Firms' rents, workers' bargaining power and the union wage premium*

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Short form of the title for page heads: Firms' rents and the union wage premium

Abstract:

This paper identifies the wage premium associated with firm-level union recognition in France. An average premium of 2% is found despite the fact that most workers are already covered by industry-level agreements. To explore the origin of the premium, I construct a simple bargaining model from which I derive three predictions, which are tested empirically using matched employer-employee data. The main prediction is that if intra-firm bargaining is behind the union wage premium, it will increase with the amount of quasi-rents available in the firms that unions organise. This prediction is validated empirically when firms' market shares are used as a proxy for their rents.

Why are union-covered workers paid more than their non-covered counterparts? An obvious explanation, often called the "causal effect" of unions, is that unions raise wages by means of bargaining and rent extraction. However, a wide range of alternative explanations could also apply: union members might be more productive than non-union members (selection of union members), organised firms may have unobserved characteristics correlated with higher wages (selection of organised firms or reverse causality), and

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union members' wage gains might be offset by losses in other areas (compensating wage differentials).

Literature on the union wage premium generally uses econometric techniques to disentangle these explanations. Yet in countries where clear sources of exogenous variation in union recognition are not readily available, these techniques are limited by the existence of confounding factors affecting both union recognition and wages. This paper's main contribution is to take a more structural approach to the causality issue. I build a simple version of the static Nash-bargaining model typically used in the rent-sharing literature. I use the model to derive and test predictions consistent with the union wage premium being due to a rent extraction phenomenon.

In keeping with the rent extraction interpretation, the bargaining model predicts that the wage differential between unionised and non-unionised firms increases with the potential rent per worker in unionised firms (prediction 1) and with union bargaining power in these firms (prediction 2). Assuming that it is costly for unions to organise in order to get a high bargaining power, the model also predicts that unions' bargaining power should increase with firms' rents (prediction 3). These predictions are checked empirically using a detailed linked employer-employee dataset on the French private sector.

This paper focuses specifically on union recognition and its effects on wages, in contrast with the empirical rent-sharing literature (e.g. Abowd and Lemieux, 1993; Blanchflower, Oswald and Sanfey, 1996), which does not always differentiate between union and non-union firms. The model is only designed to support the causal interpretation of these effects. What I call the firm-level union recognition wage premium – or in short, "the union wage premium" – is the wage differential between workers in firms where unions are recognised for bargaining purposes and firms where they are not. As, by law, firm-level bargaining has to cover all firms' workers in France, this premium corresponds to the wage differential between workers covered by unions at firm level and those who are not. It therefore differs from the union membership premium traditionally estimated in the Anglo-Saxon literature (see e.g. Lewis, 1986; Freeman and Medoff, 1984; Blanchflower and Bryson, 2004b). The decision here to focus on the effect of bargaining for all potentially covered workers is the most suitable in this institutional context, because union membership is very low in France and does not appear to yield any particular advantages over workers who are covered, but are not members (see Bunel and Raveaud, 2008).

I draw on the wealth of information provided in the data to test the model's main prediction. The data contains subjective information on respondent firms' market shares. I argue that firms reporting a large market share should have more rent per worker on average for potential union extraction than those reporting a small market share. I therefore decompose the sample of firms by their reported market shares and compare the *ceteris paribus* wage differential between unionised and non-unionised firms in the sub-groups. I argue that a higher differential observed in larger market-share firms supports the rent extraction interpretation of the wage differential between organised and non-organised firms. Stewart (1990) has already taken the idea to use firms' market shares as a proxy for their potential rents in order to study the union wage premium in the UK, using very similar data to this paper. This article's contribution in relation to Stewart (1990) is to embed firms' market shares more formally in a bargaining model so as to assess the causal impact of unions on wages. The empirical rent-sharing literature usually uses accounting profits (e.g. gross operating profit) as a proxy for firms' rents. Although, at first glance, profits seem to be the most natural measure of rents, using them in a wage equation raises well-known tricky endogeneity problems: (i) the automatic negative accounting relationship between wages and profits, (ii) reverse causality in the event of efficiency wages generating higher profits, (iii) the joint response of wages and profits to productivity shocks. These problems can be avoided when estimating a bargaining model by using firms' market shares, rather than profits, as a measure of firms' long-term potential rents.

Union recognition may be endogenous as unions may, for example, target firms with high potential rents. If this were the case, estimates of the union wage premium and of its relationship with firms' market shares could be biased. However, I show that union recognition mostly depends on the individual willingness of a worker in the firm to represent the union rather than on a collective process. It can be gained almost costlessly under French law. I study carefully how union recognition is shaped by the institutional environment and conclude that my estimates of the union wage premium are unlikely to be biased by a selection of the best firms by unions. Finally, worker productivity may also be endogenous to the rents available in the firm: the more productive workers are, the more likely they are to generate greater profits and rents. I control for this possible

selection effect, taking average worker productivity at firm level as an additional explanatory variable in some of my regression models.

I test the model's second and third predictions using union membership rates as a proxy for unions' bargaining power when they are recognised for bargaining. As France is a country of "open-shop" unionism, there is no requirement for workers to be union members when a union is recognised in their firm. I thus argue, as is commonly found in the literature on unions (e.g. Reilly, 1996; Barth et al., 2000), that a higher proportion of union members in a firm where a union is recognised reflects greater union support and hence greater bargaining power for the union. I then check that the wage differential between firms where unions are recognised for bargaining and those where they are not is increasing with the proportion of union members in those firms (prediction 2), and that the proportion of union members in unionised firms is increasing with their market shares (prediction 3).

However, as the individual decision to join a union is endogenous, the proportion of union members in each firm is also likely to be endogenous. The empirical tests of predictions 2 and 3 which are based on union density should therefore be interpreted very cautiously and only considered as auxiliary results of the paper because different interpretations are possible to explain variations in union membership across firms. Nevertheless, the fact that these variations are in line with the predictions of the bargaining model still contribute to confort the rent-extraction interpretation. In particular, to my knowledge, the fact that unions get stronger support and higher membership in high-rent firms has never been checked empirically before.

Another of this paper's contributions is to provide the first reliable study of the effect of unions on wages in France, a country where unions are seen as powerful and a nation that is typical of a continental European system of open-shop unionism with multi-level bargaining. As with many continental European countries, bargaining in France takes place at the national, industry and firm levels. Yet studies on union wage impacts in these countries are thin on the ground. One particular issue is that most workers are covered by collective industry-level agreements. It is often argued that this makes impossible to estimate union wage effects in France. I show that industry-level bargaining is actually

very weak. Hence my decision to focus essentially on firm-level bargaining and to estimate the effect of unions at firm level over and above industry-level agreements.

Last but not least, France has a couple of particularities that set it apart from other countries. In 2000, it had the second highest collective bargaining coverage in the OECD, but the lowest unionisation rate[1]. How can unionism be effective in a country with such a large discrepancy between union membership and actual union coverage? The question is especially relevant in France, which has a reputation of having extremely powerful unions. As Craig Smith put it in an article published in The New York Times in 2006,[2] 'Despite one of the lowest rates of unionisation — only about 8 percent of the French work force are members — the unions have enormous leverage over the government. They play a unique organisational role in France's hierarchical society, rallying the populace accustomed to a confrontational relationship with leaders considered elitist. Spark-plug unions, some people call them.' This widely held view of the strength of French unions is based on evidence at national level (such as the relatively high national minimum wage) and on the major national strikes and demonstrations held episodically with a great deal of media coverage. Yet how strong are French unions at firm level? And how can they be so strong with so few members?

The paper is organised as follows. Section 1 reviews the literature. Section 2 describes the French institutional set-up, with a particular focus on the strength and role of industry-level bargaining. Section 3 describes the data and empirical choices made. Section 4 presents estimates of the union wage premium using standard wage determination models. Section 5 builds a simple bargaining model, while Section 6 presents estimates of predictions derived from this model. The last two sections discuss potential biases and conclude. A great deal of additional material is available in the (online) appendices[3].

[1]Source: OECD Employment Outlook, 2004.

[2] See the following webpage for the entire article: http://www.nytimes.com/2006/03/29/international/europe/29unions.html

[3]These appendices contain descriptive statistics and basic robustness checks (Appendix A); additional estimates from wage equations derived from the bargaining model (Appendix B), recalculation of the main results presented in the paper using an older dataset for 1998 and for each major French union separately (Appendix C); a series of results displaying the weakness of industry-level bargaining in France (Appendix D).

1 Literature

Econometric restrictions often prevent studies from completely disentangling the potential union wage premium explanations. Microeconomic studies based on samples of workers tend to confuse bargaining status with other firm-level characteristics such as firm size. Such is the case with a huge body of studies in the United States, which find sizeable union wage premiums[4].

More recent studies by DiNardo and Lee (2004), DiNardo and Mas (2012), and Frandsen (2012) use regression discontinuity design (RDD) techniques to identify the "causal effect" of unions by comparing closely run union certification elections. These studies find no union coverage effect on average wages (DiNardo and Lee, 2004), but strong redistributive effects from high-wage workers to low-wage workers (Frandsen, 2012). However, regression discontinuity designs have their limitations in that they can only provide local estimates: as suggested by DiNardo and Mas (2012), the effect on wages of US unions that win a certification election by a large margin might actually be greater than the RDD estimates suggest.

Moreover, RDD techniques cannot be used for European countries, because unions do not generally need to win a majority election to be recognised as bargaining partners. Without a research design to isolate exogenous variations in union recognition probability, many empirical papers on the union wage premium have had to rely on econometric techniques to address the endogeneity of union recognition. Card and De La Rica (2006) include a polynomial in the propensity score (probability of union recognition at establishment level) in their regression models to better control for establishment-related observable characteristics and the mean observable characteristics of co-workers in a move to control for workers' unobserved productivity-related characteristics. Bryson (2002) also uses propensity score matching techniques. Other papers attempt to explicitly model the firm selection process by unions and use two-step Heckman procedures (Heckman, 1976) to correct for selection-induced biases (see, for example, Reilly, 1996). However, in the absence of a convincing instrument that would affect union recognition without directly affecting wages, these approaches are hindered by the scant information that can be drawn from the data, which makes it impossible to control for all potential confound-

[4] Studies using a panel of workers from the Current Population Survey (CPS) cannot grasp firms' characteristics. See Lewis (1986) for an extensive survey of the early literature and Freeman and Medoff (1984) or Card (1996) for famous examples based on the CPS.

ing factors affecting union recognition and wages[5].

These difficulties explain the choice made in this paper to take a more structural approach and to estimate additional predictions derived from a bargaining model. I use a simple version of the classic union-firm bargaining models (see e.g. McDonald and Solow, 1981; Brown and Ashenfelter, 1986). A large body of empirical literature on rent-sharing has derived estimable wage equations from similar models (see Martins, 2007, for a survey[6]). However, most papers in this literature focus mainly on rent-sharing and they pay little or no attention to unions as an institution that may affect the structure of wages. For instance, early contributions by Hamermesh (1970), Christofides and Oswald (1992), and Abowd and Lemieux (1993) focus only on the union sector, whereas more recent work by Margolis and Salvanes (2001), Martins (2009), and Card, Devicienti and Maida (2011) looks at the entire economy, but does not distinguish between union and non-union firms. A handful of papers do differentiate between union and non-union firms and industries (Blanchflower, Oswald and Garett, 1990; Nickell and Wadhwani, 1991; Blanchflower, Oswald and Stanfey, 1996; Van Reenen, 1996; Arai, 2003; Hildreth and Oswald, 1997; and Kramarz, 2008). However, these papers do not use a bargaining framework to study union wage effects *per se* and they do not discuss the potential endogeneity of union recognition and workers' bargaining power, and how institutional settings shape these variables.

Two papers by Stewart (1990) and Gürtzgen (2009) take the same line as mine. Stewart studies the link between establishments' market shares and union wage differentials at establishment level in the UK, while Gürtzgen (2009) estimates how the extent of rent-sharing varies with collective bargaining coverage at firm and industry level in Germany. Yet these papers also assume that workers' bargaining power is exogenous to firms' rents. In this paper, I use union membership as a proxy to measure unions' bargaining power. This means that I can study how this bargaining power, and union recognition itself, is affected by rent-seeking. In keeping with Stewart (1990) and Blanchflower, Oswald and

[5]Problems identifying the causal impact of unions on wages are further detailed in Bryson, 2007, pp. 34-37

[6]Important contributions to this literature include Hamermesh (1970), Nickell and Wadhwani (1991), Blanchflower, Oswald and Garrett (1990), Christofides and Oswald (1992), Abowd and Lemieux (1993), Blanchflower, Oswald, Sanfey (1996), Van Reenen (1996), Hildreth and Oswald (1997), Margolis and Salvanes (2001), Arai (2003), Kramarz (2008), Martins (2009), and Card, Devicienti and Maida (2011).

Garett (1990), I also take the establishments' reported market shares to proxy for their potential rents, which avoids the main problems raised by the empirical rent-sharing literature as regards using profits on the right-hand side of a wage equation.

This paper also focuses on the effect of union coverage rather than union membership. This distinction is important in continental European countries (e.g. Belgium, France, Germany, Italy, Scandinavia and Spain) since the vast majority of workers are covered by collective agreements whether they are union members or not (Bryson, 2007). This paper hence complements recent studies on continental European countries, which focus on industry-level bargaining and examine the level of co-ordination and relative influence on the overall structure of wages at the different bargaining levels (Avouyi-Dovi et al., 2009, Cardoso and Portugal 2005, Plasman et al., 2007, Gürtzgen 2009, Rusinek and Rycx 2011, and Fitzenberg et al., 2013). The methodological difference here is that I take a two-step approach, arguing first that industry-level bargaining is weak in France before homing in on the effect of unions at workplace level, as recently studied by Blanchflower and Bryson (2009) who estimate a union recognition premium at workplace level for the UK.

This paper provides one of the first estimates of the union wage premium in France. To my knowledge, only one other study focuses specifically on the union wage premium in France. This study by Coutrot (1996) finds a 3% wage differential between unionised and non-unionised establishments based on a cross-section of establishments in 1992, but without controlling for workers' standard productive characteristics such as education and experience[7].

2 Institutional environment

French legislation governing union representation was amended on 4 May 2004 and more recently on 20 August 2008. As this study focuses on 2002 and 2004, I describe the

[7]Some papers have also presented estimates of a union wage premium as a secondary result. These include Laroche (2002) who focuses mainly on the effect of unions and profits, Araï et al. (1996) who look at industry wage differentials, Leclair and Petit (2004), and Duguet and Petit (2009) who study the effect of unions on the gender wage gap, and Kramarz (2008) who examines the effect of bargaining on offshoring. These studies typically suffer from the same identification issues as the international literature described above (with the exception of Kramarz, 2008). They also sometimes pay little attention to institutional aspects since they are not primarily interested in the question.

functioning of industrial relations before these two laws were passed. I begin with a brief description of industry-level bargaining before turning to a more detailed presentation of firm-level and establishment-level industrial relations.

At first glance, France's regulated industrial relations system with multi-level bargaining has much in common with many continental European countries. First, most of the workforce is covered by industry-wide agreements negotiated by unions and employer associations. Second, individual employers can sign firm- or establishment-specific agreements with unions when unions are recognised at firm or establishment level. The Statistics Department of the French Ministry of Labour (DARES), reports that 97.7% of the workforce was covered by a collective labour agreement in 2004. With a union density of approximately 8%, France has the highest coverage rate and lowest union density in the OECD (OECD Employment Outlook, 2004).

Industry-level bargaining is organised by branches. A branch is a bargaining unit of workers in the same industry or group of industries, sometimes in a given geographic area and/or occupation[8]. When a branch agreement is signed between unions and an employer association, only the firms whose employer is a member of the association are initially covered. Unions, the government or another employer association may subsequently ask for the agreement to be extended to all workers in the branch, which is done once the agreement is approved as being legally compliant [9]. In practice, the extension mechanism tends to be the rule (Barrat and Daniel, 2002), which explains why most of the workforce is covered by industry-wide agreements.

In 1982, the Auroux Act (August 4, 1982) encouraged decentralised bargaining and industry-level bargaining declined (Barrat et al., 1996). By the early 2000s, many wage agreements were out of date since they had rarely been renegotiated in the previous two decades. They actually trailed behind national standards in many sectors and on many issues. In 2007, precisely 50% of the 160 branches with more than 5,000 employees[10] had a branch minimum wage below the national minimum wage. The branch minimum wage

[8] For example, white-collar workers in the construction sector bargain at national level, whereas other occupations bargain at regional level (see Avouyi-Dovi et al., 2009).

[9] This differs from Spain, where industry-level agreements are automatically extended to the entire industry, and from Germany, where extension depends on representativeness conditions (see Du Caju et al., 2008, for details).

[10] There are some 700 branches in total. The Ministry of Labour provides information on the 160 branches with more than 5,000 employees each. In total, these branches account for more than half all private sector employment.

was therefore useless since the national minimum wage prevails over industry-level wage agreements. Figure 1 illustrates this point and plots the French national minimum wage in 2007 along with the distribution of minimum wages for the largest 160 branches. To sum up, almost all workers are covered by industry-level agreements (so it is impossible to identify the effect of these industry contracts on wages for want of a group for comparison). Yet many of these contracts are inadequate and even outdated, which gives unions scope to bargain at firm or establishment level [11].

The 2004 OECD Employment Outlook's comparisons of the extent of bargaining at national, industry and firm level rank France in the second group of OECD countries with the most decentralised bargaining institutions (with Australia, Italy, the Slovak Republic and Switzerland) just behind the US, the UK, Canada, Poland, Korea and Japan. With respect to this classification, I focus solely on the union wage premium at firm or establishment level, much like the Anglo-Saxon studies (where private sector bargaining is purely decentralised) and Card and De La Rica's studies on Spain (2006). My approach differs in this from a recent body of literature on continental European countries, which focuses on industry-level bargaining and the relative influence of the different bargaining levels on the overall structure of wages (Avouyi-Dovi et al., 2009, Cardoso and Portugal, 2005, Plasman et al., 2007, Gürtzgen, 2009, Rusinek and Rycx, 2011, Fitzenberg et al., 2013) [12].

Firm-level (resp. establishment-level) agreements can be signed between unions and employers once the unions have been recognised within firms (resp. establishments). These agreements are required to improve upon the minimum wage for the industry and must set a wage above the national minimum wage. Three key institutional features differentiate France - and most European countries (see Slomp, 1998) - from the United States in terms of industrial relations at establishment and firm level. First, there are no certification elections. Second, the workers in each firm can be represented at firm level by more than just one union. In this case, all the unions legally recognised in the firm are entitled to bargain with the employer for the entire workforce in the firm. Third, unionism

[11] A full description of branch minimum wages over the period 2003-2009 is given in André and Breda (2011). Overall, their analysis confirms the weakness of industry-level bargaining in France in the 2000s.

[12] Appendix D presents several additional elements to confirm that industry-level bargaining does not play a crucial role in shaping the structure of wages in France and leaves some space for additional firm-level bargaining.

is totally "open shop". The details of these particularities are described below at firm level.

No certification elections:

To be recognised in a firm or establishment with more than 50 employees, the main unions generally need only find one worker who agrees to officially represent the union in the firm or establishment. This worker is called a union representative. Table 1 presents a brief description of the main French unions and the distribution of union representatives. Over 95% of union representatives belong to the five largest national "historical" unions. These "historical" unions are recognised as legal bargaining units within firms or establishments wherever a worker agrees to be their representative[13]. This is a fundamental feature of French industrial relations in larger firms and establishments: certification elections are not required for historical unions to organise larger firms.

In firms and establishments with 10 to 50 employees, unions have to choose their representatives from among workers who have already been elected as employees' representatives. These employees' representatives are legally recognised non-union representatives who act as the voice of the workers in their day-to-day relations with the employer (they are generally also members of the works councils). Workers in firms and establishments with more than ten employees elect them by a simple majority vote (the winners are simply those with the most votes) every two to four years from among candidates who choose to stand for election. Firms and establishments with 10 to 50 employees have more to do to gain union recognition than larger entities. However, even in these smaller firms and establishments, union recognition for bargaining is still much more straightforward than the US certification process, which requires a majority of workers to be pro-union.

All in all, the lax legal requirements for firm-level and establishment-level union recognition make it easier for unions to legally organise firms and establishments, and to set up a legal framework for official wage bargaining. However, the low organisational cost paid by the unions in these firms and establishments, and the fact that they are not necessarily supported by the majority of the workforce, should logically place limitations on their bargaining power and the scope of their action.

Different unions can organise the same firm:

[13] The other non-historical unions may have to hold a certification election to be recognised at firm level if the employer or a worker so requires.

The above-described recognition process applies to each union, which means that the total number of unions able to cover workers in a given firm or establishment is theoretically unlimited. Table 2 shows the distribution of establishments in terms of the number of unions they have. The second column displays the non-weighted distribution in the dataset used – the REPONSE data described in the next section – while the third and fourth columns are obtained using weights to make the data representative of French private sector workplaces with more than 20 employees or the workers in these workplaces. Table 2 shows that approximately 36% of private sector workplaces with more than 20 employees are organised, representing 64% of the workforce in these workplaces. This discrepancy is explained by the fact that an establishment's probability of being organised increases considerably with its size (see Table 1 in online Appendix A).

Unionism is completely "open shop":

Unions are open shop when one or more unions are recognised for bargaining in a firm or establishment and newly hired employees do not have to become union members or take part in strikes. On this basis, I use the percentage of union members at establishment level as a measure of the unions' bargaining power. Lastly, union contracts have to apply to all workers in the firm or establishment. I therefore study the effect of unions on the wages of both union and non-union members.

The institutional industrial relations and bargaining set-ups are identical at firm and establishment level. There is theoretically no link between bargaining in the different establishments of a given firm: unions may be recognised solely in some of the establishments of a multi-establishment firm and not in others. As the establishment level appears to be more relevant, I conduct the empirical analysis of the effect of union recognition on wages at this level [14].

3 Data description

The empirical analysis is made using two sources of data.

First, the 2002 French Wage Structure Survey (ESS02) collected detailed wage and

[14] It is hard to know exactly what the actual bargaining unit is. For mono-establishment firms, establishment-level and firm-level union recognition are obviously one and the same. Multi-establishment firms are large enough to always have unions recognised at firm level in practice. For these firms, only establishment-level union recognition varies enough to offer material for comparison.

job data on up to 60 employees in each of some 15,000 private sector establishments in the manufacturing, construction, trade and service industries. The survey design is such that wage outcomes can be modelled at employee level, including controls for establishment characteristics. Employers interviewed by the ESS were asked to give detailed official information on the respective employees' wages and hours worked. I use this information to construct gross hourly earnings, calculated as gross annual earnings divided by the total number of hours worked. Gross annual earnings include basic wages, performance-related pay and non-performance related bonuses before the deduction of workers' social security contributions and income tax.They are net of employers' social security contributions. Agriculture, mining and household services are excluded from the ESS02 sample, as are small establishments (less than 10 employees). Given that firm-level union coverage is extremely low for small workplaces and the industries excluded from the ESS02, the limited coverage of the ESS02 is not a major problem for my study. My sample excludes workers for whom bargaining is irrelevant (CEOs and board members, apprentices, and self-employed workers) as well as workers whose wages fall in the first and last percentiles of the hourly wage distribution. The final sample contains 91,562 full-time workers and 15,172 part-time workers for whom hourly earnings and union presence are known.

The second dataset used is the Ministry of Labour's 2004 French Workplace Employment Relations Survey (REPONSE04) of up to 10 employees in each of 2,929 business establishments with more than 20 employees. REPONSE04 contains extensive information on industrial relations at workplace level and firms' organisational and technological structures. Data are provided on union density, the names of the workplace unions and whether the workplace has a firm-level contract. I use union density to proxy the union's bargaining power. REPONSE04 also contains information on each establishment's market share, as reported by its manager. I use this information to proxy the firm's market power and potential rents. REPONSE04 workers' hourly earnings for 2003 are taken from social security records (the Déclaration Annuelles de Données Sociales, DADS) and matched with the dataset. These hourly earnings are constructed as annual earnings divided by the number of hours worked. They include basic wages, performance-related pay and non-performance related bonuses. They are net of employers and workers' social security contributions, but gross of income tax. There is just one minor difference between the hourly earnings used in ESS02 and those taken from the DADS for use in RE-

PONSE04: DADS earnings do not include workers' social security contributions whereas ESS02 wages do. The REPONSE04 survey covers mainly the private sector, but includes some public companies as well as non-profit associations and co-operatives. Given that this paper focuses on unions and rent-sharing, I have excluded these observations and retained a final sample of 2,451 business establishments owned by private non co-operative firms. I have also excluded workers for whom bargaining is irrelevant: CEOs and board members along with farmers, apprentices and self-employed workers[15].

REPONSE04's main drawback compared with ESS2002 is that it is relatively small. Its main advantage, however, is that it contains extensive workplace-level information. I use ESS2002 precisely to estimate the cross-sectional union wage gap[16] and make comparisons with similar studies. Then I use REPONSE04 to test the more sophisticated predictions that these union wage gaps will increase with firms' market shares and workers' bargaining power where they are due to rent extraction[17].

4 The union wage premium in a standard wage determination model

Before turning to a more sophisticated econometric analysis in a move to capture the causal effect of unions on wages, I provide a precise estimation of the union wage premium that controls for individual-level and establishment-level observable characteristics. To do so, I present a series of regression models of the type:

$$\ln(w_{ij}) = X_i\beta + Z_j\gamma + U_j\alpha + \epsilon_{ij} \tag{1}$$

[15]Given that the earnings come from an administrative source, I have not excluded workers with extreme wages. However, I have performed the entire empirical analysis on both the full and truncated samples (removal of 0.5% or 1% tails of the wage distribution) of the ESS02 and REPONSE04 datasets. The results (available on demand) are always very similar.

[16]Technically, I use hourly earnings and not hourly wages. However, as performance-related pay is minor for most workers, there is little difference between the two and I sometimes use the common terminology "wage gap" or "wage premium" to describe the hourly earnings differential between workplaces where unions are recognised for bargaining and those where they are not.

[17]The two datasets I use have equivalents in other countries that have been used a great deal to study unions. REPONSE has the same design as WERS in the UK (See Bryson et al., 2011, for a study based on both REPONSE and WERS). Plasman et al. (2007) use Wage Structure Surveys similar to ESS to study the effect of multi-level bargaining on wages in Belgium, Denmark and Spain. Card and De La Rica (2006) do the same for Spain.

where w_{ij} represents the hourly earnings of individual i in establishment j, X_i is a set of observed skills characteristics (such as age and education) for worker i, Z_j a vector of firm-level covariates and U_j an indicator for the presence of one or more unions in establishment j. Assuming that $\mathbb{E}[\epsilon_{ij}|X_i, Z_j, U_j] = 0$, the effect of establishment-level union recognition can be estimated consistently by a conventional (OLS) regression applied to (1).

The first 4 columns of Table 3 present a series of regression models in keeping with equation 1 on the ESS02 dataset. The first column (specification 1) includes solely a dummy for union recognition at workplace level. The estimated coefficient is just over 20%, suggesting a large premium associated with union recognition. The results in Column 2 suggest that more than 80% of this gap is explained by differences in worker and firm characteristics between unionised and non-unionised workplaces. The covariates in this specification include the individual worker's gender, age, education and occupation (both divided into 4 groups), and dummies for establishment size, industry and region. Many of the control variables are statistically highly significant, and their inclusion raises the R-squared above 60%. The estimated marginal effects of the control variables are consistent with what is usually found in the literature when estimating this type of linear wage equation. Hourly earnings increase by about 1% per additional year of experience (as proxied by age), which is exactly what Card and De La Rica (2006) find for Spain when estimating almost the same wage model with similar data. The returns to education (without controlling for selection) are such that workers with secondary school qualifications (resp. college or university qualifications) earn about 10% more (resp. 25% more) than secondary school drop-outs. The gender wage gap is estimated at around 13%, which is standard in this type of linear wage equation and slightly higher than when using a more suited wage decomposition (*i.e.* an Oaxaca Blinder decomposition, see Meurs and Ponthieux, 2000). Lastly, wages are increasing with establishment size.

Columns 3 and 4 of Table 3 present the results of two regression models with an extended set of control variables: ten dummies for age (instead of a linear control), four dummies for tenure, and two-digit dummies for industries (column 4 only). The inclusion of detailed controls for age and tenure reduces the wage premium associated with union recognition at workplace level by about one additional third (comparing column 3 with column 2), whereas the inclusion of two-digit industry dummies (47 industries instead of 9) induces just a small additional reduction in this premium (comparing columns 3 and

4).

Models (2') and (3') of Table 3 estimate the same specification as models (2) and (3) using the REPONSE04 data. The union wage premiums estimated from the two datasets are very similar (and not statistically different at the usual levels), as are the estimated marginal effects of most of the other covariates. REPONSE04 contains around five times fewer establishments, such that all estimated coefficients in REPONSE04 present a standard error some two to three times larger. The union wage premium is therefore estimated less accurately using the REPONSE04 data and it becomes statistically not significant at conventional levels once extended controls are included for workers' age and tenure (model 3'). The proximity between the point estimates obtained from the two datasets suggests that REPONSE04 can be used to further study the union wage premium, despite its relatively small sample size [18]. Lastly, models (5) and (6) take advantage of the wealth of the REPONSE04 data to successively add more detailed industry controls (168 dummies in Model 5 and 328 dummies in Model 6) and additional establishment controls. None of these inclusions affects the estimated union earnings premium, which remains stable at around 2% [19]. This is slightly smaller than found by Coutrot (1996) for France in the early 1990s.

Why is the union wage premium so small for France when the country is supposed to have powerful unions? A first explanation is the existence of a high and binding national minimum wage in France. In 2004, 15.6% of French workers (excluding temporary and agricultural workers) received the annual rise in the national minimum wage [20]. The high national minimum wage may simply leave little leeway for further bargaining at decentralised level. This explanation is consistent with the work by Aghion et al. (2011), who find that France has evolved towards equilibrium (in terms of industrial relations) with a highly regulated minimum wage and poor labour relations. In this equilibrium, the state regulation of the minimum wage crowds out the possibility for workers and employers

[18] ESS02 includes establishments of 10 to 19 employees whereas REPONSE04 does not. This makes it harder to compare models (2), (3) and (2') and (3'), as they are estimated on slightly different samples. I thus re-estimate models (2) and (3) on the ESS02 subsample of establishments with more than 20 employees, obtaining estimates of the union wage premium of 0.025 (model 2) and 0.016 (model 3).

[19] This 2% firm-level union wage premium is also robust to controlling for industry-level bargaining (see results in online Appendix D).

[20] Including the rise in the *Garantie Mensuelle de Rémunération*, which was introduced to pay people the minimum wage for a 39-hour week even though they had switched to a 35-hour week. See Seguin, 2005

to negotiate and develop trusting labour relations. If we assume that decentralised wage rises are more likely to be secured when labour relations are good, then a high extent of minimum wage regulation is a substitute for good labour relations and thus for high wage rises at decentralised level.

A second explanation for the low union wage premium in France derives directly from the analysis of the French institutional set-up. In France, the large national unions are recognised *de facto* in firms and workplaces as soon as they find a worker who agrees to be their representative. This is a very weak legal constraint, which implies in particular that a union can be legally recognised in a firm even though a large majority of the firm's workers are actually opposed to the union. In this case, the union cannot credibly threaten to go on strike and its bargaining power will certainly be lower, resulting in a lower wage premium. Since the cost of organising is low, unions also have an incentive to organise a large number of firms rather than just selecting those with very high rents. Table 2 indeed shows that, despite a low unionisation rate, unions are found in a large number of firms. The low average premium associated with union recognition at decentralised level therefore needs to be placed in the context of the relatively large number of workers who benefit from such a premium.

Lastly, note that union wage premiums estimated using similar wage or earnings determination models vary from one country to the next. Using a specification almost identical to mine, Card and De La Rica (2006) find a wage premium of approximately 12% for women and 8% for men for firm-level contracting[21]. Their estimates are close to the union membership wage premiums typically estimated in the United States. In the UK, Blanchflower and Bryson (2009) find no union recognition wage premium in the UK conditional on union membership status[22]. Caution is called for when making international comparisons, because institutional set-ups vary dramatically across countries. One aspect that might still play a role is the total institutional cost of organisation: in countries where it is hard to secure recognition, e.g. in the US, unions might be expected to target solely firms where potential bargaining gains are high enough to offset the cost

[21]Specification (2) of Table 3 endeavours to reproduce specification (2) of the third table in Card and De La Rica (2006) as closely as possible. The main difference here is the focus on union recognition, whereas Card and De La Rica focus on firm-level contracting. I actually find no wage premium associated with firm-level contracting in France, probably due to the fact that unions in France often negotiate wages without signing a formal wage agreement

[22]Whereas the recent study by Blanchflower and Bryson (2010) finds a union membership wage premium of around 5% in the UK (private sector, years 2001-2006).

of organisation. Conversely, in countries where the cost of organisation is low, such as in France, unions are probably likely to be found in more firms, but to have lower wage effects because they do not target the most profitable firms. If this explanation holds, the union wage premium should still be higher in firms with high potential rents, even in countries where recognition is easy to secure. This prediction is tested in the next section.

5 A bargaining model generating three predictions

The larger the rents and the workers' bargaining power in a given firm, the higher their wages. In this section, I formalise this assumption in a simple bargaining model. The purpose of this more structural approach is to present evidence that the union wage premium is indeed due to bargaining and rent extraction, rather than selection effects or compensating wage differentials. This is done by deriving three simple testable predictions compatible with the rent extraction notion, but much harder to explain if it is assumed that only selection effects and compensating wage differentials are at work in the union wage premium.

I first assume that, in the absence of unions in the firm, worker i in firm j is paid a market hourly wage w_{ij}^m that depends on her characteristics and her firm's characteristics. Keeping the notation in the previous section, we have, for workers in non-unionised firms:

$$\log(w_{ij}^m) = X_i\beta + Z_j\gamma + \epsilon_{ij} \tag{2}$$

A prominent body of literature (Abowd and Lemieux 1993; Abowd and Allain 1995; Blanchflower, Oswald and Sanfey 1996) has shown that a great deal of rent-sharing occurs in the US, Canada and France. Equation (2) nonetheless assumes that rent-sharing does not occur at establishment level in the absence of unions. Under French law, actual firm-level bargaining (face-to-face discussions between the employer and a worker representative) can only happen when unions are recognised. Yet implicit bargaining might still be thought to occur in non-unionised firms, resulting in some rent-sharing. The existence of industry-level bargaining in France, albeit weak (see above), might also imply some rent-sharing in non-unionised firms. Kramarz (2008) estimates a bargaining model

with a large longitudinal dataset for France and shows that there is no rent-sharing in firms in which official bargaining does not take place[23], that is in firms in which unions are not recognised. To control for potential rent-sharing at industry level, I nevertheless include detailed industry indicators in the firm's covariates Z_j. I also provide empirical evidence consistent with the fact that there is no rent-sharing in non-unionised firms in the next section.

Denote w_{ij}^U the wage of worker i when unions are recognised for bargaining in firm j. w_{ij}^U is assumed to be the result of Nash bargaining between the employer and the workers. Each worker's outside option in the bargaining is the market wage she could get in a non-union firm. The firm's threat point is zero profit. Let us denote $w_j^m = \sum_{i \in j} w_{ij}^m$ as the threat point for firm j workers as a whole and $w_j^U = \sum_{i \in j} w_{ij}^U$ as the total wage bill in firm j. Bargaining consists of maximising the product of the employer and workers' surplus respective to their threat points:

$$w_j^U = Arg \max (w_j^U - w_j^m)^{\varphi_j} (pF(L_j) - w_j^U)^{1-\varphi_j} \tag{3}$$

where L_j is firm j labour force and $F(L_j)$ is its production function, while p is a revenue shifter. $pF(L_j) - w_j^U$ are firm j profits. φ_j is the union bargaining power. The purpose of the paper is not to make a detailed empirical analysis of the various bargaining models, since this has already been done extensively in the empirical rent-sharing literature (e.g. Abowd and Lemieux, 1993; Blanchflower, Oswald and Sanfey, 1996; Kramarz, 2008). Yet some clarification is called for. In the strongly efficient bargaining model (Brown and Ashenfelter, 1986), the union and the firm negotiate both wages and employment. In the weakly efficient bargaining model[24], the firm and the union negotiate wages only, while the firm unilaterally sets employment at its profit-maximising level given the negotiated wage rate. Since it does not set out the arguments of the maximisation, equation (3) is compatible with these 2 models. Abowd and Lemieux (1993) show that, in the two

[23] More precisely, he shows that 50% of quasi-rents are captured by workers in firms with official bargaining regarding wages and employment, whereas there is no rent-sharing in firms with no official bargaining or official bargaining regarding wages only.

[24] This model is a version of the right-to-manage model or labour demand model (dating back to Dunlop, 1944), which includes wage bargaining in the first step of the model rather than unilateral wage-level setting by the union.

abovementioned models, the solution of equation (3) is

$$w_j^U = w_j^m + \phi_j QR_j L_j \tag{4}$$

where ϕ_j is equal to φ_j in the strongly efficient bargaining model and to a positive fraction of φ_j in the weakly efficient bargaining model. $QR_j = (pF(L) - w_j^m)/L$ are the quasi-rents per worker in firm j and represent the profit per worker that the firm would make if all the workers were paid their market wage. Equation (4) gives the share of quasi-rents to the workforce. Finding what each worker gets individually calls for an assumption as to how the union splits the bargained surplus among the firm's workers. I make the common assumption that the union is egalitarian and splits the surplus equally among all the workers[25]. Under this assumption, equation (4) can be rewritten at individual level:

$$w_{ij}^U = w_{ij}^m + \phi_j QR_j \tag{5}$$

This simply means that the wage of worker i in firm j is equal to her individual market wage plus a share of the bargained surplus, which is equal for all workers in firm j. Taking the log of equation 5, we obtain $\log(w_{ij}^U) = \log(w_{ij}^m) + \log(1 + \phi_j QR_j/w_{ij}^m)$. Since firms' quasi-rents QR_j are usually small relative to their total labour cost and since the workers' bargaining power ϕ_j rarely exceeds 0.5 (Kramarz, 2008), we can work with first order terms:

$$\log(w_{ij}^U) = \log(w_{ij}^m) + \phi_j QR_j/w_{ij}^m \tag{6}$$

Substituting w_{ij}^m by its expression given in equation (2) and denoting U_j as an indicator equal to 1 when unions are present in firm j, we finally get a general wage equation for both workers in union and non-union establishments:

$$\log(w_{ij}) = X_i\beta + Z_j\gamma + U_j(\phi_j QR_j/w_{ij}^m) + \varepsilon_{ij} \tag{7}$$

Equation (7) gives rise to two main predictions for the wage premium $\phi_j QR_j/w_{ij}^m$ associated with firm-level union recognition:

[25] This assumption has no implications for the three main predictions that we want to derive from the model. It only affects the distribution of union wage gains across workers.

Prediction 1: the higher the firm's quasi-rents, the higher the union wage premium.

Prediction 2: the greater the union's bargaining power, the higher the union wage premium.

Consistent with the assumption that there is no rent-sharing in workplaces where unions are not present, I can define workers' (taken as a whole) bargaining power ψ_j by $\psi_j = U_j \varphi_j$. Equation (7) can then be rewritten:

$$\log(w_{ij}) = X_i\beta + Z_j\gamma + \psi_j QR_j / w_{ij}^m + \varepsilon_{ij} \tag{8}$$

To avoid the presence of the individual market wage w_{ij}^m on the right-hand side of the log-wage regression when the union is assumed to be egalitarian, a wage equation similar to Equation 8 can also be estimated[26]:

$$w_{ij} = X_i\beta' + Z_j\gamma' + \psi_j QR_j + \varepsilon_{ij}^{'} \tag{9}$$

Ignoring the speocific role of unions, the empirical literature on rent-sharing typically estimates wage equations similar to 9 to recover estimates of ψ_j that is treated as an unknown parameter. However, ψ_j is likely to be endogenous: the higher the porspects of rent-extraction, the higher the incentive for workers to increase their bargaining power. The idea can easily be formalized. Consider that workers taken collectively have to pay a cost $c(\psi)$ to secure bargaining power equal to ψ. $c(\psi)$ is a simple measure of the aggregate cost paid by workers to organise at establishment level. It includes such elements as the cost of getting union recognition, union dues for unionised workers, union work for union representatives and sunk costs invested in the organisation process. For now, I do not attempt to detail how this cost is shared across workers but I assume that it is increasing and convex. Convexity seems a reasonable assumption: to get a high bargaining power, the union needs to be well organized in a large organization involving most workers in the firm. However, the organizational cost and the likelihood of free-riding are likely to increase convexly with the number of workers involved (see for example the classical book by Olson, 1965).

In a two-step game, workers should choose in the first step the bargaining power that

[26] Equation 9 is derived from equations 5 considering that $w_{ij}^m = X_i\beta' + Z_j\gamma' + \varepsilon_{ij}^{'}$.

will maximise their surplus in subsequent bargaining with the employer:

$$\psi_j = Arg\max(w_j^m + \psi_j QR_j - c(\psi_j))$$

The chosen bargaining power simply satisfies $c'(\psi_j) = QR_j$, leading to a third prediction when c is convex:

Prediction 3: the higher the firm's quasi-rents, the higher the workers' bargaining power.

Predictions 1, 2 and 3 are drawn directly from the Nash bargaining framework. The idea is to use the large amount of information available in the REPONSE04 dataset to provide reasonable proxy variables for the firms' quasi-rents and workers' bargaining power and to empirically test these predictions.

6 Firms' rents, workers' bargaining power and the union wage premium

This section first introduces the two proxy variables that I use for firms' quasi-rents and workers' bargaining power. It then tests predictions 1 and 2 separately before moving on to a more direct estimation of equation (7). A discussion of selection issues follows in the next section.

Using establishments' market shares to proxy their quasi-rents:

Prediction 1 states that if union wage premiums reflect bargaining, then the larger a firm's quasi-rents, the larger these premiums will be. The *ex-ante* quasi-rents on which the bargaining is really made are not observable. What is observable in the data is the *ex-post* wages and profits resulting from the bargaining. To gain a measure of quasi-rents, authors such as Abowd and Lemieux (1993) and Kramarz (2008) estimate a market wage (rather than actual wage) for each worker to compute the *ex-ante* profits on the basis of which the bargaining is conducted. Since this measure of quasi-rents remains highly endogenous[27], these authors also instrument it using measures of foreign competition

[27] Profits and alternative measures of quasi-rents derived from accounting variables such as sales can be endogenous in many respects. For example, in efficiency wage theory (Akerlof and Yellen 1986), higher wages generate higher profits rather than vice versa, leading to reverse causality in wage-profit

shocks. An alternative strategy proposed by Blanchflower, Oswald and Sanfey (1996) is to use past profits at industry level rather than current profits[28].

In this study, I take a more direct approach and use a simple indicator of the existence of potential rents at establishment level in keeping with Stewart (1990). This indicator is the establishment's market share as reported by its manager. Stewart (1990) studies the effect of product market conditions on union wage differentials based on the 1984 *Workplace Industrial Relations Survey*, which is qualitatively similar to the *establishment* REPONSE survey. He uses a similar qualitative variable – albeit less accurate – to the one I use[29]. In the REPONSE04 survey, managers are asked whether their establishment's market share is less than 3%, between 3% and 25%, between 25% and 50% or over 50%. Table 4 (first and second rows) shows the distribution of this subjective market share variable across the 1,861 REPONSE04 establishments for which it is available. An establishment's market share is a direct measure of its market power, that is its ability to unilaterally raise its sales price and profit margin (see, for example, Buzell et al., 1975; Stewart, 1990, and Geroski, 1988, for a survey). It is therefore a good measure of the *ex-ante* potential rents that firms can secure in their industry vis-à-vis their competitors. Of course, a firm's long-run market share depends on its performance and might be correlated with the quality of its employees. Yet the market share varies little and is not affected in the short run by wage variations, unlike profits that are automatically correlated with wages. So use of the market share avoids some of the endogeneity problems that arise when using measures of quasi-rents derived from accounting data, which actually represent the *ex-post* results of potential bargaining.

Firms' market shares and labour costs are far less volatile and sensitive to economic shocks than profits or sales. Market share can be viewed as an indicator of long-run firm health. We know from the theory of implicit contracts (Azariadis, 1975) that firms insure their workers against economic fluctuations (Guiso et al., 2005). This makes wages rigid in the short run and implies that the short-term relationship between current profit flows and current wages is a weakened measure of the total quantity of rent-sharing within firms. Indeed, if bargaining occurs in the long run (as in a repeated game), the workers will want

regressions.

[28] There are also several papers that simply link current wages to current profits. See Fakhfakh and FitzRoy (2002) for an example regarding French data and a review of the literature.

[29] Araï, Ballot and Skalli (1996) also use a similar market share variable in a different context.

to exchange wage insurance in bad years against less rent sharing in good years. In other words, the extent of rent-sharing in a given year might depend on the firm's performance in previous years. For this reason, studies that set out to link profits directly to wages also have to deal with delicate framing problems (see Abowd and Lemieux 1993) and need to make assumptions about which profits are negotiated in a given year (previous year's profits, current profits, average past profits, etc). The use of market share as an indicator of firms' potential rents captures the firms' long-term capacity to raise wages and avoids these tricky framing problems as well as biased relationships between wages and profits that can appear in the short run.

These arguments are confirmed by directly comparing the subjective market share variable with usual profit variables. In order to make these comparisons, I have matched the DIANE dataset, which contains publicly-available company accounts[30], with the REPONSE04 dataset. The DIANE dataset provides firm-level accounting information that can be used to construct firms' net income, Earnings Before Interest and Taxes (EBIT) and labour productivity from 1995 to 2004. This latter variable will be included in some wage equations in order to better control for workers' unobserved productivity (see the following discussion section). The 2004 correlation between the subjective establishment-level market share variable used in this study and usual firm-level profit variables is positive, but small (table 5, col. 1 and 4). The correlation between market share and EBIT is nevertheless statistically significant at the 5% level. Not surprisingly, the correlation between long-term average profits and market share is stronger and statistically more significant (Table 5, col. 2, 3, 5 and 6). This confirms that the market share variable captures more the firms' long-term capacity to raise wages than their current situation. The use of market share hence avoids the framing problems that arise when looking at the relationship between current wages and current profits. Finally, the small correlations I find also show that using a market share variable is not merely equivalent to using a profit variable from a statistical point of view.

From an economic standpoint, a high market share certainly implies monopolistic power, but it may also represent a monopsony. Indeed, in addition to being one of

[30]The DIANE dataset is provided by Bureau van Dijk, a private consulting company, and it is the French source file for the Amadeus database. Matching with REPONSE04 leads to a loss of about 500 REPONSE04 establishments, which is a quarter of the REPONSE sample.

the only sellers in their industry, high market share firms may also be one of the only possible employers for their workers, provided they use a labour force with industry-specific human capital. In this case, they should be able to hire workers at lower wages than the competitive wage. This would be found if the labour market were competitive, that is, if there were no union operating on the labour market. This argument can be clarified based on the standard neoclassical approach to union behaviour introduced by Dunlop (1944). In most models, a union is considered to make the labour market monopolistic (at least to some extent). The union's monopolistic power stems from its at least partial ability to set the price of labour (*i.e.* the wage level). From this point of view, my approach consists of comparing four different types of situations: (1) A competitive firm (*i.e.* a firm operating on a competitive goods market) faced with a competitive labour supply (*i.e.* no unions), (2) a competitive firm faced with a "monopolistic labour supply" (*i.e.* a unionised workforce), (3) a monopolistic firm faced with a competitive labour supply, and (4) a monopolistic firm faced with a monopolistic labour supply. The bargaining model suggests that unions should not be able to raise the wage level in competitive firms and that union wage gains should be increasing with the extent of rents or, similarly, with the extent of monopolistic power of the firms that the unions organise. This means that the wage level in configurations (1) and (2) should be equal (competition on the goods market prevents the union from obtaining anything) and that the wage level in configuration (4) should be higher than in configuration (3). Yet the fact that a monopoly firm is also a potential monopsony generates a third prediction: the wage level in configuration (3) should be lower – or at least not higher – than in configuration (1). However, we have no prediction of the wage differential between configurations (1) and (4) because two opposite effects are in play: the monopsonistic power of the firm pushes down wages whereas the union pushes them up.

Why not use an objective measure of a firm's market share rather than the subjective market share reported by managers? A common problem with objective measures of market share is that they require the geographic units and industries to which firms belong to be specified. An objective measure of a firm's market share is generally obtained by dividing its sales by total sales in its industry and country. Yet some firms are not in direct competition with the other firms in their industry. More problematic is the fact that firms operate on very different geographic scales depending on their line of business.

Table 4 (last 2 rows) clearly shows this with a distribution of the firms in the sample based on their reported target market. Only 24% of the establishments do business on the national market. For them, the standard market share indicators computed at national level would really include the true competitors. For the remaining 76% of firms, though, these standard market share indicators are inaccurate measures of the real competitive pressure that they face. The subjective measure I use is not subject to these drawbacks since the interviewed managers should be able to easily evaluate the real size of their market. Lastly, my approach uses a measure of each establishment's market share rather than the broader measure of industry concentration used in other studies (see, for example, Blanchflower, 1986). Given that an industry's level of concentration is not informative as to the relative market power of each particular firm in the industry, industry concentration seems inappropriate for the within-industry comparison of unionised and non-unionised firms that I set out to make in this study. My approach is also consistent with the results reported by Hirsch and Connolly (1987), who find evidence suggesting that a firm's market share is a more likely source of union rents than industry concentration. It is also in line with the results reported by Stewart (1990), who uses establishment-level data to show that union wage differentials are lower in firms with a higher number of competitors.

Testing model two first predictions:

The first three models of Table 6 test the relationship between market share and the union wage premium using the REPONSE04 data[31]. Model (1) presents the raw relationship (without any control variable), Model (2) uses the same worker and establishment control variables as those used in Table 3's more detailed specifications, and Model (3) takes advantage of the wealth of the REPONSE04 dataset to add more detailed controls for workers' age and tenure, establishment age, and detailed industry dummies. The establishment's market share (classed into four categories), union recognition and their interaction are the variables of interest in these models. A higher market share in the absence of unions is associated with lower wages in all models, consistent with the fact that establishments with high market shares can use their monopsonistic power to drive wages down. When no control variables are included (model 1), union recognition in establishments with low market shares is associated with higher wages. However, once

[31]Descriptive statistics on REPONSE04 variables are available in online appendix A (table 2).

controls are included (models 2 and 3), this same union recognition is associated with lower wages, although the estimates are inaccurate and not statistically significant at the usual levels. This is in line with the idea that there are no rents for unions to negotiate in firms facing a great deal of competitive pressure (those with low market shares). If anything, wage gains obtained by unions in these firms should raise production costs above their competitive level and drive the firms out of the market, making them invisible in my data sample. Lastly, the interaction between union recognition and market share is estimated to raise wages by about 5% in the specification that excludes control variables (model 1) and by about 2.5% when control variables are included. These results are in accordance with Prediction 1 and are robust in Model 3 to the inclusion of detailed industry fixed effects (161 dummy variables). The idea in Model 3 is to identify the union effect based on an intra-industry comparison of establishments with different market shares and union-recognition status. This improves upon models (1) and (2) in that unions are historically found more in certain industries (such as manufacturing) and that the average level of wages and the average extent of concentration vary a great deal across industries (Krueger and Summers, 1988). Nevertheless, since the REPONSE04 sample is relatively small, it makes sense to test the model's predictions also using the less demanding specification of the Model (2) regression, which includes fewer covariates.

Models (1) to (3) in Table 6 impose a linear increase in the union wage premium with the market share variable. This assumption is relaxed in Figure 2, which plots the union wage premium for each market share group, conditional on the detailed set of covariates included in Model (2) of Table 6. The union wage gap varies almost linearly between a non-statistically significant -3% gap among the establishments reporting less than a 3% market share and a highly significant gap of 7.5% among the establishments reporting a market share of over 50%. The difference between the union wage gaps in these two groups is thus 10.5%. Figure 2 also clearly shows that the average union wage premium of 2% is concentrated mostly among establishments with a market share of over 50%. These establishments represent 16% of the unionised establishments (see Table 4) and just over 10% of all establishments in the sample. Fischer's tests of equality between the estimated union wage gaps in the largest market share group and in the first, second and third market share groups return p-values of 0.003, 0.054 and 0.111 respectively. This

implies, in particular, that the union wage gap is almost certainly wider among firms in the largest market share group than among firms in the smallest market share group.

The proxy variable used here for the unions' bargaining power is the percentage of unionised workers in the establishment (see Reilly, 1996, and Barth et al., 2000, for other examples). Since workers do not have to be union members to be covered by union bargaining, the percentage of unionised workers provides a direct indicator of the number of workers who support the union(s) recognised in their establishment. Unions have more credibility to bargain and threaten strike action if they are supported by a large number of workers. In this respect, the percentage of unionised workers is a good indicator of the unions' bargaining power. However, union membership is known to be very endogenous, implying that the percentage of unionised workers in each workplace can be correlated with wages for other reasons than the union's bargaining power. Results based on the percentage of unionised workers should thus be considered as suggestive: we want to check that all the model's predictions are confirmed, but we should keep in mind that other interpretations are possible. The percentage of unionised workers as reported by the establishments' managers is bracketed in a five-value variable. This variable is described in Table 4 [32].

The relationship between the unionisation rate and the union wage premium is tested in models (4) to (6) of Table 6. Model (4) presents the raw relationship without any control variables. The set of control variables in models (5) and (6) is identical to those used in models (2) and (3). In both models (5) and (6), the interaction between union recognition and the unionisation rate has a significant impact on hourly earnings, in accordance with Prediction 2. Union recognition alone and having a high unionisation rate without official union recognition do not affect wages. This is an indication of the validity of the assumption made in the bargaining model that no bargaining occurs in firms where unions are not present. Indeed, if bargaining also takes place in a non-unionised workplace, we should probably observe a wage premium in non-unionised establishments with a great deal of unionised workers. The right panel of Figure 2 displays the estimated union wage gap in each unionisation rate group. The union wage gap widens

[32] Note that only 34% of establishments where unions are recognised have more than 10% of unionised workers. The average unionisation rate in establishments where unions are recognised is actually very low (a simple calculation from national statistics shows that it is less than 20%) and it is far lower than in the US where 92% of covered workers are unionised (Eren, 2009).

from virtually 0 in the group of establishments with less than 1% of unionised workers up to 12% among establishments with more than 10% of unionised workers. The right panel of Figure 2 also shows that the union wage premium of 2% is concentrated among establishments where unionisation rates are over 10%. These establishments represent one-third of the establishments where unions are recognised for bargaining and 20% of all establishments in the sample. Fischer's test of equality of the estimated union wage gaps in the first and last unionisation rate groups has a p-value of 0.012, implying that the union wage gap is wider among the firms with a high unionisation rate at the usual 5% level.

Models (7) to (9) in Table 6 lastly provide a joint test of the bargaining Model 2 predictions with different sets of control variables. The estimates are close to the results found when the predictions are tested separately: the estimated coefficient for interaction between union recognition and market share is slightly higher, whereas the coefficient for interaction between union recognition and the unionisation rate is slightly lower (in specifications that include control variables).

More general wage equations derived from the bargaining model can also be estimated to study the interaction between firms' quasi-rents and workers' bargaining power. Direct estimates of equations (8) and (9) show that the cross-effect on wages of a strong bargaining power and a high market share is approximately +8%. [33]

Testing the model third prediction

To proxy workers' bargaining power, I simply multiply union recognition by the unionization rate five-value variable. I test the link between workers' bargaining power and quasi-rents by estimating an establishment-level ordered-logit regression of this proxy on the establishments' market share groups and other covariates. The results are displayed in columns 1 and 2 of Table 8: consistent with prediction 3, the probability of having a higher bargaining power increases systematically from one market share group to the next. For example, one can compute that growth from a market share of less than 3% to a market share of over 50% increases an establishment's likelihood of having both union recognition and more than 10% of union members by approximately 10%.

[33]The exact wage equation I estimate and the complete estimation results are presented in online Appendix B. See also online Appendix C for additional empirical results (including estimates of the union wage premium and tests of prediction 1 union by union) as well as a robustness check of prediction 1 in 1998.

The workers' bargaining power variable is composed of two parts: union recognition and the unionisation rate. The contribution of each part to the relationship between potential rents and workers' bargaining power is also shown in Table 8. The link between market share and union recognition is first tested in columns 3 and 4. Both models find that larger market share is not systematically associated with a higher probability of union recognition. Indeed, the probability of union recognition is higher in establishments with market shares of 3% to 25% and 25% to 50% than in establishments with market shares of over 50%. There is however a clear positive link between market share and the unionisation rate (column 5 and 6). This link is even stronger when we focus only on establishments in which unions are recognised for bargaining (columns 7 and 8). One can compute that growth from a market share of less than 3% to a market share of over 50% increases an establishment's (resp. a union establishment's) likelihood of having more than 10% of union members by approximately 6% (resp. 10%). However, no positive association can be found between market share and the unionisation rate in establishments where unions are not recognised for bargaining (results not reported). In total, these findings imply that the relationship between potential rents and workers' bargaining power is driven by workers getting more and more unionised when there are prospects for rent extraction and a union is already in place in their working establishments. This confirms that union density is endogenous and that the results of prediction 2 should be interpreted cautiously. It also suggests that union recognition itself is exogenous to firms' rents, which I will explain in the next section.

7 Selection issues and robustness of the results

Given that predictions 1, 2 and 3 are directly derived from a bargaining model, their empirical validation supports the rent-sharing interpretation of the wage premium associated with union recognition. Yet a selection process might still be at work, for example, if the best workers select themselves into large unionised firms with the highest market shares or if unions strategically organise high-paying firms. Despite my efforts to control for observable individual and establishment characteristics, there could still be some unobservable component of individual productivity or establishment compensation policy correlated with establishment union status and market share that might generate higher

wages. I present evidence suggesting that this is unlikely.

First, if a selection process of the best workers is at work in union firms, it should show up in the labour productivity of the selected establishments. I have tested this prediction and reproduced the empirical analysis conducted in this paper including a linear control for labour productivity (measured as the value-added per employee) in all the regression models in order to better capture workers' unobserved ability. The labour productivity variable used is a firm-level variable taken from the DIANE dataset, which contains publicly-available company accounts and which I have matched with the REPONSE04 dataset[34]. Cross-sectional regressions of firm-level labour productivity on union recognition and various sets of control variables show that union recognition is never associated with significantly higher labour productivity. As a consequence, the inclusion of firm-level productivity in the regression models presented in the paper usually leaves the point estimates for union recognition, market share and the unionisation rate virtually unchanged. Table 7 shows this by reproducing the main specifications of the paper with and without controlling for worker productivity on the subsample of establishments for which firm-level productivity is available. All in all, these results suggest that there is no selection of the more productive workers into organised establishments with a large market share or a high unionisation rate[35].

Another potential source of bias is where union firms would already pay higher wages even in the absence of unions. In this case, the selection does not concern the workers' individual characteristics, but the characteristics of their place of work. This phenomenon could happen because (i) unions are likely to target high-rent firms where returns to bargaining are high, and (ii) those high-rent firms may pay higher wages even in the absence of unions. Evidence suggests that none of these conditions is verified.

Should high-rent firms pay higher wages in the absence of unions, we would probably

[34]The DIANE dataset is provided by Bureau van Dijk, a private consulting company, and it is the French source file for the Amadeus database. The match with REPONSE04 leads to a loss of about 500 REPONSE04 establishments, which is a quarter of the REPONSE sample. This is why I have not *de facto* controlled for labour productivity in the regression models.

[35]This absence of selection is not at odds with the literature. As noted by Bryson (2007, p.35), the unions' wage standardisation policy is most appealing to workers with low earning potential because they stand more to gain through unionisation. Yet union wage gains may attract both good and bad workers, and if employers in unionised firms were to observe the productivity of job applicants, they could hire a more highly skilled workforce. These two selection processes work in the opposite direction, leaving the effect of unions on workers' selection theoretically unclear (Farber, 2001).

observe a positive link between wages and market share even in the absence of unions. However, Table 6 (second row) shows that there is no such link. Similarly, should unions actually target and organise the establishments with the highest potential rents, we would observe a positive correlation between union recognition and market share. This is not the case either (Table 8, col. 3 and 4). The absence of any clear association between union recognition and market share in these specifications which control for industry dummies lends support to the idea that unions do not target the best firms within industries. Unions may nevertheless behave strategically at a more macro level and organise all the firms in the best industries rather than just the best firms within a given industry. In this case, the workplace-level union wage premium would decrease when more controls were added for industries. A comparison of Model (3) with Model (2) and Model (6) with Model (5) in Table 3 shows that this is hardly the case[36].

These findings that unions do not strategically select firms support the causal interpretation that the union wage premium reflects wage gains due to a rent extraction phenomenon. However, they may appear surprising regarding our earlier results showing that workers' bargaining power and establishments' unionisation rates increase with firms rents. They are also at odds with the theoretical argument that unions target the best firms (Bryson, 2007) and the evidence that, in some countries, unions are indeed found more in the most profitable industries (see Brown et al., 2009, for the UK). So why do French unions not appear to behave strategically at all at firm level? The institutional environment could go some way to explaining this. The key point is that the presence of unions in French firms basically relies on one particular worker's willingness to become a union representative. The union status of firms depends more on a few individuals than on a general organisation of workers into a shared interest grouping. Whereas rent seeking is a clear incentive for workers to organise collectively in a union, it is probably only a minor factor in any single individual's decision to become a union representative. Becoming a union representative is indeed going to affect workers' utility far beyond the provision of bargaining gains, as it secures employment protection, paid time off to do

[36]In specifications that do not control at all for worker and establishment characteristics, the raw union wage gap narrows from 19% without controlling for industries to 14% for one-digit industries to just under 13% for two-, three- and four-digit dummies. When control variables for individual characteristics and establishment size are included in the regressions, the inclusion of industry dummies (1, 2, 3 or 4 digits) does not affect the union wage premium at all.

union work and a particular social status in the firm. It also has an effect on career prospects and may lead to wage discrimination (Breda, forthcoming).

Even though union recognition institutionally depends on a worker's individual willingness to become a union representative, workers may still manage to develop a suitable incentive scheme within each establishment such that the interest of the worker who becomes a union representative is aligned with the common interest[37]. Should these kinds of incentive mechanisms be at work, then union recognition would be a collective process, which could not be said to be largely independent of firms' rents. I have more formally tested for the existence of worker interactions that would explain union recognition and make it a more strategic collective choice. To do so, I have studied the goodness of fit of a toy model that assumes that workers *do not* interact when deciding whether to become a union representative. Under this hypothesis, we can assume that each worker has a probability $p + \epsilon_i$ of becoming a union representative, where p is the mean probability across all workers and ϵ_i are *independent* idiosyncratic terms. The expected probability of union recognition in an establishment of size n is then $P_n = 1 - \mathbb{E}[\prod_{i=1}^{n}(1-(p+\epsilon_i))] = 1-(1-p)^n$ (the key assumption of independence means I can switch the expectation and product signs in order to get the right-hand side result). Using maximum likelihood, I find that the individual mean probability p that best fits the ESS02 data is $p = 0.0064$ (details available on request). Figure 3 displays both the theoretically predicted probabilities of having a union representative P_n when $p = 0.0064$ and the empirical proportion of establishments with a union based on establishment size (the latter is obtained using a locally weighted regression of U_j on establishment size with bandwidth 0.2). The fit appears to be very good, showing that empirical evidence supports the hypothesis of independence across workers' decisions to become a union representative, which in turn explains why workplace-level union recognition is more exogenous in France than it might be in other countries.

However, the fact that union recognition is in a large extent exogenous does not imply that all workers are always completely lacking in strategic behaviour. Once a union

[37]This would entail explicitly or implicitly contracting in order to offer the union representative appropriate monetary or non-monetary rewards. This could be problematic since it implies solving a number of organisational issues: free-riding of non-union members, information asymmetry about the representative's utility, moral hazard regarding the effort the representative puts into bargaining, etc. However, without a formal theory as to how workers organise collectively within firms, these arguments cannot rule out the possibility of such contracting.

is recognised for bargaining within its establishment, workers seem actually affected by the prospects of rent-seeking, as more workers become union members when there are more potential rents to be negotiated (see columns 7 and 8 of Table 8). Unlike union recognition, the unionisation rate is an aggregate measure of the workers' willingness to organise. It is therefore more likely to be driven by collective goals and hence by the amount of rents available, as suggested by the results presented in Table 8.

A last alternative to the rent-sharing explanation of the union wage premium is the theory of compensating wage differentials. If workers can switch cost free from the non-unionised to the unionised sector, market forces should make them indifferent in equilibrium to working in one or the other of these two sectors. In this case, the wage gains secured by unions would be offset by losses in non-wage aspects of worker compensation such as workload, working conditions and job security. If the union's objective function targets wages at the expense of non-wage aspects of compensation, unions could well extract monetary rents in firms where they are present, but lose out on other aspects at the same time. The simple bargaining model I use in this paper does not model the non-wage aspects of workers' compensation. This means it is impossible here to disentangle this weaker explanation from the pure rent extraction option that would predict that unions make workers better off across all compensation aspects. A key prediction of compensating wage differential theory is that workers at equilibrium remain indifferent to working in the unionised or non-unionised sector. This prediction is tested in Breda (2011, pp. 121-130) with a focus on voluntary resignations in unionised and non-unionised firms. The results show that the annual rate of voluntary resignations is one-third lower in unionised establishments, even when controlling for worker productivity. This is consistent with the idea that workers are better off in these establishments. The quarterly dismissal rate is also slightly lower in these establishments, implying that there is no loss of job protection when unions are present. These two results suggest that the wage gains obtained by unions are not offset by losses in other areas, contrary to the prediction of the theory of compensating wage differentials.

8 Conclusion

This paper studies the wage premium associated with establishment-level union recognition in France. A premium of 2% is precisely estimated from individual hourly earnings equations using a large dataset that allows me to control for standard observable workers and firm characteristics. The analysis is then taken a step further to investigate whether the union wage premium in France might reflect wage gains due to rent extraction. In this case, the premium would be increasing with the amount of rents available in firms. This prediction is derived from a simple bargaining model and tested using firms' market shares as aproxy variable for their potential rents. Empirical results show that the union wage premium increases from virtually 0% to 8% in firms with high potential rents, confirming the main theoretical prediction of the bargaining framework.

The paper also points up a distinction between union recognition and bargaining power and how institutions can affect these two variables. French legislation makes union recognition very easy by stipulating that it takes just one worker to show willing to become a union representative. In such a context, union recognition appears quasi-random to firms' rents and is obtained in a relatively large number of firms. However, and not surprisingly, it does not necessarily mean that workers are really willing to organise collectively in order to secure high bargaining power. This may explain why union wage gains are quite low on average. In most firms where unions are recognised, profits and expected gains from bargaining remain too low to prompt workers to really organise collectively in support of the union. However, when potential rents increase, unionisation rates increase as well, suggesting that workers are more willing to pay the cost of organising collectively. Much higher union wage gains are consequently observed in high rent firms.

Closer study of workers' incentives to organise collectively to secure high bargaining power in different institutional environments looks to be a promising area of research. It could, for example, identify reasons for the historical decline of unions in the recent period. Brown *et al.* (2009) show that rising product market competition over the past 30 years could explain the simultaneous decline of the unions. My findings provide direct evidence that workers are more likely to pay the cost to organise collectively in firms with less product market competition. Hence, they lend support to the idea that greater competition lowers unionisation rates. Further research should seek to link the extent of

unionisation to firms' rents and union wage gains, across both countries and time.

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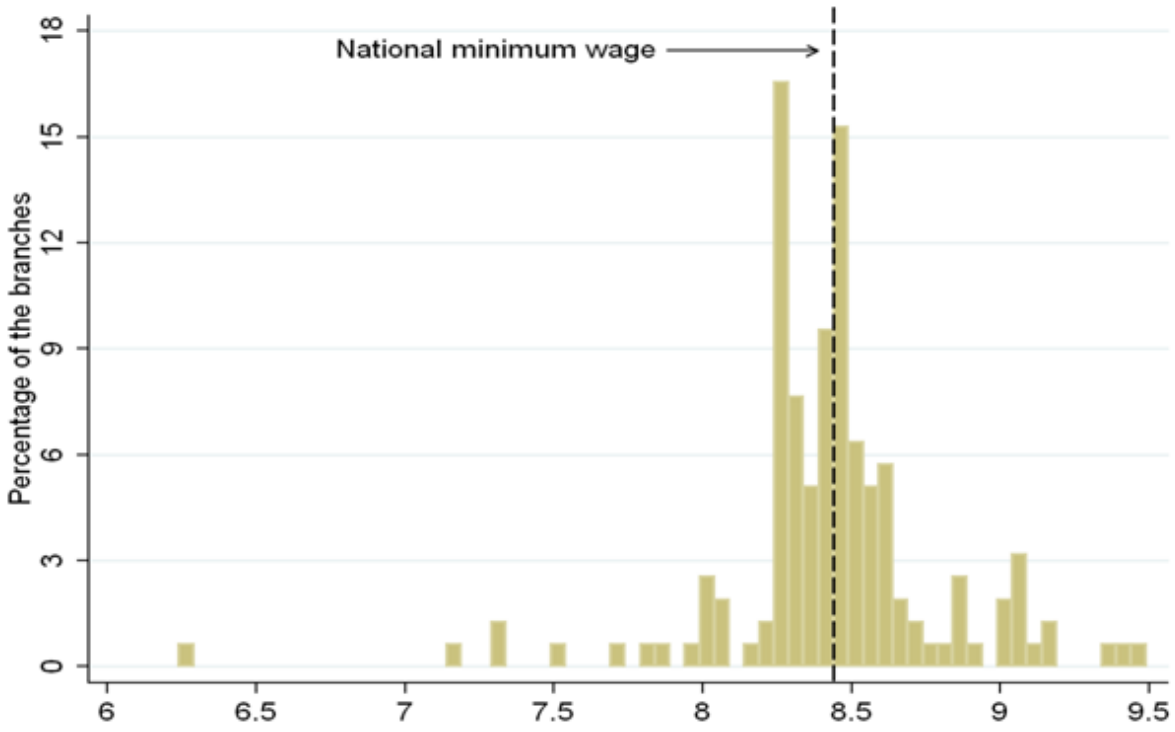
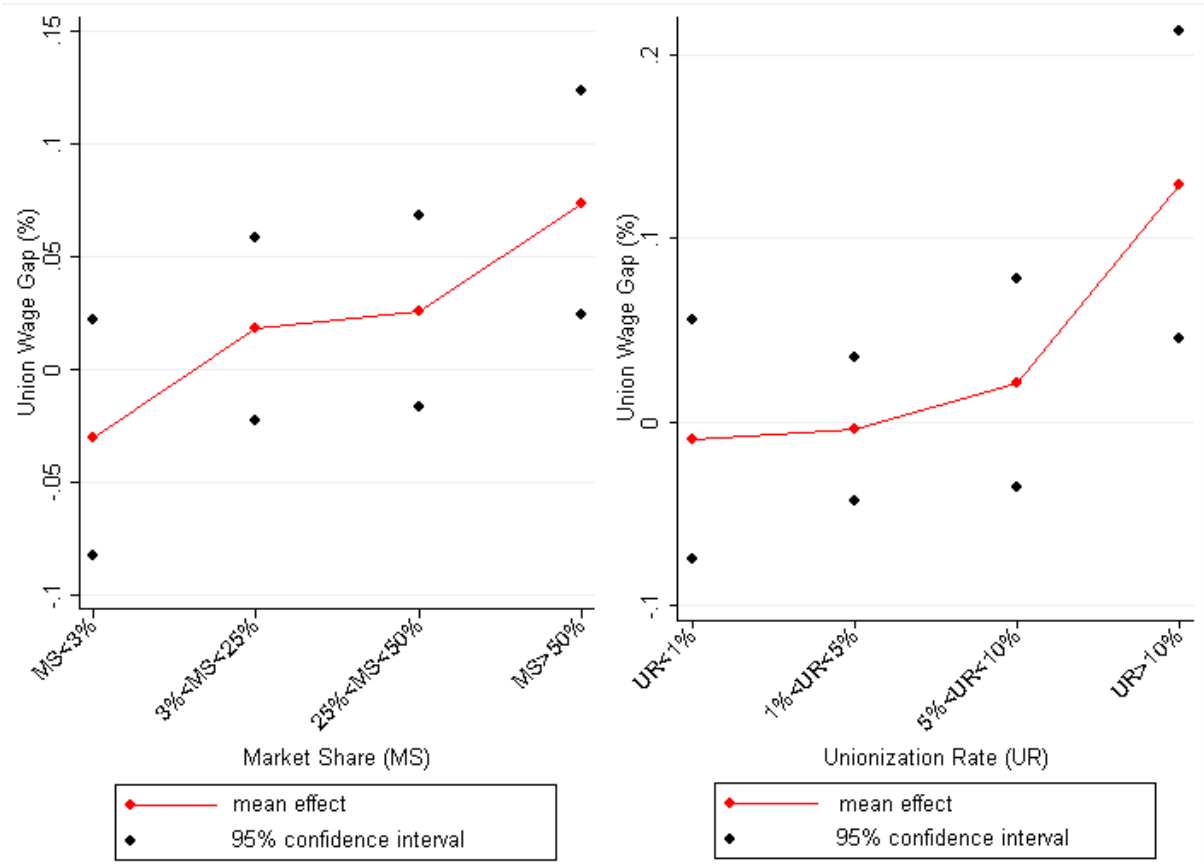
Tables and Figures

Figure 1: *Distribution of the branches hourly minimum wages in 2007.*



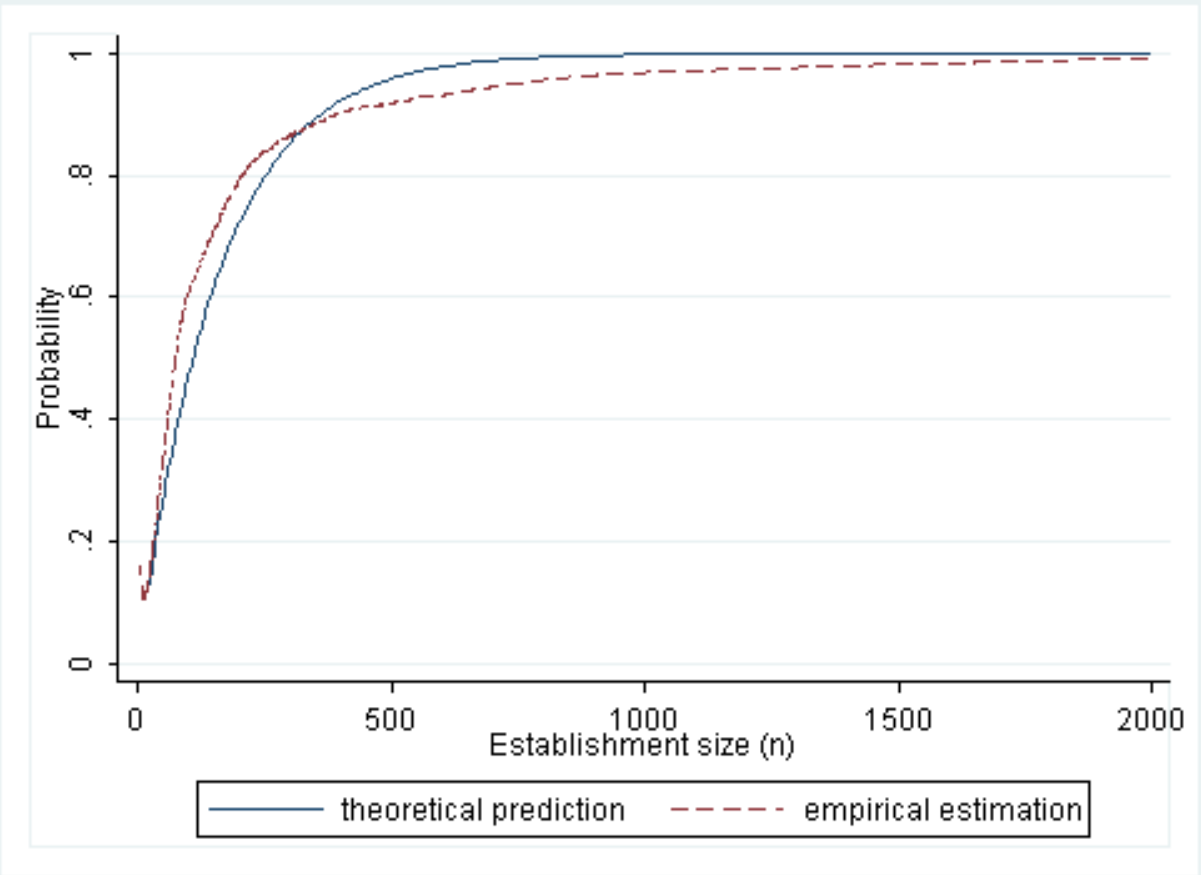
Notes: The hourly national minimum wage in the 1st of July 2007 was equal to 8.44€. *Source:* Author's computations from the Collective Bargaining annual book (2007). Only the 160 branches covering more than 5,000 workers are represented. They cover 10 million workers, which is more than one half of the private sector total employment.

Figure 2: *The union wage gap in each market share and unionisation rate group (controlling for other observable characteristics)*



Notes: The union wage gaps in both graphs are obtained by running 2 regressions of the individual hourly earnings from DADS03 on detailed observable individual characteristics (gender, age tenure, education, occupation, full-time job) and establishment characteristics (size, region, firm age, 3-digit industries) and a set of 4 indicators for market share groups (left graph) or 5 indicators for unionisation rate group (right graph) as well as the interaction of these indicators with a union recognition dummy. The plotted point estimates and 95% confidence intervals correspond to the estimated effect of these interactions on hourly earnings. The point estimates should be interpreted as the union wage premium within each market share or unionisation rate group, conditional on other observable workers and establishment characteristics.

Figure 3: *Probability to have a union representative as a function of establishment size)*



Notes: Theoretical prediction is the function $y = 1 - (1 - p)^n$ with $p = 0.0064$.

Empirical estimation is obtained from a locally weighted establishment-level regression of union recognition on establishment size (with a bandwidth of 0.2).

Obtained from the ESS02 data. The figure only represents establishments with less than 2,000 employees having information on union recognition (N=10,819 establishments).

Table 1: *Description of the French main unions in 2004*

French union	**Historical/ Ideological roots**	**Representation (in 2004)**
Confédération Générale du Travail (CGT)	Marxism	27.6%
Confédération Française Démocratique du Travail (CFDT)	Socialism	27.3%
CGT-Force Ouvrière (FO)	Trotskyism	19.7%
Confédération Générale des Cadres (CGC)	white collars	11.3%
Confédération Française des Travailleurs Chrétiens (CFTC)	Christians	10.5%
Others (these are generally local or sector specific unions)		3.5%

Notes: The last column gives the distribution of all the union representatives among establishments with more than 20 employees in 2004 (obtained from the REPONSE dataset using a weighted average of the number of union representatives in each workplace). This statistic differs from the figures usually used to assess the relative importance of the large French unions (which are the votes at the professional elections and the number of members self declared by unions themselves).

Table 2: *Distribution of the workplaces with more than 20 employees in terms of the total number of unions present (in 2004)*

Number of unions present in a workplace	Proportion of workplaces in the datasample (in %)	Proportion of French workplaces concerned (in %)	Proportion of French workers concerned (in %)
0	33.90	64.34	36.03
1	18.09	19.32	19.04
2	13.29	7.60	13.07
3	12.16	3.73	10.44
4	9.98	2.60	8.37
5	9.38	1.98	8.78
6	2.36	0.27	3.34
more than 6	0.83	0.17	0.94

Notes: From Author's computation using the REPONSE dataset and the set of weights provided by the ministry of Labour to make the data sample representative of the French private sector workplaces with more than 20 employees or of the workers in those workplaces.

Table 3: *Log Hourly Earnings Regressions (ESS02 and REPONSE04)*

	Dependant variable: log of hourly earnings							
Sample	*ESS02 (10+ employees)*				*REPONSE04 (20+ employees)*			
	(1)	(2)	(3)	(4)	(2')	(3')	(5)	(6)
Union Recognition	0.201***	0.0270***	0.0196***	0.0173***	0.031**	0.021	0.018	0.021
	(0.007)	(0.005)	(0.005)	(0.005)	(0.013)	(0.013)	(0.013)	(0.014)
Worker's characteristics								
Women		-0.132***	-0.134***	-0.133***	-0.149***	-0.149***	-0.135***	-0.148***
		(0.003)	(0.003)	(0.003)	(0.008)	(0.008)	(0.008)	(0.009)
Age		0.0113***	10 groups	10 groups	0.010***	10 groups	10 groups	10 groups
		(0.000)			(0.000)			
High School		0.0968***	0.103***	0.0994***	0.055***	0.061***	0.048***	0.054***
		(0.004)	(0.004)	(0.004)	(0.010)	(0.010)	(0.009)	(0.011)
Some College		0.137***	0.145***	0.139***	0.110***	0.122***	0.108***	0.115***
		(0.004)	(0.004)	(0.004)	(0.012)	(0.012)	(0.011)	(0.013)
College or University Degree		0.269***	0.284***	0.277***	0.219***	0.246***	0.224***	0.218***
		(0.005)	(0.005)	(0.005)	(0.017)	(0.017)	(0.016)	(0.018)
Firm's characteristics								
11-20 Workers		-0.0302***	-0.0282***	-0.0281***	N.A.	N.A.	N.A.	N.A.
		(0.006)	(0.006)	(0.006)				
21-50 Workers	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
51-100 Workers		0.00639	0.00444	0.00533	-0.001	-0.001	-0.003	-0.004
		(0.006)	(0.006)	(0.006)	(0.015)	(0.014)	(0.015)	(0.017)
101-200 Workers		0.0210***	0.0182***	0.0199***	0.027*	0.025	0.028*	0.006
		(0.006)	(0.006)	(0.006)	(0.016)	(0.016)	(0.015)	(0.018)
Over 200 Workers		0.0461***	0.0414***	0.0438***	0.071***	0.065***	0.064***	0.049***
		(0.006)	(0.006)	(0.006)	(0.015)	(0.015)	(0.015)	(0.019)
4 occupation groups, 10 region groups	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
10 age, 4 tenure groups	No	No	Yes	Yes	No	Yes	Yes	Yes
Industries	No	1 digit	1 digit	2 digits	1 digit	1 digit	3 digit	4 digits
Full-time worker, Establishment age (4 groups)	No	No	No	No	No	No	Yes	Yes
ICT use, listed firm, family firm, management	No	No	No	No	No	No	No	Yes
Observations	106,734	97,751	97,751	97,751	6,449	6,387	6,357	4,917
Nb. Of Establishments	12,021	10,741	10,741	10,741	2,177	2,158	2,149	1,638
R-squared	0.034	0.625	0.632	0.636	0.626	0.640	0.678	0.709

Notes: Standard errors are calculated with clustering by establishments in all models. The first 4 models are estimated from the ESS02 data (establishments with more than 10 employees), and the last 4 one using the REPONSE04 data (establishments with more than 20 employees). Model (8) includes a dummy for establishments belonging to a listed firm, another one for those belonging to a family firm, and two indexes for the extent of ICT use and innovative management practices (see data appendix of Bassanini et al. (2013) for details on the construction of these indexes).

*: significant at the 10% level. **: significant at the 5% level. ***: significant at the 1% level.

Table 4: *Distribution of establishments in terms of their declared market share, targeted market and percentage of union members (in 2004, from employers' claims in REPONSE04, not weighted)*

Market Share (MS)	**MS< 3%**	**3%<MS<25%**	**25%<MS<50%**	**MS>50%**		**Total**
Number of establishments	318	787	451	305		1861
(percentage)	(17%)	(42%)	(24%)	(18%)		(100%)
Nb. of non-unionised estab.	146	257	137	109		649
(percentage)	(22%)	(40%)	(21%)	(17%)		(100%)
Nb. of unionised estab.	172	530	314	196		1212
(percentage)	(14%)	(44%)	(26%)	(16%)		(100%)
Targeted market	**Local**	**Regional**	**National**	**European**	**International**	**Total**
Number of establishments	477	416	576	305	666	2440
(percentage)	(20%)	(17%)	(24%)	(12%)	(27%)	(100%)
Unionisation Rate (UR)	**UR<1%**	**1%<UR<5%**	**5%<UR<10%**	**UR>10%**		**Total**
Number of establishments	493	560	595	481		2129
(percentage)	(23%)	(26%)	(28%)	(23%)		(100%)
Nb. of non-unionised estab.	473	190	72	18		753
(percentage)	(63%)	(25%)	(9.6%))	(2.4%)		(100%)
Nb. of unionised estab.	20	370	523	463		1376
(percentage)	(1.45%))	(27%)	(38%)	(34%)		(100%)

Notes: The table presents the number and proportion of establishments in each market share group, targeted market group and unionisation rate groups for all establishments in the REPONSE survey, and for non-organised and organised establishments taken separetely. Results are produced without using sample weights and come from employers answers.

Lecture: 318 employers have declared that their establishment's market share is lower than 3%. They are 146 to decalre both no unions and a market share lower than 3%.

Table 5: *Correlations between subjective market share and contemporaneus or long period average profits*

	Net income			EBIT		
	2004	2000-2004	1995-2004	2004	2000-2004	1995-2004
Market share	0.042	0.061**	0.076***	0.064**	0.072**	0.075***
p-value	*0.141*	*0.032*	*0.008*	*0.026*	*0.012*	*0.009*
Observations	1228	1228	1228	1228	1228	1228

Notes: The table gives the correlation coefficients, their p-value, and the number of observations available to compute the correlation. I have restricted to the common subsample for which accouting information is available all years.

EBIT are Earnings Before Interest and Taxes. 2004 corresponds to the value of the variable for the accounting year 2004. 2000-2004 (resp. 1995-2004) gives the five-years (resp. ten-years) average between 2000 and 2004 (resp. 1995 and 2004).

*: significant at the 10% level. **: significant at the 5% level. ***: significant at the 1% level.

Table 6: *Log Hourly Earnings Regressions: Union recognition, bargaining power and rents (REPONSE04)*

	Dependent variable: log of hourly earnings								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Union Recognition (estab. level)	0.076*	-0.028	-0.046	0.161***	-0.025	-0.018	0.010	-0.083**	-0.086**
	(0.046)	(0.030)	(0.030)	(0.030)	(0.020)	(0.019)	(0.056)	(0.035)	(0.035)
Market share	-0.033**	-0.018**	-0.022***				-0.040***	-0.024***	-0.027***
	(0.014)	(0.008)	(0.008)				(0.014)	(0.008)	(0.008)
Union Recognition*Market share	0.053***	0.027**	0.028***				0.059***	0.030***	0.032***
	(0.018)	(0.011)	(0.011)				(0.019)	(0.011)	(0.011)
Unionisation Rate				-0.023	-0.010	-0.012	-0.021	-0.006	-0.004
				(0.015)	(0.010)	(0.009)	(0.016)	(0.011)	(0.010)
Union Recog. *Unionisation rate				0.029	0.029**	0.024**	0.037*	0.024*	0.017
				(0.018)	(0.012)	(0.011)	(0.020)	(0.013)	(0.012)
Workers controls:									
Gender, educ., age, occup., full time	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Detailed age and tenure	No	No	Yes	No	No	Yes	No	No	Yes
Establishment controls: Size, Region	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Establishment controls: Age	No	No	Yes	No	No	Yes	No	No	Yes
Establishment controls: Industries	No	1 digit	3 digits	No	1 digit	3 digits	No	1 digit	3 digits
Observations	5114	4990	4934	5745	5612	5547	4534	4430	4386
R-squared	0.051	0.641	0.711	0.043	0.640	0.714	0.053	0.634	0.684

Notes: In all models, union recognition, market share and unionisation rate are defined at the establishment level and standard errors are calculated with clustering by establishments.

Market share and unionisation rate are categorial variables both taking four different values (from 0 to 3, in increasing order). All regression models in this table rely on the underlying (and somehow arbitrary) assumption that the log hourly earnings varies linearly with these two categorial variables. This assumption will be loosened in figure 2.

The control variables used are those in models (2') and (5) of table 3.

*: significant at the 10% level. **: significant at the 5% level. ***: significant at the 1% level.

Table 7: *Main earnings specifications – with and without controlling for firm-level workers' productivity (REPONSE04)*

Dependent variable:	*log of hourly earnings*									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
log value added per worker		0.160***		0.129***		0.131***		0.121***		0.123***
		(0.015)		(0.017)		(0.020)		(0.018)		(0.020)
Union Recognition (estab. level)	0.035**	0.030**	0.027**	0.024*	-0.039	-0.031	-0.008	-0.006		
	(0.013)	(0.012)	(0.013)	(0.012)	(0.031)	(0.030)	(0.019)	(0.018)		
Market Share					-0.026***	-0.024***				
					(0.008)	(0.008)				
Union Recognition*Market Share					0.030***	0.026**				
					(0.012)	(0.011)				
Unionisation rate							-0.012	-0.007		
							(0.010)	(0.010)		
Union Recognition*Unionisation rate							0.022*	0.017		
							(0.012)	(0.011)		
High Market Share (HMS)									-0.052***	-0.050***
									(0.017)	(0.017)
High Bargaining Power (HBP)									0.007	0.006
									(0.014)	(0.014)
HMS*HBP									0.099**	0.097**
									(0.042)	(0.039)
Workers controls:										
Gender, educ., age, occup., full time	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Detailed age and tenure	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Establishment controls: Size, Region	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Establishment controls: Age	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industries	1 digit	1 digit	3 digits	3 digits	3 digits	3 digits	3 digits	3 digits	3 digits	3 digits
Observations	5,100	5,100	5,023	5,023	3,986	3,986	4,398	4,398	3,550	3,550
R-squared	0.625	0.656	0.680	0.693	0.683	0.697	0.683	0.695	0.685	0.697

Notes: The table reproduces the main specifications of the paper with and without controlling for workers' productivity on the subsample of establishments' for which firm-level productivity is available. In all models, union recognition, market share, unionisation rate and bargaining power are defined at the establishment level and standard errors are calculated with clustering by establishments.

Market share and unionisation rate are categorical variables both taking four different values (from 0 to 3, in increasing order). The high market share variable is a dummy equal to 1 for establishments declaring a market share larger than 50%. The high bargaining power variable is a dummy equal to 1 for establishments where unions are recognised and with more than 10% unionised workers. The control variables used are those in columns (2) and (3) of table 3, with the exception that the type of working contract is not observable in REPONSE04 and has been replaced by a dummy variable for full time workers.

*: significant at the 10% level. **: significant at the 5% level. ***: significant at the 1% level.

Table 8: *Establishment-level regressions: Are Union recognition and bargaining power explained by rents? (REPONSE04)*

Dependent variable:	*Bargaining Power*		*Union Recognition*		*Unionisation Rate*		*Unionisation Rate*	
Sample	*All workplaces*		*All workplaces*		*All workplaces*		*Union workplaces only*	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
MS<3%	REF	REF	REF	REF	REF	REF	REF	REF
3%<MS<25%	0.245*	0.180	0.362**	0.318	0.251*	0.141	0.289	0.289
(robust standard error)	(0.136)	(0.151)	(0.175)	(0.198)	(0.131)	(0.144)	(0.185)	(0.215)
Marginal effect	–	–	*0.067*	*0.068*	–	–	–	–
25%<MS<50%	0.298**	0.281*	0.357*	0.489**	0.296**	0.202	0.285	0.255
(robust standard error)	(0.152)	(0.170)	(0.203)	(0.230)	(0.145)	(0.163)	(0.200)	(0.235)
Marginal effect	–	–	*0.064*	*0.101*	–	–	–	–
MS>50%	0.358**	0.314*	0.199	0.140	0.359**	0.308*	0.668***	0.719***
(robust standard error)	(0.170)	(0.190)	(0.207)	(0.230)	(0.163)	(0.179)	(0.225)	(0.267)
Marginal effect	–	–	*0.036*	*0.030*	–	–	–	–
Establishment controls:								
Size and region	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Age	No	Yes	No	Yes	No	Yes	No	Yes
Industries	1 digit	3 digit	1 digit	3 digit	1 digit	3 digit	1 digit	3 digit
Regression Model*	ologit	ologit	logit	logit	ologit	ologit	ologit	ologit
Observations	1,646	1,643	1,860	1,591	1,647	1,644	1,058	1,055
Pseudo R-squared	0.149	0.191	0.365	0.369	0.113	0.160	0.034	0.096

Notes: The bargaining power variable used in the first 2 columns is the interaction of union recognition and of the five-brackets unionisation rate variable. The size and region establishment controls used are identical to those in table 3. 3 establishment age indicators have also been included in models (2), (4) and (6).

* "ologit" means "ordered logit" model. *: significant at the 10% level. **: significant at the 5% level. ***: significant at the 1% level.