on interviews with human resource managers and employee representatives. The ECS was collected in spring 2013 across 32 countries, including all current 28 EU member states, and the Former Yugoslav Republic of Macedonia, Iceland, Montenegro and Turkey. For reasons of data availability on wider contextual factors which must be controlled for, our analysis concentrates on the 28 EU member states. We use data on all other aspects of the wider collective bargaining system i.e. employment relations, system from European Commission (2014) and for the macroeconomic context from European Commission (2013) in order to guarantee consistency between different data sets.

The data is representative for businesses and organizations with 10 or more employees and thus enables us to test our hypothesis on a comprehensive sample of different collective bargaining systems. The sample size for our estimation sample is 22,008 companies with individual country samples between 256 (Malta) and 1,439 (Italy). Most importantly for our research question, the ECS contains detailed information about coverage by national, sectoral and company-level collective agreements for each company. We combine this information with country-level information on governability and coordination to arrive at our fine-grained classification of bargaining systems across Europe. In total we consider four types of single level bargaining, specifically company, coordinated sector bargaining, uncoordinated sector bargaining, national bargaining, six types of two level bargaining (company and sector, company and national, sector and national, each governed and ungoverned) and two types of three level systems, namely (un-)governed company, sector and national agreements. Our reference category is purely individual bargaining between the employer and employee, leading to a total of 13 categories, which is the most comprehensive and fine-grained classification considered in the literature so far as it explicitly differentiates between all existing levels and combinations of levels and interactions.[9]

As an outcome and indicator for the efficacy of collective bargaining systems we use changes in labor productivity from 2010 to 2013, measured in three categories, "increased, "decreased" and "remained the same". In most specifications, we collapse this into a single dummy variable taking the value "1" if labor productivity increased. This choice of the dependent variable offers some advantages over other commonly used measures. Macro-level cross country studies usually use performance indicators such as (nominal and real) wage increases, unit labor costs, (un)employment, inflation, taxation, and (wage) inequality (see, e.g., Calmfors and Driffill 1988; Soskice 1990; Wallerstein, Golden, and Lange 1997; Iversen 1998; Flanagan 1999; Traxler et al. 2001; Addison and Belfield 2004; Johnston and Hancké 2009; Baccaro and Simoni 2010; Brandl 2012; Johnston 2012; Murtin, de Serres, Hijzen 2014). In micro studies, wage related indicators such as nominal wage levels, increases, wage premium, wage dispersion and excess wages are used as performance or outcome measures (see, e.g., Hartog, Leuven, and Teulings 2002; Rycx 2003; Cardoso and Portugal 2005; Plasman et al. 2007; Fitzenberger, Kohl, and Lembcke 2008; Dahl, le Maire, and Munch 2013; Daouli et al. 2013; Boeri 2014). In contrast, we evaluate the performance of collective bargaining systems by the ability of the relevant actors to sign collective agreements on wages

[9] A further differentiation would have been theoretically possible as company level bargaining could be coordinated as well, but this system does not exist in any EU member state. It would also be possible to differentiate further by categorizing multi-level systems along coordination and governability. However, this would increase the number of categories to 19 and would lead to extremely low observation numbers for some categories leading to unreliable estimates. For these reasons we do not consider a further differentiation in the following analysis.

and working conditions that lead to a labor costs development enabling *productivity growth* of the companies affected by the agreement. Even though fewer studies used productivity as an outcome indicator (see, e.g., Addison and Hirsch 1989), we prefer productivity growth over wage growth and wage level indicators for a variety of reasons.

First, collective bargaining is not exclusively about wages but also about working conditions such as working time (including hours of work, rest periods, work schedules and flexible work), remuneration forms and schemes (including wage and non-wage benefits and bonuses), innovation and organizational change regulations, as well as vocational training agreements which do not all influence wages but will have an impact on company productivity (see, e.g., Nergaard et al. 2009; Addison et al. 2013; Voss, Schöneberg, and Rodriguez Contreras 2015). Taking only wages into account as an outcome of collective bargaining would miss the effects of these regulations on working conditions, even though they are significant cost and investment factors and potentially influence the productivity of companies considerably. Second, what is important for the "success" of companies is their productivity development and not necessarily the development of their employees' wages. As a matter of fact, depending on the wage setting mechanism employed by a company, e.g. efficiency wages (see, e.g., Akerlof and Yellen 1986; Krueger and Summers 1988), the link between wage levels and wage increases and productivity is highly complex so that (excessive) wage increases do not necessarily hinder the productivity of companies. For example, in multi-level collective bargaining systems in which a favorability principle (in melius) regarding wages exists, it is inevitable that any additional collective agreement leads to higher wages (see, e.g., Hartog et al. 2002; Rycx 2003; Cardoso and Portugal 2005; Plasman et al. 2007; Dahl et al. 2013, Daouli et al. 2013; Boeri 2014). However, while wages are necessarily higher in multi-level systems, ceteris paribus, company productivity might not necessarily be negatively affected. In fact, productivity might even increase as non-wage issues which matter for productivity are regulated in the collective agreement (see Windolf

1989), but also because the higher wages of such multi-level systems could impose (efficiency) wage effects which translate into productivity increases in some companies (see, e.g., Levine 1991; Lazear 1995; Hibbs and Locking 2000). Thus, productivity growth is not only the more comprehensive efficacy indicator of collective bargaining compared to wage growth or any other wage indicator, but also the most valid. Finally we prefer productivity growth as an indicator because it is explicitly mentioned as a direct success factor in political debates such as the Europe 2020 strategy. Thus it enables us to directly link our results with current political debates and to inform policy goals.

(Table 1 about here.)

Table 1 presents an overview of the prevalence of all bargaining systems in the EU, how widespread these systems are across the member states, as well as descriptive information on the share of companies reporting increases in productivity in each category. The largest group in our sample (i.e. 37%) are companies without any collective bargaining, which are also present in each EU country. In these companies, wages and working conditions are set exclusively by individual agreements between the employer and the employees. Individual bargaining is followed by the various types of single-level bargaining which total a share of 42%. Two and three-level systems are less common, but exist in 20% of all companies in the EU. As regards the number of agreements at different levels, the majority are signed on a company level, followed by the sectoral level and then the national level. This ranking is consistent with other sources (see, e.g., European Commission 2014) even though the number of national level collective agreements is relatively high. The latter can be explained by some respondents treating social pacts, i.e. ad hoc agreements between national (peak) level employers' associations, trade unions, and the government, as collective agreements, while other sources such as the European Commission (2014) categorize social pacts separately.[10]

Comparing the number of single and multi-level agreements, it is striking that that every third collective agreement nowadays is a multi-level agreement. This could be interpreted as an indicator for a process of decentralization of collective bargaining leading to an increase in the number of company agreements in addition to higher level agreements which still prevail in many countries. It is also striking that all these systems are not exclusive to specific countries or smaller groups of countries. In fact, we have not one single country in which only one single system of collective bargaining exists. Rather national systems are rather characterized by a perforated landscape of collective agreements struck by different units at different levels. This, as well as the fact that in 20% of all companies a multiple-level bargaining system exists, indicates the current hybrid nature of national collective bargaining systems in the EU.

Examining productivity increases across the different categories reveals large differences across the different bargaining systems. While these are clearly unconditional differences that may be influenced by other variables, they are at least suggestive of some link between bargaining systems and productivity. Importantly for our analysis, the descriptive results also suggest that productivity increases differ depending on governability and coordination, even within otherwise identical bargaining systems.

In the next step, we evaluate whether these productivity differences persist when introducing various sets of controls and conducting various types of robustness checks. We begin by simply regressing a dummy for productivity increases on the full range of bargaining system

[10] Whether social pacts are collective agreements is largely a matter of definition and there are reasons in favor and against a differentiation (see, e.g., Brandl 2012) but in fact it is difficult for respondents in companies to differentiate between them.

dummies using linear regression.[11] We then introduce various control variables in blocks, beginning with industry dummies and various other company characteristics such as membership in an employer organization, the presence of a union representative, establishment size (3 dummies), public/private sector, dummies for being a company headquarter or a subsidiary site, presence of a works council and (grouped) shares of employees with open ended contracts, with university degrees, who are female, who work part-time and who are in highly-qualified jobs. Subsequently, we introduce a fairly comprehensive set of macro variables to control for all kinds of country differences. This set of macro controls are the change in log GDP from 2010 to 2013, the current tax burden (change from 2010 to 2013 and level in 2013), the average share of exports and imports in world trade (change from 2010 to 2013 and level in 2013), log of the total labor force in 2013, real unit labor costs for the total economy (change from 2010 to 2013 and level in 2013), the harmonized consumer price index (change from 2010 to 2013 and level in 2013) and respective exchange rate with the Euro (change from 2010 to 2013 and level in 2013). All these variables correspond to the set of variables used in relevant macro studies on the efficacy of collective bargaining systems. Finally, in a last specification, we replace the macro variables with country fixed effects, thus capturing all observed and potentially unobserved factors differing between countries. It is important to be clear that this last specification is likely to miss a large part of the effects of interest: Governability and coordination vary essentially between different countries but not within them, while the presence of country fixed effects means that the effects are identified using differences in bargaining systems across companies within countries. While this fact will likely drive results towards zero, this specification is still an interesting benchmark case as it likely represents the lowest possible bounds for the effects of interest.

[11] We also calculated Probit marginal effects. Estimates are essentially identical.

In a second step, we re-estimate the specifications using the original (ordinal) variable and ordered probit regressions. These estimates confirm our earlier results. Finally, we conduct a range of additional robustness checks in relation to our classification of countries in terms of coordination and Governability. In a first robustness check, we explore additional classifications of countries, which are sometimes suggested in the literature. In another robustness check, we test whether the results are heavily influenced by the presence of a single country by dropping each country in turn and re-estimating our model. We then present summary results on the distribution of coefficients across these estimates.

V. Results

Table 2 presents the basic regression results. We start the discussion of the results with specification (1) which includes the full set of control variables and proceed then to alternative specifications in order to investigate the robustness of our results. An important result is that a large share of the coefficients appears to be qualitatively *un*affected by the inclusion of various control variables across columns (1) to (4). This is reassuring as it suggests that the potential for omitted variable bias is comparatively small. The inclusion of country fixed effects in column (5) predictably reduces the size and significance of the estimated coefficients to about 40-50% of those in column (1). However, even in this specification, the vast majority of coefficients retain their sign as well as their relative size in relation to each other. This also underlines once again that all multi-level collective bargaining systems which include the sectoral level of bargaining are associated with a significantly superior efficacy.

(Table 2 about here.)

Looking at the results reveals that across specifications the share of companies with productivity increases is significantly higher if they fall into the domain of company-level, coordinated sector, national and governed sector and company, governed sector and national, ungoverned company and national, and governed three level collective agreements, compared to companies which are covered by no collective agreement. Uncoordinated sector bargaining in turn is associated with a significantly lower share of companies experiencing productivity increases. However, the positive effect on companies' productivity, i.e. the efficacy of collective bargaining systems, is highest for governed three-level bargaining systems and for the governed two-level systems which include sectoral bargaining.

These results fit our theoretical considerations regarding single level collective bargaining systems. National level bargaining and company level bargaining are associated with beneficial outcomes with a slightly better efficacy of national bargaining, which is also in line with theoretical considerations of the Calmfors and Driffill (1988) hypothesis. However, as regards the efficacy of sectoral systems, the claim made by Soskice (1990) and Traxler (1995) that it is necessary to consider whether there is an integrative interaction between bargaining units, apparently has merit. Not only does the efficacy of coordinated sector bargaining systems outperform all other single level systems, but governed multi-level systems which include sector bargaining are also characterized by a high degree of efficacy. However, these results also show that uncoordinated and ungoverned multi-level systems fail to be positively associated with the productivity development of companies and might in fact even be negatively related. By comparing the estimates from (1) with the estimates in specifications (2) to (4), the robustness of the positive efficacy effects of the coordinated sector bargaining system, and of all governed multi-level systems which include the sectoral level, as well as the negative efficacy for uncoordinated sectoral bargaining is confirmed. For several other types of bargaining systems the results are less clear-cut. Depending on the specification, ungoverned multi-level systems are associated with either a worse or similar efficacy than having no collective agreement. Also the robustness of the positive efficacy of company and national bargaining is contested. Again, these results are plausible in light of the theoretical reasoning as in (3) company specific controls mitigate the effects of company bargaining effects and the effects of national level bargaining need controls for the national macroeconomic context which is missing in (4).

(Table 3 about here.)

The previous analysis has mainly focused on the productivity increases of companies. In principle, it could be possible that this specification misses important changes that occur at the productivity remaining the same vs. declining margin. Table 3 repeats our analysis using all three categories of the outcome variable using ordered probit regressions. Positive coefficients in this specification imply "better" productivity changes.

As we can see from Table 3 there are indeed some changes, mainly that company and national bargaining become insignificant. At the same time the main result in relation to the multi-level systems and the importance of coordination and governability remain. The inclusion of fixed effects renders some effects insignificant, however, these estimates should be treated with caution as non-linear models such as ordered probits are generally less efficient than linear models and many of the properties of fixed effects do not translate easily from linear models.

(Table 4 about here.)

In our analysis we categorize collective bargaining as governed or ungoverned as well as coordinated or uncoordinated on the basis of coordination and governability mechanisms that are observable in different countries. As mentioned earlier, the legal and contextual framework of these mechanisms varies across countries so that any classification of countries is not necessarily always clear cut. Even though our classification of coordination and governability is based on widely accepted sources (see Aumayr-Pintar et al. 2014; European Commission 2014: Traxler et al. 2001), there are some borderline cases. Specifically, Greece, Italy, and Spain can be classified differently in terms of the degree of coordination, while the same can be said for Belgium regarding the degree of governability. For Belgium, this doubt arises because of the regional division of collective bargaining. The potential fuzziness of the classification of Greece, Italy, and Spain is mainly due to the fact that in all three countries (relatively) strong centralized features of centralized and thus of coordinated bargaining exist, but these do not always materialize in full, comprehensive and wide ranging coordination due to a high fragmentation of the trade union and employers' association system in these countries. In addition, in all three countries collective bargaining institutions were reformed during the time the ECS data was collected, leading to more emphasis on the role of deregulated collective agreements. This means that the degree of integrative interaction between units in these countries is not adequately reflected in the sources we used for classification. For this reason Table 4 explores the robustness of results with respect to an alternative classification of countries in terms of coordination and governability.

While there are some changes in significance across specifications, for example, for the negative coefficient for ungoverned sector and national bargaining which becomes significant in some specifications, the main results remain very similar to those in Tables 2 and 3. Specifically, coordinated sector bargaining as well as governed multi-level bargaining systems are associated with more favorable labor productivity development than having no collective agreement; while uncoordinated sector bargaining und ungoverned multi-level systems that involve sectoral bargaining tend to have worse labor productivity development.

(Table 5 about here.)

Table 5 presents the results from a final robustness check which considers the extent to which specific countries are potentially driving the results. We re-estimate our models omitting all observations from each country in turn. The table presents summary results from these estimates, specifically the average coefficient, the median, minimum and maximum coefficient and the percentage of estimates where the coefficient was significant. The results essentially confirm our main results from the previous tables. Coordinated sector bargaining, governed multi-level systems involving sector bargaining and ungoverned multi-level systems not involving sector bargaining are always positively related to labor productivity improvements and are always significant. On the flipside, uncoordinated sector bargaining is always associated with lower labor productivity improvements. All other results are somewhat mixed, although national bargaining is usually significant and positively related to labor productivity improvements.

Taken together, the results present a coherent picture across a range of different specifications and samples. The effect of collective bargaining on company productivity growth depends heavily on the integrative interaction between collective bargaining units on the same and on different levels.[12] In fact, this holds for single and multi-level systems. On a sectoral level coordinated collective bargaining is significantly associated with a higher number of companies reporting productivity increases compared to all other single level systems. Moreover, all multi-level collective bargaining systems involving the sectoral level outperform all other categories in terms of productivity. This includes two and three level systems and is in line with previous country studies on the efficacy of collective bargaining (reforms). For example these results here confirm the efficacy assessment of the German collective bargaining system analyzed and discussed by Dustmann et al. (2014) as Germany is

[12] This is confirmed by the (Wald) joint significance test reported in Table 2 of all multi governed bargaining systems.

predominantly characterized by governed two-level systems, coordinated sectoral bargaining, and company bargaining next to individual bargaining. Even though the performance indicator differs, the results here also confirm other country studies (see, e.g., Granqvist and Regnér, 2008) as it shows that the Swedish system, in which governed two and three level bargaining is prevailing, has the ability to perform well in terms of increasing the productivity of companies.

Although the results of this study correspond with recent studies and evidences, they also challenge fundamental theoretical hypotheses for various reasons. The Calmfors and Driffill (1988) hump-shape thesis for instance argues that the relative advantage of specific systems of collective bargaining lies either in the capacity of bargaining units to exploit the labor cost-moderating effect of centralized bargaining or in the need to minimize labor costs because of exposure to (international) competition. This theoretical reasoning must be reconsidered as centralized, i.e. national bargaining, is not found to be associated with the highest performance compared to other systems. In fact, when coordinated, sectoral systems are associated with an even higher performance compared with company, national, and individual bargaining.

These results also amend the theoretical reasoning that multi-level systems are associated with the worst performance of all bargaining systems (see Boeri 2014) as our results show that the performance of multi-level collective bargaining systems is dependent upon the integrative interaction of bargaining units between the levels, i.e. upon the governability of the system. Indeed, our results suggest that integrative interaction is the key element for the efficacy of collective bargaining systems. On the one hand, the results here show that multi-level bargaining systems under low governability perform worst because they combine all the disadvantages of possible sector cartelizing effects and free riding incentives of bargaining units. On the other hand, the results show that if multi-level systems are governed, they have the potential to outperform *all* other bargaining systems as they incorporate the need to internalize the costs and benefits of their outcomes as well as enable bargaining units at different levels to adopt and adjust bargaining outcomes to unit and domain specific circumstances. These results on the performance of coordinated and governed collective bargaining systems are generally consistent with the reasoning by Soskice (1990) and Traxler (1995) for national collective bargaining systems in a macroeconomic framework of analysis. However, given that the organizational and structural framework of collective bargaining has changed significantly in the past three decades as national systems have transformed into hybrid systems and fuzzy national bargaining "regimes", there was the need to adjust the theoretical and empirical framework. This has necessarily lead to a revision of previous evidence and reasoning on the one hand but a validation and confirmation of others.

VI. Conclusion

In this paper we argued that the structural framework of collective bargaining in Europe is characterized by the presence of a diversity of collective systems. These systems differ in the sense that collective bargaining takes place at different levels either exclusively on specific levels or combined at different levels. In addition, collective bargaining systems differ regarding the integrative interaction between different bargaining units at different levels and domains. Given that various bargaining systems are observable across EU member states, national bargaining landscapes provide a perforated and complex, i.e. hybrid, picture. As little is known about the efficacy of these systems of collective bargaining, this paper provides a detailed analysis of the impact of these systems on company productivity.

The analysis was based on a fine-grained categorization of distinct collective bargaining systems which are observable in the EU member states. It was explained how the key components of collective bargaining systems, i.e. the level and the degree of integrative interaction at the same and on different levels, affects the performance of companies which was measured by increases in companies' productivity. We argued that company productivity is a preferable and valid measure of the efficacy of collective wage bargaining systems as it captures not only the impact of agreements on wages but also on non-wage issues, such as working conditions, which form an important part of collective bargaining. It was hypothesized that centralized, company level, as well as coordinated and governed multi-level systems of collective bargaining are associated with a superior performance relative to other systems. The efficacy of the distinct systems of collective bargaining was tested on the basis of micro-level, i.e. company data, from the 2013 European Company Survey. As the dataset used is not only comprehensive but also representative for the EU, it allows us to achieve a high degree of generalization of the results, which confirms but also rejects some of our hypotheses. On the one hand, we had to revise the idea that company and national level bargaining systems are associated with the highest performance. Our analysis provided strong and robust empirical evidence that coordinated sectoral bargaining and governed multi-level bargaining systems are associated with an even higher efficacy than company and national bargaining. On the other hand, we were able to confirm that any form of integrative interaction between collective bargaining units at the same level as well as on different levels is a key factor for the efficacy of collective bargaining.

In fact, coordinated sector collective bargaining (as for example still common in Austria), governed company and sector bargaining (as for example common in Germany), and governed national, sectoral, and company level bargaining (as for example common in Nordic countries) are associated with a superior performance compared with other systems of collective and individual bargaining. Company and individual bargaining systems (as for example common in the Central and Eastern European Countries and in the UK) are associated with an "average" performance compared to all other categories. Systems with the worst performance were identified as those for uncoordinated sectoral and non-governed multi-level systems (as for example common in some peripheral countries of the EU). Our results are robust in controlling for a wide-range of company and country-level variables and across a wide range of empirical specifications.

These results also provide evidence on the success of past and current policy recommendations provided by policy making institutions and authorities in the context of current attempts to reform collective bargaining. Most notably this applies to recommendations under the umbrella of the EC new economic governance and the Europe 2020 strategy, as well as to policy recommendations given by international organizations such as the IMF. Nearly all policy recommendations in this context were geared towards fostering and strengthening company collective bargaining and individual bargaining (see, e.g., Marginson 2015). For a number of countries in Central and Eastern Europe this led to the disappearance of any forms and structures of sectoral and national collective bargaining. In a number of other countries, especially in Southern Europe, this lead to the introduction or strengthening of supplementary levels of collective bargaining (see, e.g., Eurofound 2014).

However, both developments are “sub optimal” in the light of the results presented here. In the case of the abolishment of any sectoral and national agreements, the performance which is “achievable” by these reforms is only “average” compared to other possible reforms, as company bargaining and individual bargaining are clearly outperformed by coordinated sectoral bargaining and governed multi-level bargaining systems. When collective bargaining is reformed towards a multi-level system in which, for example, sectoral bargaining is widened and complemented by company bargaining, the performance of the reform depends upon the ability of units to interact in an integrative way. On the one hand, if the reform leads to an ungoverned multi-layer bargaining system, the performance of this system can be expected to be worse. On the other hand, if the reform is flanked by governability mechanisms, the reform is likely to succeed in a first best solution.

Given that past reforms and transformations of collective bargaining systems in the EU were predominantly geared towards the strengthening of company bargaining without any attention to the coordination and governability of collective bargaining, our analysis suggests that past reforms and current recommendations and reforms have resulted in a second best, or sometimes even a dampening efficacy. As this study uses not only the most comprehensive, fine grained analysis of current hybrid systems of collective bargaining in the EU, but also the most generalizable data set, the conclusion for informed policy making is that the "standard" reform agenda should be reconsidered and more attention must be paid to the integrative interaction of bargaining units.

References

Adascalitei, Dragos, Sameer Khatiwada, Miguel A. Malo, and Clemente Pignatti Morano. 2015. Employment protection and collective bargaining during the Great Recession: A comprehensive review of international evidence. MPRA Paper no. 65509, Munich Personal RePEc Archive, Munich.

Addison, John T. 2005. Collective bargaining systems and macroeconomic and microeconomic flexibility: The quest for appropriate institutional forms in advanced economies. IZA Discussion Paper no. 9587. Institute for the Study of Labor, Bonn.

Addison, John T., and Barry T. Hirsch. 1989. "Union effects on productivity, profits, and growth: Has the long run arrived? *Journal of Labor Economics* 7:72-105.

Addison, John T., and Clive R. Belfield. 2004. Unions and employment growth: The one constant? *Industrial Relations* 43:305-23.

Addison, John T., Paulino Teixiera, Katalin Evers, and Lutz Bellman. 2013. Collective bargaining and innovation in Germany: Cooperative industrial relations? IZA Discussion Paper no. 7871. Institute for the Study of Labor, Bonn. (forthcoming in Industrial Relations, 2016)

Akerlof, George, and Janet Yellen. 1986. *Efficiency wage models of the labor market*. Cambridge: Cambridge University Press.

Aumayr-Pintar, Christine, Jorge Cabrita, Enrique Fernández-Macías, and Carlos Vacas-Soriano. 2014. *Pay in Europe in the 21st century*. Dublin: Eurofound.

Baccaro, Lucio, and Marco Simoni. 2010. Organizational determinants of wage moderation. *World Politics* 62:594-635.

Boeri, Tito. 2014. Two-tier bargaining. IZA Discussion Paper no. 8358. Institute for the Study of Labor, Bonn.

Brandl, Bernd (2012). Successful wage concertation: The economic effects of wage pacts and their alternatives. *British Journal of Industrial Relations* 50:482-501.

Bruno, Michael, and Jeffrey D. Sachs. 1985. *The economics of worldwide stagflation*. Oxford: Blackwell.

Calmfors, Lars. 1993. Centralization of wage bargaining and macroeconomic performance. *OECD Economic Studies* 21:161–91.

Calmfors, Lars, and John Driffill. 1988. Bargaining structure, corporatism and macroeconomic performance. *Economic Policy* 6:13–61.

Cameron, David R. 1984. Social democracy, corporatism, labour quiescence and the representation of economic interests in advanced capitalist countries. In *Order and conflict in contemporary capitalism*, ed. John H. Goldthorpe. Oxford: Clarendon Press.

Cardoso, Ana R., and Pedro Portugal. 2005. Contractual wages and the wage cushion under different bargaining regimes. *Journal of Labor Economics* 23:875-902.

Carlin, Wendy. 2012. Real exchange rate adjustment, wage-setting institutions, and fiscal stabilization policy: Lessons of the Eurozone's first decade. *CESifo Economic Studies* 59:489-519.

Crouch, Colin. 1993. *Industrial relations and European state traditions*. Oxford: Clarendon Press.

Dahl, Christian M., Daniel le Maire, and Jakob R. Munch. 2013. Wage dispersion and decentralization of wage bargaining. *Journal of Labor Economics* 31:501-33.

Daouli, Joan, Michael Demoussis, Nicholas Giannakopoulos, and Ioannis Laliotis. 2013. Firm-level collective bargaining and wages in Greece: A quantile decomposition analysis. *British Journal of Industrial Relations* 51:80-103.

Dell'Aringa, Carlo, and Laura Pagani. 2007. Collective bargaining and wage dispersion in Europe. *British Journal of Industrial Relations* 45:29–45.

Doucouliagos, Hristos, and Patrice Laroche. 2009. Unions and profits: A meta-regression analysis. *Industrial Relations* 48:146-84.

Dustmann, Christian, Bernd Fitzenberger, Uta Schönberg, and Alexandra Spitz-Oener. 2014. From sick man of Europe to superstar: Germany's resurgent economy. *Journal of Economic Perspectives* 28:167-88.

Eurofound (European Foundation for the Improvement of Living and Working Conditions). 2014. *Changes to wage-setting mechanisms in the context of the crisis and the EU's new economic governance regime*. Dublin: Eurofound.

------. 2015. *European Company Survey, 2013*. [data collection], UK Data Service, Accessed 16 December 2015, SN: 7735, http://dx.doi.org/10.5255/UKDA-SN-7735-1

------. 2016. *Changes to collective bargaining*. Dublin: Eurofound.

European Commission. 2011. Concluding the first European semester of economic policy coordination: Guidance for national policies in 2011-2012, Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic And Social Committee And the Committee of the Regions, COM(2011) 400 final, Brussels.

------. 2013. European Commission's Directorate General for Economic and Financial Affairs. *Annual macro-economic database (AMECO),* http://ec.europa.eu/economy_finance/db_indicators/ameco/index_en.htm

------. 2014. *Industrial relations in Europe report 2014*. Brussels: European Commission.

Fitzenberger, Bernd, Karsten Kohn, and Alexander C. Lembcke. 2008. Union density and varieties of coverage: The anatomy of union wage effects in Germany. IZA Discussion Paper no. 3356, Institute for the Study of Labor, Bonn.

Flanagan, Robert J. 1999. Macroeconomic performance and collective bargaining: An international perspective. *Journal of Economic Literature* 37:1150-75.

Granqvist, Lena, and Håkan Regnér. 2008. Decentralized wage formation in Sweden. *British Journal of Industrial Relations* 46:500–20.

Hartog, Joop, Edwin Leuven, and Coen Teulings. 2002. Wages and the bargaining regime in a corporatist setting: The Netherlands. *European Journal of Political Economy* 18:317–31.

Hibbs, Douglas J. and Håkan Locking. 2000. Wage dispersion and productive efficiency: evidence for Sweden. *Journal of Labor Economics* 18:775-82.

IMF (International Monetary Fund). 2015. *The 2015 external sector report: Individual economy assessments*. Washington: IMF.

Iversen, Torben. 1998. Wage bargaining, central bank independence, and the real effects of money. *International Organization* 52:469-504.

Johnston, Alison. 2012. European Economic and Monetary Union's perverse effects on sectoral wage inflation: Negative feedback effects from institutional change? *European Union Politics* 13:345-66.

Johnston, Alison, and Bob Hancké. 2009. Wage inflation and labour unions in the EMU. *Journal of European Public Policy* 16:601-22.

Katz, Harry C. 1993. The decentralization of collective bargaining: A literature review and comparative analysis. *Industrial and Labor Relations Review* 47:3-22.

Kenworthy, Lane. 2001. Wage-setting institutions: A survey and assessment. *World Politics* 54:57-98.

Kenworthy, Lane. 2006. Institutional coherence and macroeconomic performance. *Socio-Economic Review* 4:69-91.

Krueger, Alan B., and Lawrance H. Summers. 1988. Efficiency wages and the inter-industry wage structure. *Econometrica* 56(2):259-93.

Lazear, Edward P. 1995. *Personnel economics*. Cambridge, MA: MIT Press.

Levine, David. 1991. Cohesiveness, productivity and wage dispersion. *Journal of Economic Behavior and Organization* 15:237-55.

Marginson, Paul. 2015. Coordinated bargaining in Europe: From incremental corrosion to frontal assault? *European Journal of Industrial Relations* 21:97-114.

Marginson, Paul, and Christian Welz. 2015. European wage-setting mechanisms under pressure: Negotiated and unilateral change and the EU's economic governance regime. *Transfer* 21:429-50.

Minns, Chris, and Marian Rizow. (2015). Institutions, history and wage bargaining outcomes: international evidence from the post-World War Two era. *Business History* 57:358-75.

Murtin, Fabrice, Alain de Serres, and Alexander Hijzen. 2014. Unemployment and the coverage extension of collective wage agreements. *European Economic Review* 71:52-66.

Nergaard, Kristine, Jon Erik Dolvik, Paul Marginson, Juan Arasanz Diaz, and Barbara Bechter. 2009. Engaging with variable pay: A comparative study of the metal industry. *European Journal of Industrial Relations* 15: 125-146

OECD (Organization for Economic Cooperation and Development). 2004. *Employment Outlook*. Paris: OECD.

Plasman, Robert, Michael Rusinek, and François Rycx. 2007. How do company collective agreements affect wages? Evidence from four corporatist countries. *European Journal of Industrial Relations* 13:161–80.

Rycx, François. 2003. Industry wage differentials and the bargaining regime in a corporatist country. *International Journal of Manpower* 24(4):347-66.

Soskice, David. 1990. Wage determination: The changing role of institutions in advanced industrialized countries. *Oxford Review of Economic Policy* 6:36-61.

Swenson, Peter A., and Jonas Pontusson. 2000. The Swedish employer offensive against centralized bargaining. In *Union, employers and central banks*, ed. Torben Iversen, Jonas Pontusson, and David Soskice. Cambridge: Cambridge University Press.

Traxler, Franz. 1995. Farewell to labour market associations? Organized versus disorganized decentralization as a map for industrial relations. In *Organized Industrial Relations in Europe: What Future?*, ed. Franz Traxler, and Colin Crouch. Avebury: Aldershot.

Traxler, Franz, and Bernd Brandl. 2009. The effects of collective bargaining coverage: A cross-national analysis. Global Union Research Paper, Discussion Paper No. 110. Geneva: International Labour Office.

Traxler, Franz, and Bernd Brandl. 2012. Collective bargaining, inter-sectoral heterogeneity and competitiveness: A cross-national comparison of macroeconomic performance. *British Journal of Industrial Relations* 50:73-98.

Traxler, Franz, Sabine Blaschke, and Bernhard Kittel. 2001. *National labor relations in internationalized markets*. Oxford: Oxford University Press.

Voss, Eckhard, Katharina Schöneberg, and Ricardo Rodriguez Contreras. 2015. *Collective bargaining in Europe in the 21st century*. Dublin: Eurofound.

Wallerstein, Michael, Miriam Golden, and Peter Lange. 1997. Unions, employers' associations, and wage-setting institutions in Northern and Central Europe, 1950-1992. *Industrial and Labour Relations Review* 50:379-401.

Windolf, Paul. 1989. Productivity coalitions and the future of European Corporatism. *Industrial Relations* 28(*1*):1-20.

Figures and Tables

Table 1

Bargaining Systems and Labor Productivity

Bargaining system	Number of observations/companies	% of observations	% with productivity increase	System present in … countries
Individual bargaining	8,182	37.2	48.4	28
		Single level systems		
Company bargaining	3,869	17.6	51.1	28
Coordinated sector bargaining	2,029	9.2	53.3	9
Uncoordinated sector bargaining	1,331	6.0	36.6	19
National bargaining	2,113	9.6	40.0	28
		Multi level systems		
		Two level systems		
Governed company and sector	636	2.9	60.0	6
Ungoverned company and sector	885	4.0	43.7	22
Governed company and national	138	0.6	54.4	6
Ungoverned company and national	557	2.5	45.1	21
Governed sector and national	521	2.3	63.3	6
Ungoverned sector and national	649	2.9	40.1	20
		Three level systems		
Governed company, sector and national	404	1.8	65.1	6
Ungoverned company, sector and national	694	3.1	45.5	21

Table 2

Base Estimates, Dependent Variable: Increase in Labor Productivity from 2010 to 2013 (1 = Yes)

	(1)	(2)	(3)	(4)	(5)
Company bargaining	0.018*	0.029***	0.008	0.027***	0.011
	(0.010)	(0.010)	(0.010)	(0.010)	(0.011)
Coordinated sector bargaining	0.064***	0.078***	0.058***	0.049***	0.018
	(0.014)	(0.013)	(0.013)	(0.012)	(0.016)
Uncoordinated sector bargaining	-0.046***	-0.034**	-0.111***	-0.118***	0.011
	(0.016)	(0.016)	(0.014)	(0.014)	(0.016)
National bargaining	0.035**	0.041**	-0.070***	-0.084***	0.015
	(0.014)	(0.014)	(0.012)	(0.012)	(0.014)
Governed company and sector	0.119***	0.134***	0.115***	0.113***	0.055**
	(0.021)	(0.020)	(0.020)	(0.020)	(0.022)
Ungoverned company and sector	-0.027	-0.003	-0.067***	-0.047***	0.014
	(0.018)	(0.018)	(0.018)	(0.018)	(0.019)
Governed sector and national	0.127***	0.156***	0.130***	0.149***	0.062**
	(0.023)	(0.023)	(0.023)	(0.022)	(0.025)
Ungoverned sector and national	-0.015	-0.006	-0.074***	-0.084***	0.014
	(0.021)	(0.021)	(0.020)	(0.020)	(0.021)
Governed company and national	0.025	0.049	0.031	0.059	-0.049
	(0.043)	(0.042)	(0.044)	(0.043)	(0.043)
Ungoverned company and national	0.048**	0.070***	-0.047**	-0.034	0.045**
	(0.022)	(0.022)	(0.022)	(0.022)	(0.023)
Governed company, sector and national	0.127***	0.156***	0.135***	0.167***	0.064**
	(0.026)	(0.025)	(0.025)	(0.024)	(0.027)
Ungoverned company, sector and national	0.004	0.028	-0.043**	-0.029	0.033
	(0.021)	(0.020)	(0.020)	(0.020)	(0.021)
Observations			22008		
R^2	0.066	0.042	0.052	0.015	0.077
Industry fixed effects	Yes	Yes	Yes	No	Yes
Company-level controls	Yes	No	Yes	No	Yes
Macro controls	Yes	Yes	No	No	No
Country fixed effects	No	No	No	No	Yes
			Tests of joint significance (p-values)		
Governed	0.000	0.000	0.000	0.000	0.004
Ungoverned	0.069	0.017	0.000	0.000	0.229

NOTE.-Coefficients, robust standard errors in parentheses. ***/**/* denote statistical significance on the 1%, 5% and 10% level respectively.
Company level controls are membership in an employer organization, the presence of a union representative, establishment size (3 dummies), public/private sector, dummies for being a company headquarter or a subsidiary site, presence of a works council and (grouped) shares of employees with open ended contracts, with university degrees, who are female, who work part-time and who are in high-qualified jobs.

Macro controls are change in log GDP from 2010 to 2013, the current tax burden (change from 2010 to 2013 and level in 2013), the average share of exports and imports in world trade (change from 2010 to 2013 and level in 2013), log of the total labor force in 2013, real unit labor costs for the total economy (change from 2010 to 2013 and level in 2013), the harmonized consumer price index (change from 2010 to 2013 and level in 2013) and respective exchange rate with the Euro (change from 2010 to 2013 and level in 2013).

Table 3

Ordered Probit Estimates, Dependent Variable: Change in Productivity from 2010 to 2013 (positive values indicate positive productivity changes)

	(1)	(2)	(3)	(4)	(5)
Company bargaining	0.00	0.04	-0.03	0.02	-0.01
	(0.02)	(0.02)	(0.02)	(0.02)	(0.03)
Coordinated sector bargaining	0.10***	0.13***	0.12***	0.11***	-0.00
	(0.03)	(0.03)	(0.03)	(0.03)	(0.04)
Uncoordinated sector bargaining	-0.14***	-0.11***	-0.38***	-0.39***	-0.02
	(0.04)	(0.04)	(0.04)	(0.03)	(0.04)
National bargaining	0.02	0.04	-0.29***	-0.31***	-0.02
	(0.03)	(0.03)	(0.03)	(0.03)	(0.04)
Governed company and sector	0.23***	0.26***	0.25***	0.25***	0.08
	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
Ungoverned company and sector	-0.10**	-0.03	-0.20***	-0.15***	-0.01
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
Governed sector and national	0.25***	0.31***	0.28***	0.33***	0.10
	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)
Ungoverned sector and national	-0.07	-0.05	-0.29***	-0.31***	-0.01
	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
Governed company and national	-0.03	0.03	-0.00	0.07	-0.21*
	(0.11)	(0.10)	(0.11)	(0.10)	(0.11)
Ungoverned company and national	0.06	0.12**	-0.23***	-0.18***	0.05
	(0.06)	(0.06)	(0.05)	(0.05)	(0.06)
Governed company, sector and	0.26***	0.31***	0.29***	0.36***	0.10
national	(0.07)	(0.07)	(0.07)	(0.06)	(0.07)
Ungoverned company, sector and	-0.06	0.00	-0.20***	-0.16***	0.00
national	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
Observations			22008		
Industry fixed effects	Yes	Yes	Yes	No	Yes
Company-level controls	Yes	No	Yes	No	Yes
Macro controls	Yes	Yes	No	No	No
Country fixed effects	No	No	No	No	Yes

NOTE.-Coefficients, robust standard errors in parentheses. ***/**/* denote statistical significance on the 1%, 5% and 10% level respectively.

Company level controls are membership in an employer organization, the presence of a union representative, establishment size (3 dummies), public/private sector, dummies for being a company headquarter or a subsidiary site, presence of a works council and (grouped) shares of employees with open ended contracts, with university degrees, who are female, who work part-time and who are in high-qualified jobs.

Narrow macro controls are the change in log GDP from 2010 to 2013, the change in current tax burden from 2010 to 2013 and the change in the respective exchange rate with the Euro from 2010 to 2013.

Macro controls are change in log GDP from 2010 to 2013, the current tax burden (change from 2010 to 2013 and level in 2013), the average share of exports and imports in world trade (change from 2010 to 2013 and level in 2013), log of the total labor force in 2013, real unit labor costs for the total economy (change from 2010 to 2013 and level in 2013), the harmonized consumer price index (change from 2010 to 2013 and level in 2013) and respective exchange rate with the Euro (change from 2010 to 2013 and level in 2013).

Table 4

Robustness Checks for Country Classifications

	Base	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Company bargaining	0.018*	0.014	0.015	0.010	0.007	0.012	0.011
	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)
Coordinated sector bargaining	0.064***	0.044***	0.050***	0.054***	0.045***	0.052***	0.045***
	(0.014)	(0.012)	(0.012)	(0.014)	(0.014)	(0.014)	(0.012)
Uncoordinated sector bargaining	-0.046***	-0.069***	-0.073***	-0.057***	-0.054***	-0.046***	-0.070***
	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)
National bargaining	0.035**	0.033**	0.035**	0.023	0.024*	0.033**	0.034**
	(0.014)	(0.014)	(0.014)	(0.014)	(0.014)	(0.014)	(0.015)
Governed company and sector	0.119***	0.112***	0.114***	0.081***	0.068***	0.079***	0.079***
	(0.021)	(0.021)	(0.021)	(0.020)	(0.018)	(0.018)	(0.018)
Ungoverned company and sector	-0.027	-0.031*	-0.029	-0.047***	-0.061***	-0.060***	-0.061***
	(0.018)	(0.018)	(0.018)	(0.018)	(0.018)	(0.019)	(0.019)
Governed sector and national	0.127***	0.118***	0.121***	0.088***	0.050**	0.097***	0.096***
	(0.023)	(0.023)	(0.023)	(0.022)	(0.020)	(0.020)	(0.020)
Ungoverned sector and national	-0.015	-0.019	-0.016	-0.040*	-0.048**	-0.084***	-0.082***
	(0.021)	(0.021)	(0.021)	(0.021)	(0.022)	(0.024)	(0.024)
Governed company and national	0.025	0.017	0.020	0.018	0.002	0.032	0.034
	(0.043)	(0.043)	(0.043)	(0.041)	(0.030)	(0.030)	(0.030)
Ungoverned company and national	0.048**	0.045**	0.047**	0.035	0.036	0.027	0.027
	(0.022)	(0.022)	(0.022)	(0.022)	(0.025)	(0.027)	(0.027)
Governed company, sector and national	0.127***	0.120***	0.122***	0.076***	0.066***	0.074***	0.074***
	(0.026)	(0.026)	(0.026)	(0.024)	(0.022)	(0.022)	(0.022)
Ungoverned company, sector and national	0.004	-0.001	0.002	-0.018	-0.031	-0.035	-0.036
	(0.021)	(0.021)	(0.021)	(0.021)	(0.021)	(0.022)	(0.022)
N				22008			
R^2	0.066	0.066	0.066	0.065	0.064	0.065	0.065

NOTE.-Coefficients, robust standard errors in parentheses. ***/**/* denote statistical significance on the 1%, 5% and 10% level respectively.

The base specification is specification 1 from Table 2. (1) changes Italy and Spain to coordinated. (2) changes Italy, Spain and Greece to coordinated. (3) sets Belgium to governed. (4) sets Belgium, Italy and Spain to governed. (5) sets Belgium, Italy, Spain and Greece to governed. (6) combines (2) and (5).

Table 5
Leave-one-out Estimates, Summary Estimation Results

Variable	Avg. coefficient	Median coefficient	Minimum coefficient	Maximum coefficient	% of estimates where coefficient is significant
Company bargaining	0.017	0.017	0.012	0.025	14
Coordinated sector	0.061	0.062	0.043	0.073	100
Uncoordinated sector	-0.043	-0.045	-0.051	-0.016	93
National bargaining	0.032	0.032	0.022	0.043	79
Governed company and sector	0.117	0.117	0.103	0.144	100
Ungoverned company and sector	-0.024	-0.024	-0.041	-0.007	4
Governed sector and national	0.124	0.125	0.104	0.143	100
Ungoverned sector and national	-0.015	-0.015	-0.057	0.018	4
Governed company and national	0.020	0.021	-0.064	0.058	0
Ungoverned company and national	0.049	0.050	0.034	0.058	86
Governed company, sector and national	0.125	0.127	0.109	0.140	100
Ungoverned company, sector and national	0.006	0.005	-0.007	0.025	0

NOTE.-Summary results based on 28 estimates of specification (1) from table 2, each omitting all companies from one country. % of estimates where coefficient is significant is rounded to the nearest full percentage point.