Collective Bargaining and Wage Dispersion*

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Abstract

The level at which collective contracts are negotiated and formally signed is crucial in determining both the overall level and the dispersion of wages. In this paper we distinguish between single-employer bargaining (SEB) and multi-employer bargaining (MEB), and we analyse the way in which they interact to study the effects on wage dispersion. An important distinction is made between two different situations: that in which bargaining is multi-level in the sense that the same group of workers can be covered by SEB and MEB at the same time, and that in which the two type of contracts are mutually exclusive, i.e. when each group of workers is covered either by MEB or by SEB. These different institutional settings allow us to analyse the impact of SEB on wage inequality conditional on other factors, including interactions of bargaining institutions with each other. The aim of this paper is to gain additional empirical evidence in order to further our understanding of the impact of the type of bargaining on wage dispersion. The study is carried out using the European Survey of Earning Structure (ESES), which is a large dataset containing detailed, matched employer-employee information for the year 1995. The countries analysed are Italy, Belgium, Spain and UK. The empirical results show that where bargaining is multi-level (Italy and Belgium), in general wage dispersion is not higher for workers covered by SEB than for those covered only by MEB. However, even when MEB and SEB are mutually exclusive (Spain and UK), only in the UK MEB contributes significantly to narrowing the wage distribution.

Key Words: Collective bargaining, wage dispersion, single-employer bargaining, multi-employer bargaining.

JEL classification: J31, J51, J52.

Themes: Wage inequality and mobility; Unions, Bargaining and conflict resolutions.

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1 Introduction

Collective bargaining is crucial in determining both the overall level and the dispersion of wages. The research literature has treated these two effects separately.

A large body of empirical research has analysed the effects of wage bargaining institutions on the overall level of wages and the macroeconomic performance of the labour market, measured in terms of either the unemployment or the employment rate. One of the most important findings is that centralisation and/or co-ordination of collective bargaining are associated with wage restraint and better outcomes in the labour market. The theoretical framework of this literature refers to the existence of various externalities which can be internalised only in systems of bargaining that are strongly centralised and/or co-ordinated ("encompassing"). These systems produce good employment results. At the other extreme, very decentralised bargaining can also produce good employment performance, since unions would exercise relatively little monopoly power.

A somewhat different body of literature has focused on the effects of bargaining institutions on wage inequalities. The findings here are that unions reduce wage inequalities and that this compression effect is strongest where union membership and bargaining coverage are high, together with high levels of centralisation and/or co-ordination of collective bargaining.

In recent decades, many countries have decided to reform their wage-setting institutions. One feature of this change has been the decentralisation of collective bargaining. The idea behind this movement is to overcome the rigid arrangements and the wage compression imposed by centralised bargaining, and to give firms more leeway in adjusting the structure of pay differentials to external local conditions and to their needs in terms of productive efficiency. A move towards decentralisation was one of the recommendations of the OECD Job Study (OECD, 1994).

The decentralisation of collective bargaining has not taken place in the same way in all countries. For example, in the UK, as in New Zealand and to some extent also in Australia, decentralisation has taken place in a process of deunionisation of the economy. In these countries the shift from multi-employer bargaining (*MEB*) to single-employer bargaining (*SEB*) has not only been radical, but it has also been accompanied by a large reduction in unionisation and a dramatic reduction in the coverage of collective bargaining. In other countries, bargaining institutions have been changing much more slowly, partly because radical intervention in the legal regulations, typical of the Anglo-Saxon countries, has not taken place. However, steps towards *SEB* have also been taken in some countries in continental Europe.

At least in principle, steps towards decentralisation taken without drastic change in labour legislation, union density, coverage of collective bargaining, and more generally in the presence of unions active in the process of wage determination, can be considered as efforts to combine the benefits of centralisation and/or co-ordination in terms of internalisation of various effects of wage negotiations with the benefits of greater relative-wage flexibility.

The empirical research available does not permit us to draw clear conclusions as to the benefits of moving from a centralised to a less centralised collective bargaining system and giving more scope and latitude to *SEB* while maintaining some form of co-ordination of bargaining that takes place at the lower level. It is possible that incentives for wage restraint are weakened if countries move towards an intermediate position of centralisation. Even less clear is the effect on wage inequalities: what are the effects of more *SEB* in a context where co-ordination and other wage-setting institutions do not change?

The purpose of this paper is to produce empirical evidence to further our understanding of these problems. A better understanding of these interactions requires rich and detailed information on how the wage-setting institutions operate in different economic contexts. The data on individual workers of the "European Structure of Earnings Survey" (ESES) made available by Eurostat for some countries are detailed enough for the purposes of this paper. The countries are Belgium, Italy, Spain and the UK

The paper is organised as follows: section 2 provides a brief review of the empirical literature on the effects of centralisation and/or co-ordination on wage dispersion; section 3 describes some relevant features of the collective bargaining institutions in the four countries examined; section 4 presents the data set and gives a short description of the characteristics of workers, jobs and firms included in the sample; section 5 presents the methodology utilised and the results obtained relative to the effects of centralisation and/or co-ordination of bargaining on wage inequalities; the last section briefly summarises and concludes.

2 Centralisation of bargaining and wage dispersion: previous empirical results

The OECD, in the "Employment Outlook" of 1997 (OECD, 1997) considers earnings inequality as one of the performance indicators correlated to collective bargaining variables, as are union density, coverage of collective bargaining and centralisation and/or co-ordination. Following the usual cross-country/time-series approach, using data for the years 1980, 1990 and 1994, the results of the OECD empirical analysis show that countries with both a high and an intermediate level of centralisation/co-ordination have a more equal earnings distribution than decentralised/uncoordinated countries.

The same kind of analysis was replicated ten years later in OECD (2004), where the ranking of countries according to their degree of centralisation/co-ordination was slightly revised by using the richer information on wage-setting institutions collected in the meantime. Again, there is consistent evidence that overall earnings dispersion (measured by quantile ratios) is lower where bargaining is more encompassing and/or more co-ordinated. Even union density shows rather good results in terms of correlation.

These findings from the OECD cross-country comparative analysis agree with a considerable number of other studies. There is quite strong evidence that

unions reduce wage inequality and that this compression effect is strongest in countries where union membership is high and bargaining is centralised and/or co-ordinated (Aidt and Tzannatos, 2002; Blau and Kahn, 1999). That a higher degree of centralisation of collective bargaining reduces wage dispersion is also found in Rowthorn (1992). More "corporatist" wage bargaining systems also appear to reduce the responsiveness of industry and firm-level wages to sectoral price and productivity movements (Holmlund and Zetterberg, 1991; Teulings and Hartog, 1998).

Blau and Kahn (1996) found that centralisation of bargaining reduces wage dispersion by narrowing the wage differentials between the 50th and the 10th percentiles, because wage compression in centralised agreements seems to come about mainly through higher wages at the lower end of the distribution. Kahn (1998) studies collective bargaining and industry wage levels for the United States and a number of European countries. He finds that the negotiation of wage floors can be at the origin of the compression of wages, especially at the bottom of the distribution, as observed in European countries. Moreover, the findings suggest that contract extension to non-union firms and the voluntary imitation by non-union firms of union pay settlements are particularly important in Europe.

The literature on the role played by the wage drift on distribution of earnings is not particularly rich because the information needed for the empirical work is often lacking. A significant degree of wage drift at the local level may undermine the purpose of a centrally-negotiated wage (OECD, 1997, p. 66). The classification of countries by bargaining level is complicated by the fact that in many countries bargaining occurs at "multiple" levels (OECD, 2004, p. 151). Not much information exists about which level most of the change in wage rates is being determined at, and even less about what proportions of earnings are determined at different levels. Different levels can have different impacts on both the overall level and on the dispersion of wages. However, information on these bargaining dimensions is poor. Yakubovich (2003) has discussed the role of the wage drift in a number of European countries. More recently Cardoso and Portugal (2004) have made an important contribution to the understanding of the effects of the wage drift in the Portuguese economy by using a unique data set for workers, firms and collective agreements. They find that the wage drift tends to increase wage differentials. In particular the empirical results show that the wage drift, in the form of firm-specific arrangements, partly offsets the egalitarian effects of collective bargaining, granting firms a high degree of freedom when setting wages.

3 Wage setting institutions in four countries: Italy, Belgium, Spain, UK

The level where collective contracts are negotiated and formally signed is one of the most obvious dimensions of the bargaining structure. In the empirical lit-

erature three levels are usually distinguished: firms and workers may negotiate over terms and conditions of employment at the level of the individual enterprise or establishment; at the other extreme, national unions and employers' associations engage in inter-industry bargaining at national level, covering the entire economy or most part of it; finally, most continental European countries have traditionally favoured "intermediate" forms of wage negotiation, mainly at branch or sectoral level.

In this paper we use a slightly different distinction of levels of bargaining in order to better observe the effects on wage dispersion. The distinction is between single-employer-bargaining and multi-employer-bargaining. *MEB* can be national, regional, local or whatever; this does not make any difference in the context of the present analysis. In the same way, *SEB* includes bargaining at the firm, establishment, plant, etc. level.

We observe a big difference between countries in both the scope and diffusion of these two types of bargaining, which coexist in many European countries including the four countries examined. However, there is an important diversity in the way in which they interact: bargaining may be multi-level, in the sense that the same group of workers can be covered simultaneously by *MEB* and *SEB*, or it may be single-level, when the two types of contracts are mutually exclusive, and thus each group of workers can be covered either by *MEB* or by *SEB*. The distinction works as a general rule, with some exceptions; in any case it applies rather well to the four countries examined. In Italy and Belgium bargaining is multi-level and *SEB* is always additional to *MEB*, while in Spain and the UK one type of bargaining excludes the other.

We turn now to a more detailed description of the institutional framework in the four countries analysed.

Italy is characterised by a system of collective bargaining at three levels which, following the usual distinction, are: economy-wide, branch and firm. Economy–wide bargaining is limited to framework agreements, national protocols, and social pacts, which do not take place at regular intervals, but rather at any time the social partners consider them useful. The best-known social pact of the last twenty years was signed in 1993, and it consisted of a tripartite agreement between the peak associations of unions and employers' organisations and the government. The protocol established that national sectoral bargaining, that is automatically extended to all workers independently of thier union affiliation, should determine general wage increases linked to a target rate of inflation to be set by the government every year (and referred to during the following three years). Wage increases over and above the minimum agreed at national level can be bargained at firm level only if related to the performance of the firm itself (profits, productivity, etc.)[1]. Bargaining at the firm level is not compulsory and it cannot define wages lower than the national minimum. Thus, while all workers in a branch will be covered by a national contract, some

[1]Before the 1993 protocol decentralised bargaining could take place at firm or plant level or at local level for groups of small firms but the relationship between centralised and decentralised bargaining was complex, with many possibilities for conflict (Ebbinghaus and Visser, 2000).

of them (independently of union membership) will be covered, in addition, by a firm-level contract. The presence of representatives of national unions assures some form of co-ordination of the local contracts and also respect of the general rules set in the 1993 protocol.

An important point to mention is that firms can give more money to their workers on top of what has been agreed with unions. As a matter of fact this is what regularly happens in those firms where local bargaining does not exist. Firms that pay only national minimum wage have some margin of manoeuvre that they use to pay extra bonuses to their workers. For this reason, it is not clear whether workers that are covered by *SEB* are paid higher wages than workers with only *MEB*. The "wage drift" emerging at firm level (i.e. the difference between actual earnings and minimum wages set at national level) can thus be of two different kinds: either determined through *SEB* or unilaterally fixed by the employer. We will come back to this point when examining the effects on wage dispersion.

Like Italy, Belgium is characterised by more than one single level of bargaining. Every two years, national collective inter-sectoral (for the whole private sector) negotiations take place to fix a norm for the pay increases to be defined at sectoral level. The norm gives some room for decisions to be taken at the sectoral bargaining tables. In fact there is not a single value to be absolutely respected; generally there is a bracket of values with a minimum and a maximum. Moreover, the norm is in general indicative and not imperative. In general the social partners have always been able to agree at national level on pay increases that provide for a minimum rise to be set at branch level. These minima must be paid to all workers in all firms in the sector, whether or not they are unionised (if workers) or members of the signatory organisations (if firms)[2]. This level of bargaining represents, as in Italy, the core of the whole system of collective bargaining.

Wage levels can be renegotiated at company level (unless specific clauses in the national contract exclude it) but they cannot be below the national minimum and, like in Italy, a single employer agreement can be signed only after the national sectoral agreement has been put in place. Terms and conditions of the local agreement must respect the constraints and the content of the lines set at the higher level of bargaining to assure co-ordination. Thus in Belgium, as in Italy, the decentralisation of bargaining is activated in a process that is "organised" by the peak national associations and because of the norm being set for the whole private sector, we could say that in Belgium co-ordination is even stronger than in Italy. Finally, what has been said for Italy about the role of the wage drift is also valid for Belgium.

As regard the Spanish system of wage-setting, one of the recurring concerns expressed by the social partners in debates on the future of industrial relations

[2]The Labour Code guarantees the extension of collective agreements to all employees at a firm that has concluded an agreement. Multi-employer agreements may be extended by the Ministry of Labour to cover unaffiliated employees in a given sector, once requested to do so by one of the signatory parts. This is generally done by means of the Royal Decree (OECD, 2004).

in Spain has been the unstructured and almost chaotic nature of collective bargaining. On the whole different levels of bargaining coexist, but in contrast with Belgium and Italy, they are mutually exclusive and the Spanish law leaves the parties free to choose which level to bargain at.

MEB is always at sectoral level; it is not only national, sometimes having more limited geographical boundaries. The most diffused sectoral *MEB* is at provincial level, where it covers nearly half of the population of workers covered by collective bargaining. The national contract follows in second place in terms of coverage; the other two, local and regional, are rather limited.

SEB occurs at company level and does not have to refer to *MEB*: it is completely autonomous and is an alternative to *MEB*. It covers between 10% and 15% of the workforce and it takes place only in a limited number of companies due to the low presence of unions in most Spanish firms.

Even though no formal relation exist between *MEB* and *SEB*, some spillover effects from the first to the second are likely, because the first is very widespread while the second affects only a minority of workers.

Collective bargaining in the UK is highly decentralised: most bargaining is at company level, while little multi-employer bargaining exists outside the public sector. Moreover, the proportion of workers covered by *SEB* has declined continuously over recent decades. *MEB* takes place at national and branch level.

Hence in the UK *SEB*, especially at the plant, division, and corporate levels, has emerged during the last two decades as the most important type of collective bargaining. In addition, there is rarely any co-ordination between *SEB* and *MEB*.

Table 1 gives some summary statistics and aggregate indicators produced by the OECD, often used to rank countries according to specific features of their industrial relations system. In accordance with the institutional patterns above described, Belgium emerges as the most "corporatist" country of the four considered, with the highest values for collective bargaining coverage, centralisation and co-ordination. The UK, which is characterised by the lowest values of the same indicators, appears as having the most decentralised and "disorganised" system of wage setting.

The level of co-ordination plays an important role in the analysis of the impact of *MEB* and *SEB* on wage inequalities. The effect of *SEB* should be stronger and in favour of greater inequalities in those countries where the level of co-ordination is low (UK), while the opposite effect should be observed when co-ordination is high (and accompanied by high union density and collective bargaining coverage). Spain and Italy have the same level of co-ordination according to the OECD ranking (see Table 1). However, in the description of the institutional setting presented in the previous pages, Spain appears to have a less co-ordinated system than Italy.

Table 1: Collective bargaining characteristics

		Trade union density (%)	Bargaining coverage (%)		Centralisation[b]	Co-ordination[c]
Italy	1980	50	80+	1980-84	3.5	3.5
	1990	39	80+	1985-89	2	2
	1992	39	82[a]	1990-94	2	3
	2000	35	80+	1995-2000	2	4
Belgium	1980	54	90+	1980-84	3	4
	1990	54	90+	1985-89	3	4
	1994	54	90	1990-94	3	4
	2000	56	90+	1995-2000	3	4.5
Spain	1980	7	60+	1980-84	4	4
	1990	11	70+	1985-89	3.5	3.5
	1994	19	78	1990-94	3	3
	2000	15	80+	1995-2000	3	3
UK	1980	51	70+	1980-84	1	1
	1990	39	40+	1985-89	1	1
	1994	34	47	1990-94	1	1
	2000	31	30+	1995-2000	1	1

Source: OECD (1997) and OECD (2004).

a) Data refer to 1993.

b) 1= company and plant level predominant; 2= combination of industry and company/plant level, with an important share of employees covered by company bargains; 3= industry-level predominant; 4= predominantly industrial bargaining, but also recurrent central-level agreements.

c) 1=fragmented company/plant level bargaining, little or no co-ordination by upper-level associations; 2 = fragmented industry and company level-bargaining, with little or no pattern-setting; 3=industry-level bargaining with irregular pattern-setting and moderate co-ordination among major bargaining actors; 4= A) informal co-ordination of industry and firm level bargaining by (multiple) peak associations; B) co-ordinated bargaining by peak confederations, including government-sponsored negotiations (tripartite agreements, social pacts), or government imposition of wage schedules; C) regular pattern-setting coupled with high union concentration and/or bargaining co-ordination by large firms; D) government wage arbitration.

4 Data and descriptive analysis

The present study is carried out using the "European Structure of Earnings Survey" (ESES); the survey contains matched employer-employee information for the year 1995 and covers establishments with more than 10 employees whose economic activity falls in Sections C to K of the Nace Rev.1 classification.

The ESES sample includes 96,267 workers and 7,778 firms for Italy, 145,107 workers and 6,020 firms for Belgium, 177,139 workers and 17,948 firms for Spain

and 93,567 workers for the UK (the ESES data-set for the UK does not give the number of firms in the sample). However, our analysis is restricted to male employees covered by either multi-employer or single-employer bargaining. Thus, besides females, we exclude workers that are covered by other types of bargaining or that are not covered at all. These workers represent a very small fraction of the sample for Italy (3.1%) and Spain (2.4%), while they make up around 14% of the Belgian sample (they are workers employed in establishments in the public utilities sector, such as the mail service and telecommunications).

The final samples are made up of 69,465 observations for Italy, 51,065 for Belgium[3], 127,285 for Spain and 51,119 for the UK.

In Italy workers are considered as being covered by multi-employer bargaining if they are employed in firms where only a nation-wide industry agreement is applied, while workers covered by single-employer bargaining are those working in a firm covered by both a national and a local agreement. The same definition is applied for Belgium, where multi-employer bargaining regards workers covered exclusively by national sectoral collective agreements, and single-employer bargaining regards workers whose wages are renegotiated collectively within the individual companies. As already explained, in both countries the second level of bargaining is in addition to the centralised one, and thus the wage negotiated at firm level cannot be lower than the minimum established at central level. With regard to Spain, we consider covered by *MEB* workers whose wages are set by national agreements or by any other level agreement above that of the enterprise or workplace (e.g. provincial and regional).Workers covered by *SEB* are those whose wages are set at enterprise or establishment level. A special caution should be expressed with regard to the UK, as in this case the ESES collective agreement variable refers only to "major collective agreements" (essentially, these are national and sectoral agreements of various kinds) while it provides no information about local agreements of any kind (enterprise or establishment). Thus, for the UK the single-employer bargaining is referred to both firms covered by local agreement or not covered at all, since the dataset does not permit to split the two groups of establishments. For this reason, particular attention should be devoted in interpreting the empirical results for this country.

The variables in the data-set that we use for our empirical analysis can be divided into 3 groups:

1. Individual characteristics: age, education;
2. Job characteristics: hourly wage, occupation (classified using isco classification), type of contract (i.e. permanent, fixed term, apprentice or other contract), working time (full time/part time) and tenure in the firm;
3. Firm characteristics: sector (classified using the Nace Rev.1 classification), size, type of collective agreement and region where the firm is located.

[3]The huge reduction of the Belgian sample is due to a large number of missing values for the hourly wage.

Table 2 presents, for the four countries analysed, the distribution of workers by type of collective bargaining and the mean wage in correspondence of both *SEB* and *MEB*. In the Italian sample the vast majority of workers (79%) is covered only by *MEB* while in Belgium local agreements regard half of the sample. In Spain, *MEB* covers 71% of the sample workers whereas in the UK only 16% of the workers are covered by *MEB*[4]. In all four countries the mean wage is higher in the presence of *SEB*, though at this stage of the analysis this may be due to composition effects.

Table 2. Distribution of workers by type of collective bargaining and hourly wage[a]

	Italy	***Belgium***	***Spain***	***UK***
MEB				
%	0.79	0.50	0.71	0.16
Mean hourly wage	19,049	574.9	1385.3	8.02
SEB[b]				
%	0.21	0.50	0.29	0.84
Mean hourly wage	22,180	645.0	1908.2	9.05
N. Obs	69,465	51,065	127,285	51,119

a: Wages expressed in the country currency.

b: For Italy and Belgium SEB is additive with respect to MEB. For UK SEB refers also to not covered workers.

5 Type of bargaining and wage dispersion

The fact that *MEB* and *SEB* coexist in the same institutional setting has important implications for the overall distribution of wages. To investigate these implications some questions need to be answered similar to those addressed in the empirical literature on the effects of unionisation on wage dispersion. The first is: is there a systematic wage gap between the workers covered by *SEB* and those covered by *MEB*? And again: are dispersion and inequalities of wages greater in the group of workers covered by *SEB* or among the workers covered by *MEB*? The difference between our results and those reported in the literature as regards the effects of unions is that in our case workers are divided according to the type of contract that covers them, and not according to being union members or not.

The answers to the questions raised above are not straightforward. They imply knowledge of the role played by other factors and other features of the wage setting system, with which the two different types of bargaining interact. It is not the purpose of this study to analyse all these relations and the various spillover effects stemming from the functioning of each of the two sets of bargaining in each of the countries examined, following a sort of general equilibrium approach. Our analysis does not claim to have such a wide-ranging scope.

[4]The possible differences with respect to the figures reported in national statistics may be due to the fact that firms with less than 10 employees are not part of the ESES sample.

Some institutional features are nonetheless taken into consideration. For example, the nature of wage drift plays a crucial role; we distinguish two cases.

First, when wage increases collectively negotiated at firm level add up to those obtained at the national level, as is the case in Belgium and Italy. In this case one would expect to observe a wage gap in favour of workers covered by *SEB*. But this is not the whole story, if one takes into account a different source of wage drift that can arise outside the collective bargaining setting: a wage drift is also likely to appear in the form of unilateral concessions or individual agreements between the employer and his employees. However, if unions with their monopoly power are able to obtain a wage increase higher than the employer would have paid in any case, a wage gap might persist. At the same time, the two different forms of wage drift may have different effects on the dispersion of wages within each of the two groups of workers. The existing empirical evidence shows that unions' preferences are egalitarian and that collective bargaining determines a compression of wages. This is particularly so for *MEB*. But *SEB* too, at least within the single unit, should produce the same result, in particular on wage differentials linked to specific characteristics of employees and their jobs. Moreover, in so far as the peak national associations exert some form of co-ordination of collective bargaining taking place at the lower level, the effect of *SEB* on inter-firm wage differentials might be limited. The same is true when the "rank and file" in each firm try to maintain the relative wage of the workers they represent, and make efforts not to lose ground with respect to workers of other firms. The forces of imitation operate most when local unions are strong. Further, the wage drift determined without collective bargaining might respond in a more flexible and diversified way to local labour market conditions and to the need of the company to motivate its workers. For this reason we can not exclude the possibility that *SEB* contributes to compressing wages. There are opposing forces at work and the final effect of *SEB* on wage inequalities is ambiguous and depends crucially on the wage policies followed by the firms and by the degree of effective co-ordination and inter-firm imitation of the wage outcomes of *SEB*.

The second case is when the two forms of collective bargaining are mutually exclusive, as in Spain and the UK. In this case some of the previous analysis has to be adapted. For instance, for the wage gap there is no particular reason to expect a "ceteris paribus" wage premium in favour of workers covered by *SEB*. Indeed, the macroeconomic literature on the merits of centralisation and/or co-ordination seems to suggest that wage restraint is stronger in the case of *MEB*, so that the wage should be lower with *MEB*. But this is valid when examining differences across countries.

In an analysis of what happens within a single country one should also consider spillovers of various kinds between the two types of bargaining, which complicate the picture and condition the final result. For the purpose of this paper we consider the effect of *SEB* on the wage gap as uncertain and, as such, to be investigated only empirically.

A further consideration refers to the wage dispersion within each group of workers, covered either by *SEB* or *MEB*. We might expect greater dispersion

in the former if specific circumstances occur, i.e. when *SEB* is the dominant type of bargaining, unions are weak both at the national and the local level, co-ordination of bargaining does not exist, peak national associations play a limited role, and the wage policy of firms is market oriented. In other words when decentralisation is diffused and not co-ordinated, we might expect a positive effect of *SEB* on wage inequalities.

Table 3 presents a descriptive analysis of wage dispersion separately by bargaining regime. It reports some inequality measures, i.e. the coefficient of variation of log of hourly wages and the 90th/10th, 90th/50th and 50th/10th percentile ratios for the whole sample and separately by bargaining regime. The analysis is also made separately for non-manual and manual workers.

Table 3. Unconditional inequality measures

	CV		**90/10**		**90/50**		**50/10**	
	MEB	***SEB***	***MEB***	***SEB***	***MEB***	***SEB***	***MEB***	***SEB***
ITALY								
All	0.153	0.143	2.814	2.695	1.909	1.877	1.474	1.435
Non manual	0.150	0.138	3.053	3.203	1.709	1.980	1.787	1.617
Manual	0.124	0.089	2.272	1.824	1.658	1.372	1.370	1.330
BELGIUM								
All	0.070	0.059	2.824	2.519	2.055	1.756	1.374	1.435
Non manual	0.072	0.058	3.131	2.585	1.914	1.699	1.636	1.522
Manual	0.038	0.039	1.658	1.739	1.332	1.321	1.245	1.316
SPAIN								
All	0.076	0.062	3.636	3.037	2.265	1.736	1.605	1.750
Non manual	0.083	0.066	4.787	3.460	2.340	1.886	2.046	1.835
Manual	0.056	0.054	2.503	2.563	1.731	1.511	1.446	1.696
UK[a]								
All	0.205	0.288	2.543	4.151	1.674	2.200	1.519	1.886
Non manual	0.221	0.295	2.761	5.006	1.810	2.182	1.525	2.295
Manual	0.174	0.216	2.234	2.556	1.464	1.574	1.526	1.625

a: For UK SEB refers also to not covered workers.

Looking at the table, it can be noticed that in Italy, Belgium and Spain almost all the inequality measures considered indicate a greater wage compression in the presence of *SEB*, while in the UK inequality is always lower if *MEB* rather than *SEB* or no bargaining is present.

In Italy, when a firm-level agreement is signed inequality is always lower for manual workers and wages are less dispersed for both manual and non-manual workers in the lower part of the wage distribution. In Belgium and Spain all inequality measures indicate that wage dispersion is lower with *SEB* for non-manual workers and for all workers in the upper part of the wage distribution.

However, the results in Table 3 may be due to composition effects, i.e. the

fact that workers hired in firms where a local agreement is signed are more homogeneous that those employed in *MEB* establishments. We will examine this aspect in the next part of this section: the issue of wage dispersion is further analysed by means of three different techniques that allow us to control in different ways for compositional effects. These are:

1. A variance decomposition exercise;
2. The computation of various wage differentials (e.g. by education and occupation);
3. Quantile regression analysis.

5.1 Variance decomposition

In order to perform the variance decomposition exercise, we start by estimating two standard wage equations, one for the *SEB* sector and another for the *MEB* sector:

$$\log w_{MEB} = X_{MEB}\beta_{MEB} + \varepsilon_{MEB} \quad (1)$$
$$\log w_{SEB} = X_{SEB}\beta_{SEB} + \varepsilon_{SEB} \quad (2)$$

where w is hourly wage, X_{MEB} and X_{SEB} are vectors of *MEB* and *SEB* workers' characteristics respectively, β_{MEB} and β_{SEB} are vectors of coefficients, and $\varepsilon_{MEB}/\varepsilon_{SEB}$ are vectors of error terms.

The overall variance of wages $Var(X\beta + \varepsilon)$ can be broken down into three components. The first is the average between-group variance, which is the variance due to observable characteristics:

$$s * Var(X_{SEB}\beta_{SEB}|SEB) + (1-s) * Var(X_{MEB}\beta_{MEB}|MEB) \quad (3)$$

where s and $(1-s)$ are the fractions of workers covered by *SEB* and *MEB* respectively.

The second component is the within-group variance due to unobservable characteristics:

$$s * Var(\varepsilon_{SEB}|SEB) + (1-s) * Var(\varepsilon_{MEB}|MEB) \quad (4)$$

The third component is the wage gap:

$$\bar{X}_{SEB}\beta_{SEB} - \bar{X}_{MEB}\beta_{MEB} \quad (5)$$

where $\bar{X}_{MEB}$and $\bar{X}_{SEB}$ are the mean values of the explanatory variables computed on the two samples of *MEB* and *SEB* workers.

The results of this decomposition exercise are reported in column 1 (Italy and Spain) and 4 (Belgium and UK) of Table 4.

The variance due to observable characteristics (rows 1 and 2) is much lower with *SEB* than with *MEB* in Belgium, while the reverse is true for the UK; the differences between the two quantities are small in Italy and Spain. As for the component related to unobservable characteristics (rows 4 and 5), in the UK the variance is much higher with *SEB* than with *MEB*, meaning that in this country *MEB* considerably reduces the returns not only to observable but also to unobservable attributes; for the other three countries there are no significant differences determined by the type of bargaining.

We now use a method similar to the one employed by DiNardo and Lemieux (1997) to estimate the effect of *SEB* on wage dispersion and to break this effect down into three components: a wage compression effect between different groups of workers, a wage compression effect within groups of workers and a wage gap effect.

In order to do this, we replicate the previous exercise of variance decomposition but we apply the *MEB* equation coefficients to the distribution of both observed and unobserved *SEB* characteristics. Doing so we obtain a counterfactual variance, which is the variance that would prevail if *SEB* workers' characteristics were rewarded as they are for *MEB* workers. This counterfactual variance is displayed in column 2 (Italy and Spain) and 5 (Belgium and UK) of Table 4.

The difference between the actual variance and the counterfactual variance can be interpreted as the *SEB* effect, after controlling for composition effects; this effect is depicted in columns 3 (Italy and Spain) and 6 (Belgium and UK) of Table 4. It should be noted that in Italy and Belgium the *SEB* effect is negative, so in these countries *SEB* contributes to reducing the dispersion of wages, while in Spain and UK the effect is negative.

Analysing the contribution of the three effects separately, the between effect is positive in Italy and UK while it is negative in Belgium and Spain; the within effect is negative in all countries with the exception of Spain. Finally, the wage gap effect is positive in Belgium, Spain and UK while it is negative in Italy. On the whole, the DiNardo and Lemieux (1997) decomposition exercise also confirms that decentralisation of collective bargaining produces egalitarian effects on wage distribution when it is formally or informally co-ordinated.

Table 4. Variance decomposition - Italy and Belgium

	ITALY			BELGIUM		
	1	2	3	4	5	6
	Actual variance	CF[a] variance	SEB effect	Actual variance	CF variance	SEB effect
Wage compression effect between						
1. Var(Xβ|MEB)	0.1132	0.1132	0.0000	0.1537	0.1537	0.0000
2. Var(Xβ|SEB)	0.1484	0.1436	0.0048	0.0846	0.1014	-0.0169
3. Average between group variance (1-s)*row 1 + s*row 2	0.1206	0.1196	0.0010	0.1191	0.1275	-0.0084
Wage compression effect within						
4. Var(ε|MEB)	0.0587	0.0587	0.0000	0.0611	0.0611	0.0000
5. Var(ε|SEB)	0.0530	0.0593	-0.0063	0.0556	0.0622	-0.0066
6. Total within group variance (1-s)*row 4 + s*row 5	0.0575	0.0588	-0.0013	0.0584	0.0617	-0.0033
Wage gap effect						
7. Δ	0.1503	0.1545	-0.0042	0.1616	0.1202	0.0414
8. (1-s)*s*Δ^2	0.0037	0.0040	-0.0002	0.0065	0.0036	0.0029
Overall variance of wages						
9. Var(Xβ+ε) row 3 + row 6 + row 8	0.1818	0.1824	-0.0005	0.1840	0.1928	-0.0088

a: CF stands for counterfactual.

Table 4 (cont). Variance decomposition - Spain and UK

	SPAIN			UK[a]		
	1	2	3	4	5	6
	Actual variance	CF[b] variance	SEB effect	Actual variance	CF variance	SEB effect
Wage compression effect between						
1. Var(Xβ|MEB)	0.1481	0.1481	0.0000	0.0781	0.0781	0.0000
2. Var(Xβ|SEB)	0.1149	0.1182	-0.0033	0.1766	0.1357	0.0409
3. Average between group variance (1-s)*row 1 + s*row 2	0.1385	0.1394	-0.0009	0.1608	0.1264	0.0344
Wage compression effect within						
4. Var(ε|MEB)	0.1183	0.1183	0.0000	0.0878	0.0878	0.0000
5. Var(ε|SEB)	0.1170	0.1216	-0.0046	0.1454	0.1572	-0.0118
6. Total within group variance (1-s)*row 4 + s*row 5	0.1179	0.1193	-0.0013	0.1362	0.1461	-0.0099
Wage gap effect						
7. Δ	0.3783	0.2713	0.1070	0.0007	0.0163	-0.0156
8. (1-s)*s*Δ^2	0.0295	0.0152	0.0143	0.0000	0.0000	0.0000
Overall variance of wages						
9. Var(X$\beta + \varepsilon$) row 3 + row 6 + row 8	0.2859	0.2738	0.0120	0.2970	0.2725	0.0245

a: For UK SEB refers also to not covered workers.

b: CF stands for counterfactual.

5.2 Adjusted wage differentials

Another interesting way to analyse how the type of bargaining affects the structure of wage differentials consists in applying the technique pioneered by Krueger and Summers (1988) to compute industry wage differentials with the correction brought by Haisken-DeNew and Schmidt (1997). The aim is to discover the difference generated by the type of bargaining in various wage differentials (e.g. by education, occupation, region).

To perform this procedure, in the first place a log wage equation with a set of dummy variables among the regressors is estimated for each country. The estimated equation is:

$$\log w = Y\alpha + W\delta + \varepsilon \tag{6}$$

where w is hourly wage with annual bonuses included, Y is an $(n \times z)$ matrix of continuous explanatory variables, W is an $n \times (K+1)$ matrix containing the constant term and k indicators for groups (e.g. education, occupation, region), α and δ are vectors of parameters and ε is a vector of error terms.

Equation (5) is estimated by a restricted least squares estimator constraining the weighted sum of the dummy's categories to be zero:

$$\omega'\delta = 0 \tag{7}$$

The weights ω are given by the dummy's categories share:

$$\omega' i = 0 \tag{8}$$

with $\omega = (0, \omega_1, \ldots, \omega_k)'$and $i = (1, 1, \ldots, 1)'$.

With these restrictions the model can be estimated without excluding one category from each dummy variable's group and the estimated coefficients represent deviations from a weighted average (and not the effect relative to the excluded category)[5].

As a measure of inter-industry wage differentials, Haisken-DeNew and Schmidt (1997) provides an appropriate estimate of the differentials' overall variability, which is given by the weighted adjusted standard deviation of coefficients:

$$SD(\delta) = \sqrt{\omega' D(d) d - \omega' diag\left[V(d)\right]} \tag{9}$$

where d is the vector of the coefficients estimates, D transforms a column vector into a diagonal matrix with diagonal equal to the vector, $diag$ denotes

[5]Haisken-DeNew and Schmidt (1997) show that the dummies' coefficients obtained from the constrained regression are the same as the industry effects calculated by Krueger and Summers (1988); in addition, they show that from the restricted regression the asymptotic variance-covariance matrix can be computed directly. Krueger and Summers (1988) calculate the industry effects estimating a log wage equation with ordinary least squares including among the regressors a set of industry dummy variables with one category excluded. The single industry wage effect is given by its coefficient. The average industry wage effect is obtained as the weighted sum of the individual industry wage effects with weights given by each industry's employment share.

a column vector formed by the diagonal elements of a matrix and V is the variance-covariance matrix of the estimated parameters (see Haisken-DeNew and Schmidt, 1997 p. 518)[6].

Table 5 reports the weighted adjusted standard deviation of coefficients (9) for the four countries, separately for *SEB* and *MEB*. It is calculated with regard to region, education, occupation, industry, size and age[7].

Table 5. Adjusted weighted standard deviation of coefficients

	Education	Occupation	Sector	Size	Age	Region
ITALY						
MEB	0.043	0.192	0.115	0.076	0.070	0.032
SEB	0.050	0.237	0.131	0.016	0.062	0.025
BELGIUM						
MEB	0.094	0.196	0.079	0.042	0.076	0.034
SEB	0.081	0.180	0.044	0.073	0.069	0.025
SPAIN						
MEB	0.081	0.187	0.069	0.095	0.083	0.060
SEB	0.107	0.172	0.056	0.076	0.069	0.041
UK[a]						
MEB	0.038	0.193	0.054	0.036	0.073	0.050
SEB	0.065	0.279	0.101	0.062	0.095	0.062

a: For UK SEB refers also to not covered workers.

The wage differentials shown in Table 5 for Belgium and the UK confirm the results obtained with the variance decomposition exercise. On the one hand, the "co-ordinated" decentralisation that characterises the Belgian system of industrial relations contributes to reducing every type of wage differential, especially by industry, region and education; the only exception regards size wage differential, which is larger in the presence of single-employer bargaining. On the other hand, in the UK the *ceteris paribus* wage dispersion is lower in every case in the presence of multi-employer bargaining.

As for Spain, it seems that decentralised bargaining, even though in this

[6]Krueger and Summers (1988) compute the standard deviation of the industry wage effects, correcting for the fact that the sampling errors of the coefficients contribute to the measured variance of the industry wage effects. However, Haisken-DeNew and Schmidt (1997) note that the estimated variance of their renormalised coefficients are overstated in the approximation proposed by Krueger and Summers (1988) and thus the standard errors, which are needed to implement the correction, are substantially overstated. The procedure implemented by Haisken-DeNew and Schmidt (1997) corrects for this.

[7]The education dummies are: primary education, lower secondary education, upper secondary education and tertiary education; the occupaion dummies are: managers, professionals, associate professionals, clerks, personal services and sale workers, craft and related trades workers, plant-machines operators and elementary occupations; the industry dummies are: mining and quarring, manufacturing, electricity gas and water supply, construction, wholesale retail sale and repair, hotels and restaurants, transport storage and communication, financial intermediation, real estate renting and business activities; the size dummies re: 10-19, 20-49, 50-99, 100-249, 250-499, 500-999, more than 1000; the age dummies are: less than 19, 20-24, 25-34, 35-54 and more than 54.

country it is not "co-ordinated", contributes to reducing wage dispersion slightly, with the only exception being the differential by education, which is lower with multi-employer bargaining.

The evidence is mixed with respect to Italy, where in three cases out of six (region, size and age) it reveals a more compressed wage distribution when a single-employer agreement is applied. The egalitarian effect is particularly strong considering wage differential by size and by region, while it is fairly small with respect to age. Multi-employer bargaining instead reduces wage dispersion by education, by occupation and by industry.

On the whole, the analysis of wage differentials computed through the corrected and weighted standard deviation of coefficients allows us to draw the same conclusions as those obtained from the variance decomposition exercise: the impact of decentralised wage-setting is to reduce wage dispersion considerably among different kind of workers and among workers hired in different types of firms when it is strongly "co-ordinated" as in Belgium, while it contributes to spreading wage differentials when it is totally "uncoordinated" as in the UK.

5.3 Quantile regression analysis

A useful tool for evaluating conditional overall wage dispersion is the quantile regression, which, in contrast with least squares estimation, allows us to estimate the impact of the explanatory variables on different points of the wage distribution, not only on its mean. In particular, following Kahn (1998), after quantile estimation we are able to replicate the results of Table 3, but the conditional rather than unconditional inter-quantile differential can be computed.

Quantile regressions are estimated separately by type of bargaining for the four countries:

$$\log(w_{pct}^{i,j}) = X^{i,j}\gamma_{pct} + \varepsilon$$

where i is an indicator for country, j = *SEB/MEB*, *pct* stands for the percentile considered (10th, 50th and 90th), X is a vector of explanatory variables, γ is a vector of parameters and ε is a vector of error terms.

The 10th, 50th and 90th percentiles of the conditional wage distribution are simulated after estimation by multiplying each estimated coefficient by the sample mean of the correspondent explanatory variable:

$$\log(\widehat{w}_{pct}^{i,j}) = \overline{X}^{i} g_{pct}$$

where g is the vector of coefficients estimates and $\overline{X}^{i}$ is a vector containing country i overall (*SEB* and *MEB* pooled) means of the explanatory variables.

The results of this computation are reported in Table 6, which shows the (conditional) 90th/10th, 90th/50th and the 50th/10th percentile ratios in correspondence with the two considered bargaining regimes for the whole sample and separately for manual and non-manual workers and for the four countries analysed.

Table 6. Conditional wage differentials

	90/10		90/50		50/10	
	MEB	*SEB*	*MEB*	*SEB*	*MEB*	*SEB*
ITALY						
All	1.788	1.721	1.377	1.350	1.298	1.275
Non manual workers	1.940	1.829	1.442	1.398	1.345	1.308
Manual workers	1.665	1.616	1.315	1.304	1.267	1.239
BELGIUM						
All	1.788	1.766	1.376	1.368	1.300	1.290
Non manual workers	1.960	1.822	1.444	1.386	1.357	1.315
Manual workers	1.634	1.546	1.320	1.250	1.238	1.237
SPAIN						
All	2.273	2.388	1.586	1.584	1.434	1.507
Non manual workers	2.630	2.512	1.702	1.618	1.545	1.553
Manual workers	2.049	2.274	1.502	1.544	1.365	1.473
UK[a]						
All	2.120	2.343	1.483	1.595	1.430	1.469
Non manual workers	2.195	2.588	1.518	1.686	1.446	1.534
Manual workers	2.035	2.052	1.454	1.464	1.400	1.402

a: For UK SEB refers also to not covered workers.

The results given in Table 6 show that in the countries where a "co-ordinated" decentralisation exists (Italy and Belgium), all the percentile ratios considered are smaller in the presence of single-employer rather than multi-employer bargaining, and this is true for both groups of workers considered; in Spain the evidence is mixed: wage dispersion is always higher in the presence of an establishment/enterprise agreement rather than with above-establishment bargaining for manual workers. For non-manual workers the overall differential and the differential in the upper part of the wage distribution are higher when a multi-employer agreement is signed. As regards the UK, the overall dispersion and the dispersion in both the lower and the higher part of the wage distribution is always lower in the presence of a collective multi-employer agreement. Finally, it is interesting to notice that in all four countries the three percentile ratios are higher for non-manual than for manual workers whatever the type of bargaining. This result may be due to the fact that the key egalitarian aim of unions and their scope for action is stronger as regards manual rather than non-manual workers.

The simulation of the 10th, 50th and 90th percentiles and the computation of their ratios have been replicated for common overall mean values of the explanatory variables. In particular, the Belgian and UK means have been used. Using common weights permits the computation of percentile ratios controlling for the different compositions of the countries' samples and thus the results

permit the analysis of cross-country differences in inequality which are due to the different prices of the workers' characteristics, after controlling for differences between countries in the distribution of these characteristics. The results show that even with common sets of weights, the lowest inequality is in Belgium and in Italy, while inequality is much higher in Spain and in the UK[8]. Thus, the comparison indicates that inequality is higher in countries characterised by more decentralised system of bargaining, whatever the applied type of agreement. Hence, wage-setting institutions play an important role in explaining not only the within-country differences in wage distribution generated by the type of bargaining, but also across-country diversity in the level of inequality.

6 Conclusions

In this paper we have examined the impact of collective bargaining institutions on wage inequalities. A large body of empirical work shows that more centralised and/or co-ordinated economies have significantly less earnings inequality compared with more decentralised and/or uncoordinated ones. This is particularly true when centralisation and/or co-ordination interacts with other institutional features such as the degree of unionisation and coverage of collective bargaining. The results of our empirical investigation, conducted by using the matched workers-firms data set of the Eurostat European Structure of Earnings Survey, do not contradict this conclusion, but they indicate that important qualifications are needed.

Our focus is on the impact of the decentralisation of bargaining obtained through a greater diffusion of single employment bargaining (*SEB*) at the firm level. The data used allow us to distinguish workers covered by multi-employer collective bargaining (*MEB*) from those covered by *SEB*, in addition to giving information on a number of specific characteristics of single workers, jobs, and firms. The data has been made available for only four countries: Belgium, Italy, Spain, and UK Each of these countries presents specific bargaining institutions that turn out to be important in explaining our empirical results. Belgium and Italy have a collective bargaining system which is multi-level: *SEB* can take place only in the way of implementing *MEB* and in addition to it. In Spain and UK, instead, the two types of bargaining are mutually exclusive: workers can be covered either by *SEB* or by *MEB* (or not covered at all).

In addition, Belgium, which is a rather "corporatist" country, presents a very high degree of centralisation of bargaining; Italy follows next, while the degree of centralisation in Spain is lower, lying at an intermediate level. More important for our analysis is the ranking of countries according to the degree of co-ordination that peak organisations exert with respect to the collective bargaining that occurs at the lower level: the OECD ranking lists the three countries at a very high level of co-ordination, with Belgium at the top. At the other extreme of the spectrum, the UK has very weak collective bargaining

[8]The results are available from the authors upon request.

institutions and the process of decentralisation of bargaining has been extreme over recent decades.

Our findings suggest that the effects of *SEB* on wage inequality depend on these different institutional features. In fact, mainly in Belgium, but also in Italy and to a lesser extent in Spain, collective bargaining at the level of the single firm does not contribute to higher wage inequality. Our findings show that the dispersion of earnings and wage differentials are not higher for the group of workers that is covered by *SEB*. This result is probably due to the forces of imitation and co-ordination that limit the role of *SEB* in widening inter-firm wage differentials, and to the egalitarian character of wage policies that in an environment where values of equity and uniformity are strong and widespread, are also followed by unions negotiating at firm level. In the case of Belgium the results are indeed contrary to what was expected: wage inequality is higher among those workers that are covered only by *MEB*. One possible explanation of this finding rests on the role plaid by the wage drift. Although we have no direct information on the amount and the nature of the wage drift at the level of the single firm, it is nonetheless likely that firms that are covered only by *MEB* have more room for manoeuvre when reacting to egalitarian wage policies followed at the central level and adjust wage differentials to their needs, thus producing a more dispersed distribution of wages within the firm. In contrast, in the UK, where the forces of co-ordination and imitation across firms are much weaker, workers covered by *MEB* have wages that are much more compressed, while for the other workers the dispersion of wages and wage differentials are much greater. Here the explanation is similar: the decentralisation of bargaining produces more wage inequality when it is radical and widespread and when it is accompanied by a process of de-unionisation and a profound weakening of values of uniformity in inspiring wage policies.

Our analysis has clear limits and the empirical results must be accepted with caution. The most important limitation is due to the fact that we look at the experience of only four countries: other countries have to be investigated to see whether the same results are confirmed. The other limit derives from the lack of information on wage drift; its features should be better described in order to consider its role in affecting wage differentials within and across firms. Finally the sorting mechanism - and the factors behind it - through which some firms bargain with their local unions while others do not should be better explored.

However, while taking these limits into account, our findings at least suggest that it is not easy to combine elements of centralisation and/or co-ordination with elements of decentralisation of collective bargaining in order to reap the benefits of both situations, i.e. wage restraint on the one hand and wage differentials more responsive to the needs of the firms on the other. A strongly centralised system with widespread *MEB* might be better even for introducing some flexibility into wage differentials, in so far as it leaves some room for firms to further increase earnings at their discretion in order to adjust the wage structure to external market conditions and to internal needs of increasing efficiency. If that degree of wage flexibility turns out to be insufficient and more inequality in earnings is demanded, a short step towards decentralisation might not be

enough. In that case a more radical move is likely to be needed.

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