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Rent-Sharing under Different Bargaining Regimes: Evidence from Linked Employer-Employee Data

Michael Rusinek
François Rycx

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Forschungsinstitut
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Institute for the Study
of Labor

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Michael Rusinek
Université Libre de Bruxelles, DULBEA

François Rycx
Université Libre de Bruxelles, DULBEA
and IZA

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IZA

P.O. Box 7240
53072 Bonn
Germany

Phone: +49-228-3894-0
Fax: +49-228-3894-180
E-mail: iza@iza.org

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ABSTRACT

Rent-Sharing under Different Bargaining Regimes: Evidence from Linked Employer-Employee Data*

In many European countries, the majority of workers have their wages directly defined by industry-level agreements. In addition, for some workers, industry agreements are complemented by firm-specific agreements. Yet, the relative importance of firm and industry agreements (in other words, the degree of centralization) differs drastically across industries. The authors of this paper use unique linked employer-employee data from a 2003 survey in Belgium to examine how these bargaining features affect the extent of rent-sharing. Their results show that there is substantially more rent-sharing in decentralized than in centralized industries, even when controlling for the endogeneity of profits, for heterogeneity among workers and firms and for differences in characteristics between bargaining regimes. Moreover, in centralized industries, rent-sharing is found only for workers that are covered by a firm agreement. Finally, results indicate that within decentralized industries, both firm and industry bargaining generate rent-sharing to the same extent.

JEL Classification: J31, J51

Keywords: rent-sharing, collective bargaining, propensity score matching

Corresponding author:

Michael Rusinek
Université Libre de Bruxelles
CP 140, Av. F.D. Roosevelt 50
B-1050 Brussels
Belgium
E-mail: mirusine@ulb.ac.be

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It is often recommended to decentralize wage bargaining so that firms can better align their pay policies with their specific needs. However, as noted by some analysts (OECD 2004, Teulings 1998), wage setting decentralization also broadens the scope for local rent-sharing. Indeed, if wage bargaining takes place at the firm level, workers (possibly represented by trade unions) may be able to extract a larger part of the rents generated by their firms. This could have important economic consequences, as it may prevent an efficient allocation of labor across firms, increase wage inequality, lead to smaller employment adjustments, and affect the division of surplus between capital and labor (Bryson *et al.* 2006). Surprisingly, there is little evidence regarding the impact of wage bargaining structures on rent-sharing. A growing body of literature does examine the micro-economic effects of wage bargaining institutions on wages. [1] A large number of papers document on the existence of rent-sharing. [2] Yet, the link between rent-sharing and wage bargaining institutions has almost exclusively been analyzed for the Anglo-American world through the comparison of unionized and non-unionized sectors. Results suggest that rent-sharing is not a particularity of unionized sectors. [3] The distinction according to union status has less meaning for most European countries because collective agreements are generally extended to non-unionized members. Another particularity of European countries is that collective bargaining occurs at multiple levels: at the industry level, union federations and employer associations set wages for all workplaces that fall under the scope of the agreement. In addition, firm agreements may be concluded at the company level generally to complement industry agreements. The impact of bargaining institutions on rent-sharing in European countries has been studied only by Gürtzgen (2005). Based on German micro-data for the mining and manufacturing sector, it is found that individual wages are positively related to firm-specific quasi-rents in the non-unionized sector and under firm-specific contracts. Industry-level agreements, however, seem to suppress firm-level rent-sharing. [4]

One point neglected in Gürtzgen (2005), as in most of the above mentioned literature, is that the relative importance of firm and industry agreements differs radically across industries (Hendricks and Kahn 1982, Katz 1993, Schnabel *et al.* 2006). In sectors composed of a large number of small and labor-intensive firms, wages are essentially set by industry agreements. In contrast, wages are mainly determined at the firm level in industries composed of a small number of large and capital-intensive firms. The degree of wage bargaining centralization thus varies across industries. So far, the literature on the wage effects of bargaining institutions in European countries has focused solely on the impact of the presence of a firm agreement in addition to an industry agreement, without considering the centralization dimension. This is an important limitation as the level at which wages are bargained does not have the same meaning in centralized and decentralized industries. The point is that industry agreements set much lower industry standards (i.e. minimum wages by category of workers) and are less detailed in decentralized industries. Therefore, industry agreements are more often improved at the firm level in decentralized industries. This may be done through collective bargaining when there is a firm-level collective agreement or through individual bargaining when workers are solely covered by an industry agreement. As a result, the impact of industry and firm-level agreements on wages may be very different in centralized and decentralized industries. Moreover, since firm agreements are mostly concluded in decentralized industries, the literature is not able to disentangle the effect of the level at which wages are set and the impact of the degree of centralization of bargaining in the industry. This paper is the first to investigate the effects of both of these dimensions of collective bargaining on the sensitivity of wages to firm-specific rents. More precisely, we address the following questions:

1) Is there more rent-sharing in decentralized than in centralized industries ?

2) Does the presence of a firm agreement (in addition to an industry agreement) similarly affect rent-sharing in centralized and decentralized industries ?

Our analysis is based on a unique linked employer-employee data set for Belgium, a typical continental European country regarding wage setting institutions. It resulted from the combination of the *Structure of Earnings Survey* for 2003 and the *Structure of Business Survey* for 2001 and 2003. It provides two interesting variables regarding wage bargaining institutions. The first one indicates whether workers in a firm are covered only by an industry wage agreement or whether they are additionally covered by a collective wage agreement at the firm level. This information is available separately for white- and blue-collar workers. Hence, it enables us to overcome a serious misclassification problem encountered in most papers on the wage effects of collective bargaining systems. The point is that in many firms, blue- and white-collar workers are not covered by the same type of collective agreement (industry vs. firm) but such information is often not available in surveys. The second variable related to collective bargaining in our survey indicates to which Joint Committee each firm belongs. [5] This variable, generally not reported in matched worker-firm data sets, makes it possible to identify the precise industry agreement by which each firm is covered. Thanks to these two variables, we were able to construct a quantitative indicator of centralization, based on the percentage of workers covered by a firm agreement within each Joint Committee.

Two endogeneity problems may arise when estimating a rent-sharing equation. First, there is an accounting relationship between wages and current profits so that profits decrease when wages increase. This leads to a downward bias in the coefficient of profits. Second, according to efficiency wage theories, an increase in wages may provide workers with incentives to step up their efforts. This may lead to an upward bias in the coefficient of profits. To correct these endogeneity problems, we applied a two-stage least squares (2SLS) technique, using 2001 profits as instruments for 2003 profits. Another issue, raised by Card and de la Rica (2006), is

that micro-econometric studies of bargaining institutions based on samples of workers may potentially confound bargaining status with other firm-level characteristics. We tried to solve this problem by using a propensity score matching (PSM) method. This boils down to comparing a sample of “treated” workers with a sample of “non-treated” workers who have similar observed characteristics.

Institutional Setting and Theoretical Predictions

As in many European countries, wage-setting in Belgium occurs at three levels (national, industry and firm) in a hierarchical way, so that an agreement concluded at one level cannot be less favorable than the upper level agreements. National agreements cover the whole country. They set national minimum wages and an upper bound on wage increases that may be bargained at lower levels. Industry agreements are concluded within Joint Committees that bring together employer and union representatives. They set industry standards (minimum wages by category of workers) for all employees covered by the Joint Committee. Finally, firm-level agreements may complete industry agreements. The relative importance of industry and firm-level agreements varies across industries. [6] Three groups of industries can be identified according to the level at which job classifications and regular wage premiums are set (Verly 2003):

1) Industries where such norms are mostly defined at the industry level and applied as such in companies. These are mainly the manufacturing industry and industries that essentially employ blue-collar workers such as the textile, food, construction, wood and transport industries.

2) Industries where such norms exist at the industry level but are often considered as a minimum that has to be improved at firm level. This is mostly the case for industries mainly employing white-collar workers.

3) Industries where such norms are mostly defined at the company level. These are mainly industries consisting of large firms: steel, non ferrous metals, glass, chemicals, paper and electricity.

It is interesting to note that the factors that seem to influence the bargaining structure in Belgium are very similar to those that affect the bargaining structure in other industrialized countries. According to the literature [7], the main reason for having centralized wage bargaining is to keep wages out of competition. In contrast, decentralized wage bargaining is more likely to be observed in industries composed of a small number of large and capital-intensive firms. The reason is that larger firms more often have specific problems to solve (Schnabel *et al.* 2006) [8], and it is less costly for them to have specific pay policies because of economies of scale. Moreover, while trade unions generally prefer industry-wide bargaining for solidarity purposes, they are generally less resistant to decentralized wage bargaining in larger firms where they tend to be better represented. In addition, their potential gains from decentralized wage bargaining are larger in more capital-intensive firms because the elasticity of labor demand is negatively related to capital intensity.

While the majority of firms in centralized industries are covered only by an industry agreement, the biggest and the most profitable ones are in general additionally covered by a firm-specific agreement. Moreover, not all firms in decentralized industries are covered by a firm-level collective agreement. In decentralized industries, the absence of a firm agreement probably indicates that wages are bargained individually at the firm-level. This is due to the fact that industry agreements are generally less detailed and set lower industry standards than in centralized industries thus broadening the scope for improvement at the firm-level.

Which theoretical predictions can be made about the impact of the bargaining structure on the extent of rent-sharing ? One can argue that, because industry bargaining cannot take into account firm-specific characteristics, the more wages are bargained at the company level, the

greater is the scope for rent-sharing. Thus one would expect to find more rent-sharing: i) in decentralized than in centralized industries and, ii) within centralized and decentralized industries, when a firm agreement is complementing the industry agreement. These predictions are, however, not obvious for several reasons. First, there can be mechanisms of pattern-setting across firms, as it is the case in Switzerland or Japan, so that the impact of decentralization is offset by coordination. Second, it is not certain that, even under decentralized bargaining, wages will highly depend on firm-level profits. For example, Levine (1993) showed that, in the US, pay policies were more influenced by the wages of other workers, within or outside the firm, than by the firm's own profits. Moreover, according to Teulings and Hartog (1998), unions in corporatist countries do not operate as aggressive local rent-seekers because they are part of a corporatist structure that provides many countervailing incentives that discourage this type of behavior. They illustrate this by analyzing wage differentials by bargaining regime in the Netherlands, where the wage setting system is very similar to the Belgian one (Van Ruysseveldt and Visser 1996). Finally, as stated previously, the presence of a firm agreement (in addition to an industry agreement) may not have the same impact in centralized and decentralized industries.

Data

The present study is based upon a unique combination of two large-scale data sets. The first, carried out by Statistics Belgium, is the 2003 *Structure of Earnings Survey* (SES). It covers Belgian firms employing at least 10 workers with economic activities within sections C to K of the Nace Rev.1 nomenclature. The survey contains a wealth of information, provided by the management of the establishments, both on the characteristics of the latter (e.g. industry, region, type of financial and economic control, size of the establishment) and on their workers (e.g. education, age, seniority, gross hourly wages, number of paid working hours, sex, type of employment contract, occupation). In addition, it provides two interesting

variables regarding wage bargaining institutions. The first one indicates whether workers in a firm are covered only by an industry wage agreement or whether they are additionally covered by a collective wage agreement at the firm level. This information is available separately for white- and blue-collar workers. Hence, it enables us to overcome a serious misclassification problem encountered in most papers on the wage effects of collective bargaining systems. The point is that in many firms, blue- and white-collar workers are not covered by the same type of collective wage agreement (industry vs. firm) but such information is often not available in surveys. Given that it is more common that white-collars workers receive pay supplements outside of collective agreements, we restrict our analysis to blue-collar workers. The second variable related to collective bargaining in our survey indicates to which Joint Committee each firm belongs. This variable, generally not reported in matched worker-firm data sets, makes it possible to identify precisely by which industry agreement each firm is covered. Thanks to these two variables, we are able to construct a quantitative indicator of centralization, based on the percentage of workers covered by a firm-specific agreement within each Joint Committee. Since the SES provides no financial information, it has been merged with the 2001 and 2003 *Structure of Business Survey* (SBS). This is a firm-level survey, conducted by Statistics Belgium, with a different coverage than the SES in that it includes neither the banking sector, nor the electricity sector, nor firms with less than 20 employees. The SBS provides firm-level information on value-added and gross operating surplus per employee. After eliminating observations with missing values, establishments with less than 5 employees, Joint Committees with less than 5 establishments and firms with negative profits in 2001 or 2003 [9], our final sample, combining both datasets, covers 26,249 blue-collar workers working in 2,012 establishments. It is representative of all blue-collar workers employed in private sector establishments (with the exception of the banking and electricity sectors) employing at least 20 workers.

Table 1 presents some selected sample statistics broken down by centralized and decentralized industries. We consider that an industry is decentralized if more than 50% of employees are covered by a firm-specific agreement. [10] The comparison of the statistics between the two sub-samples is in line with the literature on the determinants of the collective bargaining structure. This confirms that factors influencing the bargaining structure in Belgium are quite similar to those identified in other countries. Decentralization of wage bargaining seems to be associated with lower labor intensity (the share of labor revenue in value added is 61% vs. 68% in centralized industries) and a higher establishment size (132 vs. 55 employees in centralized industries). Profits are 66% higher in decentralized industries, which may be a sign of lower product market competition, which itself may be caused by the fact that firms are more concentrated in decentralized industries. According to Katz (1993), work organization is another factor to explain decentralization of collective bargaining. We indeed observe that the percentage of employees doing team, shift, night or weekend work is much larger in decentralized industries (50%) than in centralized industries (18%). The same holds true for the percentage of employees with variable pay (30% vs. 12% in centralized industries). Finally, we observe that the percentage of female workers is lower (14% vs. 20%), seniority in the firm longer (11 years vs. 8 years), the percentage of full-time workers larger (91% vs. 85%), and the education level higher in decentralized industries. All of these characteristics are generally associated with high worker bargaining power. This seems to indicate that unions accept forms of decentralization (based on a loosening of industry agreements) only if workplace representation is strong (Visser 2005). Further descriptive statistics (reported in appendix 2) show that within centralized industries, 14% of firms are covered by a firm-specific agreement in addition to the industry agreement. On average, these firms are bigger, make more profits and are characterized by a lower degree of labor intensity than those only covered by an industry agreement. On average, they also employ more

tenured and educated workers, who are more often: i) employed on a full-time basis, ii) doing shift, night or weekend work, and iii) receiving variable pay. Overall, it is interesting to note that characteristics of firms covered by a firm-specific agreement in centralized industries are quite similar to those of firms in decentralized industries.

Empirical Framework

To estimate the amount of rent-sharing in Belgium, we rely on the right-to-manage model. [11]. Hence, suppose a bargaining situation where a firm's real profit function is given by:

$$\Pi = R(L) - W\,L \tag{1}$$

with Π the real profits, *R(L)* the real revenue, *W* the real wage and *L* the employment level. Also consider a risk-neutral group of workers, not necessarily a union, that attempts to maximize the expected utility of a representative member, defined as:

$$U = \frac{L}{N}\,W + \left(1 - \frac{L}{N}\right)A \tag{2}$$

with *N* the number of members in the group ($0 < L \leq N$) and *A* the outside option ($W > A$). The outside option is the expected value of real revenue perceived by an individual in case of redundancy. It depends positively on the unemployment benefit and on the expected real wage that a worker would obtain elsewhere, and negatively on the unemployment rate. The model is solved backwards: the profit-maximizing firm determines the employment level, given the bargained wage in the first stage of the game. The resulting deal is represented by the maximization of the generalized Nash bargain. For a company, without fixed costs, the level of utility reached when bargaining fails equals zero. Indeed, since we assume that all workers are affiliated to the group, the company will have to cease production if no agreement is reached. The fallback position of a representative member of the group is equal to *A*. Accordingly, the generalized Nash bargaining problem can be written as follows [12]:

$$\underset{W}{Max}\ U^{\beta}\,\Pi = \underset{W}{Max}\left(\frac{L}{N}\left(W-A\right)\right)^{\beta}\left(R(L)-W\,L\right) \qquad (3)$$
$$s.t.\ \ R'(L)=W$$

with $\beta \in [0,1]$ the relative bargaining power of the workers in the wage bargain. The first order condition of this problem is given by:

$$W = A + \beta\,\frac{\left(R(L)-W\,L\right)}{L} \qquad (4)$$

Expression (4) suggests that real wages are affected by the outside option, real profits-per-employee and the relative bargaining power of workers.

The corresponding statistical specification, which will serve as a benchmark for our empirical analysis, can be written as follows:

$$w_{ij} = \delta_0 + \delta_1 X_i + \delta_2 Z_j + \beta\left(\frac{\Pi}{L}\right)_j + \varepsilon_i \qquad (5)$$

where w_{ij} is the logarithm of the gross hourly wage of worker i in firm j, X_i is a vector of individual characteristics and working conditions (4 dummy variables for the highest completed level of education; prior potential experience, its square and its cube; tenure within the current company and its square; sex; 8 occupational dummies; a dummy for part-time employment; an indicator showing whether the individual is paid a bonus for shift work, night-time and/or weekend work and 3 dummies for the type of employment contract); Z_j a vector of firm characteristics (2 regional dummies indicating where the establishment is located; the size of the establishment; 2 dummies indicating the form of financial and economic control and 34 dummies for the sectoral affiliation); $\left(\frac{\Pi}{L}\right)_j$ the logarithm of profits per employee in firm j and ε_{ij} an error term. In a first stage, we estimate this equation by ordinary least squares (OLS) with White (1980) heteroscedasticity consistent standard errors. Moreover, in order to control for the potential bias deriving from aggregated firm variables in

an individual wage specification, standard errors are corrected for within-group correlated errors as suggested by Moulton (1990). Results are shown in the first column of Table 2. All coefficients have the expected sign and they are generally highly significant. [13] Moreover, the adjusted R^2 reaches almost 50 per cent. Our estimate of the wage-profit elasticity is 0.017. This means that on average a doubling of profits-per-worker increases earnings by 1.7%. To evaluate the impact of profits on the distribution of wages, Lester's (1952) range of pay due to rent-sharing has been calculated. This statistic indicates the degree to which wages change if a worker were hypothetically to move from a low- to a high-rent firm. It is obtained by applying the following formula:

$$4\hat{\beta}\,\frac{\sigma(X)}{\overline{X}} \qquad (6)$$

where $\hat{\beta}$ is the estimated wage-profit elasticity, X measures the level of firm profits-per-employee, and $\sigma(X)$ and $\overline{X}$ denote the standard deviation and the mean value of X, respectively. On the basis of this formula, it appears that, *ceteris paribus*, the wage of a worker would increase by 10% if he/she switched jobs from a firm whose profits are two standard deviations below the mean level of profits to another firm whose profits are two standard deviations above the mean.

Our benchmark regression clearly supports the hypothesis that individual wages are significantly and positively related to the firm's ability to pay. Nevertheless, caution is needed. Indeed, two econometric problems arise when using current profits as an explanatory variable. First, there is an accounting relationship between wages and current profits: if wages increase, profits (i.e. value-added minus remuneration of labor) automatically decrease. Therefore, our OLS estimate of rent-sharing is likely to be downward biased. Second, a positive relationship between wages and current profits may arise because higher wages can provide employees with incentives to step up their effort (cf. efficiency wage

theories). This would lead to an upward biased estimation of rent-sharing. In order to correct for both problems, we apply 2SLS, using 2001 profits as instruments for 2003 profits. Results of our 2SLS regression are presented in the second column of Table 2. We find that the wage-profit elasticity increases from 0.017 to 0.032, which indicates that our previous estimate was downward biased. [14] As a result, Lester's (1952) range of pay due to rent sharing increases from 10% to 19%.

Rent-sharing by degree of centralization

To investigate the interaction between rent-sharing and decentralization, we ran the 2SLS regression separately for centralized and decentralized industries. The results from this analysis, reported in Table 3, indicate that rent-sharing is significantly higher in decentralized (wage-profit elasticity of 0.087) than in centralized industries (wage-profit elasticity of 0.023).

However, since firm-level characteristics may differ across industries it is not certain that the difference in rent-sharing is due to centralization. Indeed, we noted above that decentralized industries are characterized by higher profits and apparently stronger workplace representation than centralized industries. So it may be that the conditions for rent-sharing are less present in centralized industries. In other words, it is not sure that firms currently in centralized industries would generate more rent-sharing if they were under decentralized bargaining. In order to correctly identify the impact of wage bargaining centralization, we used propensity score matching (Heckman *et al.* 1999). This consists in selecting a sub-sample of firms from centralized industries to form a control group in the estimation of the impact of centralization on rent-sharing. This control group should include firms of centralized industries with characteristics close to those of firms of decentralized industries. In other words, firms in the control group must have particular features so that their estimated

probability of being in a decentralized industry is sufficiently high. This is the case for most firms covered by a firm-specific agreement in centralized industries as we saw that their mean characteristics are not very different from those of firms in decentralized industries. [15] Yet, our control group may also contain a number of firms of centralized industries that are not covered by such firm-level agreements. In practice, we used nearest neighbor matching with replacement [16]. This implies that first we estimated a propensity score for each firm based on its probability of being in a decentralized industry. This is done by the estimation of a probit model. Then, for each firm in the decentralized sample, we selected the firm in the centralized sample with the closest propensity score [17]. A firm in the centralized sample may be used more than once as a match. In the end, we obtain a sub-sample of firms from the centralized sample that has the same probability distribution of being in a decentralized industry as the sample of "decentralized firms". Therefore, any remaining difference in rent-sharing between the two samples can be attributed to the degree of centralization [18]. The variables included in the probit model are those that influence both the degree of centralization and the level of rent-sharing. Theoretically, rent-sharing mainly depends on the rents generated by the firm and the bargaining power of the workers. These variables are also important determinants of the degree of centralization of the industry. Hence, the explanatory variables in our probit model include firm-level profits per employee and variables that influence or signal worker bargaining power (average tenure in the firm, percentage of female workers, proportion of part-time workers, structure of the firm's workforce by type of employment contract and occupation (ISCO 2 digits), establishment size, dummies for the firm's type of financial and economic control and a dummy indicating whether the firm is covered by a firm agreement). Moreover, since the degree of centralization may also depend on more macro-economic variables, we included dummies for the industry (NACE 1 digit) and the region where the establishment is located. Note that

these variables can also be considered as proxies for the outside option of the workers in the wage bargain. Finally, in order to control for firm-specific wage policies, we controlled for the percentage of workers with variable pay. The pseudo R^2 of our probit regression is 0.30, which is quite high compared with other studies on the determinants of the collective bargaining structure. [19] As a comparison, in Schnabel *et al.* (2006), the pseudo R^2 is 0.23 and 0.16 respectively for the U.K. and Germany. 13 firms from the decentralized sample were dropped because no match close enough was found. For the remaining firms, the matches are very close: the mean differences in propensity score between the firms in the decentralized and centralized industries is 0.001 and ranges between 0 and 0.099. Of the 1,669 firms in the centralized sample, 217 were used as a match. 71% of those firms have a weight of 1 which means that they are matched to a single decentralized firm. The largest weight is 7. For most variables, matching has reduced the differences in mean between the two samples: the mean absolute standardized difference decreases from 24% to 8%. [20] Table 4 shows that, even when using PSM, the wage-profit elasticity is more than four times higher in decentralized than in centralized industries (0.086 vs. 0.021). These findings confirm that there is significantly more rent-sharing in decentralized than in centralized industries. They provide a counterargument to the one advanced by Teulings and Hartog (1998) that unions do not operate as rent-seekers in corporatist countries. Indeed, it seems that this depends heavily on the degree of centralization of the industry.

Rent-sharing by degree of centralization and bargaining level

In order to verify if the presence of a firm agreement similarly affects rent-sharing in centralized and decentralized industries, we further divided the samples according to the level at which wage bargaining occurs. Our results, shown in Table 5, indicate that within centralized industries there is significantly more rent-sharing in firms covered by a firm-

specific agreement than in firms solely covered by an industry agreement (the wage-profit elasticity is 0.039 under firm bargaining and 0.020 under industry bargaining). In contrast, for decentralized industries, we find that the extent of rent-sharing is not significantly affected by the level of wage bargaining. Finally, results show that the wage-profit elasticity is always larger in decentralized than in centralized industries regardless the bargaining level.

It could be argued that these results are biased because firms covered by industry and firm agreements have different characteristics. To prevent such a bias, we applied the PSM method as in the previous section. The specification of the underlying probit model remains almost unchanged. [21] Matching substantially reduces differences in characteristics between both samples (industry vs. firm). The mean absolute standardized difference decreases from 16% to 7% and from 28% to 12% respectively for the centralized and decentralized industries. Results obtained with PSM (Table 6) confirm and accentuate the previous ones. Within centralized industries, while the wage-profit elasticity stays roughly similar for firms covered by a firm agreement, the elasticity decreases from 0.020 to 0.013 and is now only significant at the 10% level for firms covered only by an industry agreement. Results thus suggest that in centralized industries rent-sharing is essentially a particularity of firms covered by a firm-specific agreement. This finding was expected since industry agreements do not take into account firm-specific characteristics. In decentralized industries, the elasticity rises from 0.049 to 0.116 for firms covered by an industry agreement and remains not statistically different from the elasticity of firms covered by a firm agreement (0.110). These findings confirm that in decentralized industries both bargaining levels generate rent-sharing to the same extent. They suggest that workers in decentralized industries, who are not covered by a firm-level collective agreement, receive wage supplements paid unilaterally by their employer. The fact that these workers also benefit from rent-sharing indicates that pay-setting does not need to be collective to generate rent-sharing.

Robustness Checks

So far, we interpreted a positive wage-profit elasticity as evidence for the fact that workers are able to extract a share of the firm's rents due to their bargaining power. This section presents the robustness checks that we ran in order to verify this interpretation.

A link between wages and profits may derive from employer practices that aim at sharing risks with workers and/or at stimulating workers' productivity. Such practices link wages to individual performances, through the use of performance-related pay, or to firm performances, for instance through the use of profit-sharing schemes. Both can generate a correlation between profits and wages. Moreover, because variable pay is more often used under decentralized bargaining than under centralized bargaining [22], it may explain the difference in wage-profit elasticity between both regimes. In order to test this hypothesis, we ran a specification using a wage variable computed only on the basis of the fixed component in pay. Results do not change significantly with this alternative specification. In addition, we also estimated the wage-profit elasticity for the sample of firms making losses. If *rent*-sharing is the correct interpretation, wages should not be correlated with firm performances in this sub-sample because only profits are shared. On the opposite, if there is *risk*-sharing, both profits and losses are shared so that a positive wage-profit elasticity should be obtained as in the case of positive profits. For the 61 firms in our sample making losses in 2001 and 2003, a negative elasticity was found. Overall, both robustness tests suggest that the risk-sharing interpretation can be rejected.

A temporary increase in demand on the product market may also explain the positive relationship between profits and wages. Indeed, employers facing an increase in demand generally first use overtime work instead of directly increasing employment. Because overtime work is better paid, wages and profits would rise together. In order to test this hypothesis, we estimated our equations with a wage variable computed on the basis of regular

hours only. Results reinforce previous findings. Indeed, wage-profit elasticities are almost unchanged except for the sample of workers not covered by a firm-specific agreement under centralized bargaining. For this sample, the elasticity is no longer statistically significant even at the 10% level. [23]

Conclusion

The link between rent-sharing and wage bargaining institutions has almost exclusively been analyzed for the Anglo-American world through the comparison of unionized and non-unionized sectors. For most European countries focusing on the union status is not particularly interesting as collective agreements are generally extended to non-unionized members. The impact of the bargaining regime is therefore better illustrated by the level of wage negotiations (industry vs. firm agreements). So far, only one paper has examined how rent-sharing is influenced by the level of wage bargaining (Gürtzgen 2005). A major issue ignored in this study (as in most of the literature on the wage effects of bargaining institutions) is that the degree of wage bargaining centralization substantially varies across industries. This is an important limitation as the level at which wages are bargained does not have the same meaning in centralized and decentralized industries. The point is that industry agreements set much lower industry standards (i.e. minimum wages by category of workers) and are less detailed in decentralized industries. Therefore, industry agreements are more often improved at the firm level in decentralized industries. This may be done through collective bargaining when there is a firm-level collective agreement or through individual bargaining when workers are solely covered by an industry agreement. As a result, the impact of industry and firm-level agreements on wages is likely to be very different in centralized and decentralized industries. Moreover, since most firms covered by a firm-level agreement are found in decentralized industries, the literature is not able to disentangle the effect of the

level at which wages are set and the impact of the degree of centralization of the industry. This paper is the first to investigate the impact of both of these dimensions of collective bargaining on the sensitivity of wages to firm-specific rents. More precisely, this paper examined the following questions:

1) Is there more rent-sharing in decentralized than in centralized industries ?

2) Does the presence of a firm-level agreement (in addition to an industry agreement) similarly affect rent-sharing in centralized and decentralized industries ?

On the basis of detailed matched employer-employee data for Belgium, with unique information on collective bargaining institutions, we show that there is substantially more rent-sharing in decentralized than in centralized industries, even when controlling for the endogeneity of profits, worker and firm heterogeneity, and differences in characteristics between bargaining regimes. This finding is not in line with the argument advanced by Teulings and Hartog (1998) that unions do not operate as rent-seekers in corporatist countries. Indeed, it seems that this depends heavily on the degree of centralization of the industry. Moreover, in centralized industries, rent-sharing only concerns workers that are covered by a firm-specific agreement. This finding was expected since industry agreements do not take into account firm-specific characteristics. Finally, results indicate that within decentralized industries, both firm and industry bargaining generate rent-sharing to the same extent. They suggest that workers in decentralized industries, who are not covered by a firm-level collective agreement, receive wage supplements that are paid unilaterally by their employer. The fact that these workers also benefit from rent-sharing indicates that pay-setting does not need to be collective to generate rent-sharing. This is in line with the Anglo-American literature showing that rent-sharing is not a particularity of the unionized sector.

Overall, our findings indicate that it may be quite misleading to examine the wage effects of bargaining institutions in Europe by focusing solely on the level at which wages are negotiated (industry- vs. firm-level agreements). Indeed, it is shown that: i) wages are substantially influenced by the degree of centralization of collective bargaining in the industry and ii) the impact of industry and firm-level agreements on wages is very different in centralized and decentralized industries.

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Notes

[1] For the Anglo-American world see Andrews *et al.* (1998), Blanchflower and Bryson (2002, 2003), Booth (1995), Bratsberg and Ragan (2002), Forth and Millward (2002), Freeman (1980), Freeman and Medoff (1984), Lewis (1986), and Schumacher (1999). For continental European countries see Checchi and Pagani (2004), Card and de la Rica (2006), Cardoso and Portugal (2003), Dell’Aringa and Lucifora (1994a, 1994b), Dell’Aringa *et al.* (2004), Dell’Aringa and Pagani (2007), Dominguez and Guttiérez (2004), Gerlach and Stephan (2004), Gürtzgen (2006), Hartog *et al.* (2002), Khon and Lembcke (2007), Plasman *et al.* (2007), and Rycx (2003).

[2] Previous studies on this issue include e.g. Abowd and Lemieux (1993), Arai (2003), Goos and Konings (2001), Kramarz (2003), Margolis and Salvanes (2001), Martins (2004), Rycx and Tojerow (2004) and Van Reenen (1996).

[3] See Blanchflower *et al.* (1990, 1996), Bronars and Famulari (2001), Estevão and Tevlin (2003), Hildreth and Oswald (1997).

[4] Another paper by Pistoresi and Strozzi (2001) examines the relationship between rent-sharing and bargaining levels in the metal-mechanical industry in Italy. Given that their data contain no information on the bargaining structure, they attribute aggregate changes to industry level bargaining and idiosyncratic changes to firm level bargaining. They find no evidence of rent-sharing at the company level.

[5] Joint Committees are permanent bodies at the industry level in which employers' associations and trade unions are represented. Their main task is to oversee the conclusion of industry collective agreements by the organizations represented. Firms covered by each Joint Committee are defined by Royal Decree. It is important to note that Joint Committees do not correspond to the economic sectors as defined by the standard NACE nomenclature.

[6] In the remainder of the paper, the term “industry” refers to all firms covered by the same Joint Committee.

[7] See Booth 1989; Deaton and Beaumont 1980; Heikkilä and Piekkola 2005; Hendricks and Kahn 1982; Katz 1993; Schnabel *et al.* 2006.

[8] According to Schnabel *et al.* (2006), large firms have more complex organizational structures, more distant personal relationships, and more coordination, monitoring and communication costs.

[9] We keep firms with positive profits because we use the logarithm of the firm’s profits-per-worker as the main independent variable. We also estimate the wage-profit elasticity for firms making losses in 2001 and 2003 (see section on ‘Robustness checks’).

[10] The proportion of workers covered by a firm agreement in each Joint Committee is shown in appendix 1.

[11] Using Belgian aggregate data from 1957 to 1988, Vannetelbosch (1996) has shown that both the right-to-manage (Nickell and Andrews 1983) and the efficient bargaining (McDonald and Solow 1981) models can be rejected in favor of the general bargaining model (Manning 1987). This means that the outcome of the bargaining process is located somewhere between the labor demand curve and the contract curve. Nevertheless, this result must be considered with caution for at least two reasons. First, the estimates are very sensitive to the specification of the reservation wage, and second, the trade union density and the number of strikes are not a very good surrogate for the relative bargaining power of unions. Also noteworthy is that, while these models have different implications for unemployment and economic welfare, they generate identical wage equations. Hence, as in most empirical papers on rent-sharing, we have chosen to rely on the right-to-manage model. For a presentation of theoretical models on rent-sharing see e.g. Blanchflower *et al.* (1996).

[12] See Nickell (1999: p.3) for a discussion on the notation.

[13] Detailed results of all wage regressions presented in this paper are available upon request.

[14] All coefficients in the first-stage regression are jointly significant at the 1% level. The adjusted R^2 stands at 0.65 and the elasticity between current and lagged profits per employee is highly significant and equal to 0.618.

[15] This observation may suggest that if affiliation to a Joint Committee were not constrained by economic activity, firms in centralized Joint Committees that are covered by a firm-specific agreement would have chosen to belong to a decentralized Joint Committee.

[16] Of the available matching methods, nearest neighbor matching produces estimates with the least bias, but at the cost of a high variance (because only part of the comparison sample is used) (Bryson 2002: p.14). Moreover, allowing the non-treated to be used more than once as comparators improves the performance of the match (Bryson 2002: p.15).

[17] We impose a caliper of 0.01, which means that the difference in propensity score cannot exceed 0.01.

[18] It must be stressed that this is only on the basis of observable characteristics. So if there are unobserved characteristics that influence both the degree of decentralization and the level of rent-sharing, we cannot exclude that the difference in rent-sharing between the two samples is due to differences in those unobserved characteristics.

[19] Results from the probit estimation are provided in appendix 3.

[20] The standardized difference is defined as the difference of the sample means in the treated (here decentralized) and non-treated (here centralized) sub-samples as a percentage of the square root of the average of the sample variances in the treated and non-treated groups (Bryson 2002: p. 15). See appendix 4 for a comparison of the sample means before and after PSM.

[21] We do not include the dummy indicating whether a firm is covered by a firm agreement.

[22] 30% of workers in decentralized industries have a variable component in their pay compared with only 12% in centralized industries.

[23] A third interpretation of a positive wage-profit elasticity, which comes from the efficiency wage theory, has already been discussed in the ‘Empirical Framework’ section.

Table 1: Worker and Firm Characteristics by Degree of Centralization

	Centralized Industries	Decentralized Industries
Worker Characteristics		
Mean Age	38.09	37.68
Education Distribution		
Primary	0.15	0.09
Lower Secondary	0.45	0.43
Upper Secondary (General)	0.13	0.17
Upper Secondary (Vocational)	0.25	0.29
Non-University Tertiary	0.01	0.02
Fraction Female	0.20	0.14
Contract Distribution		
Unlimited-Term	0.94	0.96
Fixed-Term	0.05	0.04
Apprentice	0.001	0.001
Other Contract	0.01	0.002
Fraction Full-Time	0.85	0.91
Fraction Working in Shift, or During Night or Weekend	0.18	0.50
Fraction with Variable Pay Component	0.12	0.30
Mean Tenure (Years)	7.74	10.82
Occupation Distribution		
Extraction and building trade workers	0.14	0.01
Metal, machinery and related trades workers	0.14	0.08
Precision, handicraft, printing and related trades workers	0.04	0.02
Other craft and related trades workers	0.14	0.01
Stationary plant and related operators	0.04	0.18
Machine operators and assemblers	0.14	0.31
Drivers and mobile plant operators	0.12	0.21
Sales and services elementary occupations	0.11	0.02
Laborers in mining, construction, manufacturing and transport	0.12	0.16
Mean gross hourly wages (EUR) [a]	11.63	13.63
Firm Characteristics		
Mean Establishment Size (Number of employees)	54.87	132.45
Economic and Financial Control Distribution		
>50% Privately Owned	0.97	0.92
>50% Publicly Owned	0.002	0.02
Other Economic and Financial Control	0.03	0.06
Region Distribution		
Brussels	0.09	0.10
Flanders	0.68	0.55
Walloon	0.23	0.34
Mean firm's share of labor revenues in value-added [b]	0.68	0.61
Mean profits-per-employee (EUR) [c]	16,526	27,373
Number of workers	21,348	4,901
Number of establishments	1,669	343

Notes: [a] Gross hourly wage includes overtime paid, premiums for shift, night and/or week-end work, and regular bonuses. It does not include irregular payments which do not occur during each pay period, such as pay for holiday, 13th month, profit-sharing, etc. [b] The firm's share of labor revenues in value added is approximated by the firm's labor costs divided by the firm's value-added. Profits-per-employee are approximated by the firm's annual gross operating surplus divided by the number of employees in the firm. Data also include information on NACE industry (35 categories) and on Joint-Committees (39 categories) affiliations.

Table 2: Log Wage Equation, Full Sample

Dependent variable: log (gross hourly wages)	Specification 1: OLS [a]	Specification 2: 2SLS [a, b]
Profits-per-worker (ln) [c]	0.017***	0.032***
	(0.003)	(0.004)
Individual characteristics and working conditions [d]	Yes	Yes
Firm characteristics [e]	Yes	Yes
Industry effects [f]	Yes	Yes
Group effects [g]	Yes	Yes
R^2	0.46	0.46
Prob > F	0.00	0.00
R^2, first stage	-	0.65
Prob > F, first stage	-	0.00
# employees	26,249	
# establishments	2,012	

Notes : * p < 0.10; ** p < 0.05; *** p < 0.01 ; [a] White (1980) heteroscedasticity-consistent standard errors are reported between brackets; [b] Instruments for 2003 firm profits-per-worker include all explanatory variables in equation (5) plus 2001 firm profits-per-worker; [c] Firm annual gross operating surplus per worker ; [d] Dummy for sex; 4 dummies for education; prior potential experience, its square and its cube; tenure within the current company and its square; a variable showing whether the individual received a bonus for shift work, night work and/or weekend work; 3 dummies for the type of contract; a dummy indicating if the worker is part-time and 8 occupational dummies. [e] Region where the establishment is located (2 dummies); size of the establishment (i.e. number of workers); financial and economic control (2 dummies). [f] NACE two-digit industry classification (34 dummies); [g] Group effects estimations use the correction for common variance components within groups developed by Over, Jolliffe and Foster (1996).

Table 3: Log Wage Equation by Degree of Centralization, Before PSM

Dependent variable: log (gross hourly wages)	Centralized industries 2SLS [a, b]	Decentralized industries 2SLS [a, b]
Profits-per-worker (ln) [c]	0.023***	0.087***
	(0.004)	(0.017)
Individual characteristics and working conditions [d]	Yes	Yes
Firm characteristics [e]	Yes	Yes
Industry effects [f]	Yes	Yes
Group effects [g]	Yes	Yes
R^2	0.45	0.40
Prob > F	0.00	0.00
R^2, first stage	0.65	0.66
Prob > F, first stage	0.00	0.00
# employees	21,348	4,901
# establishments	1,669	343

Notes : * p < 0.10; ** p < 0.05; *** p < 0.01 ; [a] White (1980) heteroscedasticity-consistent standard errors are reported between brackets; [b] Instruments for 2003 firm profits-per-worker include all explanatory variables in equation (5) plus 2001 firm profits-per-worker; [c] Firm annual gross operating surplus per worker ; [d] Dummy for sex; 4 dummies for education; prior potential experience, its square and its cube; tenure within the current company and its square; a variable showing whether the individual received a bonus for shift work, night work and/or weekend work; 3 dummies for the type of contract; a dummy indicating if the worker is part-time and 8 occupational dummies. [e] Region where the establishment is located (2 dummies); size of the establishment (i.e. number of workers); financial and economic control (2 dummies). [f] NACE two-digit industry classification (34 dummies); [g] Group effects estimations use the correction for common variance components within groups developed by Over, Jolliffe and Foster (1996).

Table 4: Log Wage Equation by Degree of Centralization, Matched Samples

Dependent variable: log (gross hourly wages)	Centralized industries 2SLS [a, b]	Decentralized industries 2SLS [a, b]
Profits-per-worker (ln) [c]	0.021***	0.086***
	(0.007)	(0.020)
Individual characteristics and working conditions [d]	Yes	Yes
Firm characteristics [e]	Yes	Yes
Industry effects [f]	Yes	Yes
Group effects [g]	Yes	Yes
R^2	0.47	0.40
Prob > F	0.00	0.00
R^2, first stage	0.77	0.64
Prob > F, first stage	0.00	0.00
# employees	3,241	4,471
# establishments	217	330

Notes : * p < 0.10; ** p < 0.05; *** p < 0.01 ; [a] White (1980) heteroscedasticity-consistent standard errors are reported between brackets; [b] Instruments for 2003 firm profits-per-worker include all explanatory variables in equation (5) plus 2001 firm profits-per-worker; [c] Firm annual gross operating surplus per worker ; [d] Dummy for sex; 4 dummies for education; prior potential experience, its square and its cube; tenure within the current company and its square; a variable showing whether the individual received a bonus for shift work, night work and/or weekend work; 3 dummies for the type of contract; a dummy indicating if the worker is part-time and 8 occupational dummies. [e] Region where the establishment is located (2 dummies); size of the establishment (i.e. number of workers); financial and economic control (2 dummies). [f] NACE two-digit industry classification (34 dummies); [g] Group effects estimations use the correction for common variance components within groups developed by Over, Jolliffe and Foster (1996).

Table 5: Log Wage Equation by Degree of Centralization and Bargaining Level, Before PSM

	Centralized industries		Decentralized industries	
Dependent variable: log (gross hourly wages)	Industry agreement 2SLS [a, b]	Firm agreement 2SLS [a, b]	Industry agreement 2SLS [a, b]	Firm agreement 2SLS [a, b]
Profits-per-worker (ln) [c]	0.020***	0.039***	0.049**	0.110***
	(0.004)	(0.010)	(0.025)	(0.029)
Individual characteristics and working conditions [d]	Yes	Yes	Yes	Yes
Firm characteristics [e]	Yes	Yes	Yes	Yes
Industry effects [f]	Yes	Yes	Yes	Yes
Group effects [g]	Yes	Yes	Yes	Yes
R^2	0.47	0.43	0.45	0.38
Prob > F	0.00	0.00	0.00	0.00
R^2, first stage	0.65	0.72	0.84	0.62
Prob > F, first stage	0.00	0.00	0.00	0.00
# employees	17,709	3,639	1,825	3,076
# establishments	1,430	239	164	179

Notes : * p < 0.10; ** p < 0.05; *** p < 0.01 ; [a] White (1980) heteroscedasticity-consistent standard errors are reported between brackets; [b] Instruments for 2003 firm profits-per-worker include all explanatory variables in equation (5) plus 2001 firm profits-per-worker; [c] Firm annual gross operating surplus per worker ; [d] Dummy for sex; 4 dummies for education; prior potential experience, its square and its cube; tenure within the current company and its square; a variable showing whether the individual received a bonus for shift work, night work and/or weekend work; 3 dummies for the type of contract; a dummy indicating if the worker is part-time and 8 occupational dummies. [e] Region where the establishment is located (2 dummies); size of the establishment (i.e. number of workers); financial and economic control (2 dummies). [f] NACE two-digit industry classification (34 dummies); [g] Group effects estimations use the correction for common variance components within groups developed by Over, Jolliffe and Foster (1996).

Table 6: Log Wage Equation by Degree of Centralization and Bargaining Level, Matched Samples

	Centralized industries		Decentralized industries	
Dependent variable: log (gross hourly wages)	Industry agreement 2SLS [a, b]	Firm agreement 2SLS [a, b]	Industry agreement 2SLS [a, b]	Firm agreement 2SLS [a, b]
Profits-per-worker (ln) [c]	0.013*	0.040***	0.116***	0.110***
	(0.007)	(0.010)	(0.024)	(0.030)
Individual characteristics and working conditions [d]	Yes	Yes	Yes	Yes
Firm characteristics [e]	Yes	Yes	Yes	Yes
Industry effects [f]	Yes	Yes	Yes	Yes
Group effects [g]	Yes	Yes	Yes	Yes
R^2	0.49	0.45	0.54	0.38
Prob > F	0.00	0.00	0.00	0.00
R^2, first stage	0.89	0.72	0.90	0.64
Prob > F, first stage	0.00	0.00	0.00	0.00
# employees	2,564	3,556	912	2,549
# establishments	179	233	76	162

Notes : * p < 0.10; ** p < 0.05; *** p < 0.01 ; [a] White (1980) heteroscedasticity-consistent standard errors are reported between brackets; [b] Instruments for 2003 firm profits-per-worker include all explanatory variables in equation (5) plus 2001 firm profits-per-worker; [c] Firm annual gross operating surplus per worker ; [d] Dummy for sex; 4 dummies for education; prior potential experience, its square and its cube; tenure within the current company and its square; a variable showing whether the individual received a bonus for shift work, night work and/or weekend work; 3 dummies for the type of contract; a dummy indicating if the worker is part-time and 8 occupational dummies. [e] Region where the establishment is located (2 dummies); size of the establishment (i.e. number of workers); financial and economic control (2 dummies). [f] NACE two-digit industry classification (34 dummies); [g] Group effects estimations use the correction for common variance components within groups developed by Over, Jolliffe and Foster (1996).

Appendix 1: Proportion of Workers Covered by a Firm Collective Agreement in Each Joint-Committee

N° of the Joint Committee	Denomination of the Joint Committee	Firm agreement coverage
113	Manufacture of ceramic	0.00
125	Manufacture of wood	0.00
307	Insurance agencies	0.00
317	Security activities	0.00
321	Wholesale of pharmaceutical and medical goods	0.00
322	Provision of personnel	0.00
324	Diamond industry	0.00
124	Construction	0.03
302	Hotels and restaurants	0.01
109	Manufacture of wearing apparel	0.02
142	Wholesale of waste and scrap	0.03
149	Activities auxiliary to manufacture of metal, mechanical and electrical products	0.04
112	Sale, maintenance and repair of motor vehicles	0.05
100	Auxiliary joint committee for blue collar workers	0.08
120	Manufacture of textiles and textile products	0.13
140	Transport (other than public and air transport)	0.14
126	Manufacture of wood products	0.15
119	Sale of food and beverage	0.20
117	Wholesale of fuels	0.21
121	Industrial cleaning	0.22
130	Publishing and printing	0.23
118	Manufacture of food products and beverages	0.36
102	Quarrying of stone	0.37
111	Manufacture of metal, mechanical and electrical products	0.47
110	Textile cleaning	0.48
313	Retail sale of pharmaceutical and medical goods	0.48
114	Manufacture of bricks	0.52
136	Manufacture of paper products	0.61
133	Manufacture of tobacco products	0.63
115	Manufacture of glass and glass products	0.67
116	Manufacture of chemicals, chemical products, rubber and plastic products	0.68
328	Public transport	0.70
311	Retail sale in big stores (other than supermarkets)	0.77
105	Manufacture of non-ferrous metals	0.83
128	Manufacture of leather and leather products	0.86
315	Air transport	0.89
312	Supermarkets	0.96
104	Manufacture of steel	0.98
129	Manufacture of pulp and paper	1.00

Appendix 2: Worker and Firm Characteristics by Degree of Centralization and Bargaining Level.

	Centralized industries		Decentralized industries	
	Industry agreement	Firm agreement	Industry agreement	Firm agreement
Worker Characteristics				
Mean Age	38.12	37.91	37.59	37.72
Education Distribution				
Primary	0.16	0.14	0.14	0.07
Lower Secondary	0.46	0.38	0.44	0.42
Upper Secondary (General)	0.13	0.15	0.17	0.17
Upper Secondary (Vocational)	0.24	0.31	0.22	0.32
Non-University Tertiary	0.01	0.02	0.02	0.02
Fraction Female	0.19	0.24	0.20	0.12
Contract Distribution				
Unlimited-Term	0.93	0.95	0.94	0.97
Fixed-Term	0.06	0.04	0.06	0.03
Apprentice	0.00	0.00	0.00	0.00
Other Contract	0.01	0.01	0.00	0.00
Fraction Full-Time	0.84	0.88	0.91	0.91
Fraction Working in Shift, or During Night or Weekend	0.14	0.34	0.42	0.53
Fraction with Variable Pay Component	0.10	0.20	0.19	0.35
Mean Tenure (Years)	7.31	9.84	10.06	11.18
Occupation Distribution				
Extraction and building trade workers	0.17	0.02	0.01	0.01
Metal, machinery and related trades workers	0.14	0.14	0.09	0.08
Precision, handicraft, printing and related trades workers	0.03	0.06	0.02	0.02
Other craft and related trades workers	0.14	0.13	0.01	0.01
Stationary plant and related operators	0.04	0.06	0.20	0.18
Machine operators and assemblers	0.11	0.28	0.32	0.28
Drivers and mobile plant operators	0.13	0.09	0.16	0.24
Sales and services elementary occupations	0.12	0.05	0.03	0.02
Laborers in mining, construction, manufacturing and transport	0.12	0.17	0.16	0.16
Mean gross hourly wages (EUR) [a]	11.49	12.31	12.45	14.16
Firm Characteristics				
Mean Establishment Size (Number of employees)	49.36	116.14	67.94	193.96
Economic and Financial Control Distribution				
>50% Privately Owned	0.96	1.00	0.93	0.91
>50% Publicly Owned	0.00	0.00	0.00	0.04
Other Economic and Financial Control	0.03	0.00	0.07	0.05
Region Distribution				
Brussels	0.09	0.08	0.08	0.14
Flanders	0.68	0.70	0.52	0.59
Walloon	0.24	0.22	0.40	0.26
Mean firm's share of labor revenues in value-added [b]	0.76	0.73	0.68	0.68
Mean profits-per-employee (EUR) [c]	16,210	20,031	22,422	34,498
Number of workers	17,709	3,639	1,825	3,076
Number of establishments	1,430	239	164	179

Notes: [a] Gross hourly wage includes overtime paid, premiums for shift, night and/or week-end work, and regular bonuses. [b] The firm's share of labor revenues in value-added is approximated by the firm's labor costs divided by the firm's value-added. Profits-per-employee are approximated by the firm's annual gross operating surplus divided by the number of employees in the firm.

Appendix 3: Probit Model for the Probability of Being in a Decentralized Industry

Dependent variable: Being in a Decentralized Industry	
Firm Covered by a Firm Agreement	0.733***
	(5.08)
Proportion Female	0.674***
	(2.81)
Proportion Part-Time	0.238
	(0.71)
Mean Tenure	0.039***
	(3.35)
Type of contract (reference: Proportion Unlimited-Term)	
Proportion Fixed-Term Contracts	0.931*
	(1.93)
Proportion Apprentices	-13.221
	(-1.58)
Proportion Other Contracts	0.222
	(0.2)
Economic and Financial Control (reference: >50% Privately Owned)	
>50% Publicly owned	2.040***
	(3.53)
Other Economic and Financial Control	0.827***
	(2.7)
Establishment's size	0.002***
	(3.15)
Establishment's size (squared)	-1.64 e-06**
	(-2.19)
Occupation (reference: Proportion Machine Operators and Assemblers)	
Proportion Extraction and Building Trade Workers	-0.658
	(-1.29)
Proportion Metal, Machinery and Related Trade Workers	-1.316***
	(-5.68)
Proportion Precision, Handicraft, Printing and Related Trades Workers	-0.680**
	(-2.32)
Proportion Other Craft and Related Trades Workers	-1.015***
	(-4.36)
Proportion Stationary Plant and Related Operators	0.658***
	(2.65)
Proportion Drivers and Mobile Plant Operators	-0.339
	(-1.18)
Proportion Sales and Services Elementary Occupations	-0.601
	(-1.54)
Proportion Laborers in Mining, Construction, Manufacturing and Transports	-0.327
	(-1.39)
Profits-per-Employee	1.61 e-06*
	(1.77)
Establishment's Region (reference: Flanders)	

Brussels	0.308*
	(1.74)
Walloon	0.518***
	(3.68)
Industry (reference: Manufacturing Sector)	
Wholesale and Retail Trade	0.115
	(0.7)
Transport, Storage and Communication	-0.477**
	(-2.06)
Real Estate, Renting and Business Activities	-1.185***
	(-2.67)
Proportion with Variable Pay Component	0.215
	(1.21)
Constant	-1.785***
	(-8.16)
Number of Observations	1,702
Wald chi2(30)	336.18
Prob > chi2	0.00
Pseudo R2	0.30

* p < 0.10; ** p < 0.05; *** p < 0.01 ; t-stat in parentheses.

Appendix 4 : Imbalance in Means Between Treated and Matched Comparators, Plus Standardized Differences.

	Centralized sample pre-match	Centralized sample matched	Decentralized sample	Standardized difference before match	Standardized difference after match
Firm-level agreement	0.08	0.27	0.41	-0.82	-0.31
Proportion female	0.19	0.29	0.32	-0.36	-0.11
Proportion part-time	0.18	0.21	0.21	-0.09	0.00
Mean tenure	6.74	8.86	10.39	-0.65	-0.26
Proportion fixed-term	0.05	0.08	0.06	-0.08	0.08
Proportion apprentice	0.01	0.00	0.00	0.24	0.00
Proportion other contract	0.01	0.00	0.00	0.09	0.02
<50% Publicly owned	0.00	0.00	0.02	-0.17	-0.10
Other Form of Financial control	0.03	0.06	0.06	-0.15	-0.01
Establishment's size	54.87	102.05	119.61	-0.43	-0.10
Establishment's size (cubed)	20544.26	33076.76	41844.94	-0.03	-0.01
Proportion Extraction and building trade workers	0.13	0.01	0.01	0.52	0.02
Proportion Metal, machinery and related trade workers	0.17	0.05	0.06	0.44	-0.01
Proportion Precision, handicraft, printing and related trade workers	0.04	0.03	0.03	0.07	0.05
Proportion Other craft and related trade workers	0.13	0.04	0.09	0.14	-0.16
Proportion Stationary plant and related operators	0.03	0.16	0.15	-0.44	0.06
Proportion Drivers and mobile plant operators	0.13	0.09	0.12	0.05	-0.07
Proportion Sales and services elementary occupations	0.15	0.09	0.14	0.02	-0.16
Proportion Laborers in mining, construction, manufacturing and transports	0.15	0.25	0.18	-0.12	0.22
Profits-per-employee	16525.71	26440.09	27373.23	-0.29	-0.03
Brussels	0.09	0.07	0.10	-0.06	-0.10
Walloon	0.23	0.34	0.34	-0.24	0.00
Mining and Quarrying	0.00	0.00	0.00	0.04	0.00
Construction	0.16	0.00	0.00	0.61	0.00
Wholesale and Retail Trade	0.26	0.29	0.32	-0.14	-0.09
Hotels and Restaurants	0.03	0.00	0.00	0.27	0.00
Transport, Storage and Communication	0.12	0.06	0.10	0.06	-0.08
Financial Intermediation	0.00	0.00	0.00	0.08	0.00
Real Estate, Renting and Business Activities	0.12	0.06	0.02	0.40	0.16
Proportion with variable pay component	0.08	0.12	0.15	-0.23	-0.10