Employers dealing with union reps. : A case for strategic discrimination?

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Abstract:

This paper studies the strategic interaction between employers and union representatives. To avoid unions, employers may try to buy their reps. When such a strategy is not successful, they may have a strategic interest to discriminate against them to lower the union's bargaining power and discourage unionism on the long run. We build a model that provides theoretical fondations for these mechanisms. We derive the conditions under which employers are likely to strategically discriminate against union reps. We then provide several pieces of evidence suggesting that such a discrimination occurs in several firms. An empirical challenge is that there does not exist any direct data on union reps. wages. We exploit linked employer/employee data to overcome this problem and build an indirect method to recover union reps. wages. Union reps. are paid 10% less than their establishment's coworkers, even after controlling for a large set of observable characteristics. This wage penalty gets as high as 20% for the reps. from the most combative unions, and are higher for the reps. with high tenure. We successfully test other model's predictions, suggesting that these lower wages are more likely to reflect discrimination than a selection effect. The discrimination interpretation is also comforted by a study of the self-declared feeling of discrimination of a sample of union reps.: results on union reps. wages and on their feeling of discrimination are perfectly in line. Finally, layoffs rates also tend to be higher for union reps., suggesting that their lower wages are not compensated by a better job proection.

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1 Introduction

On paper, it definitely looks attractive to become a union representative. When a worker accepts to become a union representative, he[1] gets additional rights and legal protections: he is allowed to negotiate wage levels and working conditions in his firm at least once a year with the employer, he is protected against layoffs (the employer needs to be authorized by the French work inspection authority to fire him) and he has paid working discharges for his union job (representing about 10% of total hours worked). In addition to these legal advantages, union representatives might also benefit from a more favorable socio-economic position: they have an informational rent due to their participation to work councils and the duty of the employer to inform them about important decisions; they also may get the esteem of their coworkers and thus a higher social status. A key feature of the French industrial relations system is that unions can be recognized in firms or establishments of firms as soon as they find a worker who is willing to become their union representative[2]: their is no election. Despite this absence of legal constraints and the apparent advantageous situation of union representatives, unions have recurrent difficulties to find workers who are willing to take the job: only one worker out of 125 is union representative, implying that 65% of establishments with more than 20 employees have no unions at all. Why are workers so reluctant to become union representatives? The goal of this chapter is to answer this question by studying more carefully the situation of union representatives and how they interact with their employers.

Looking at the situation of union representatives is fairly new in the labor economics literature and it thus needs to be justified carefully. By taking explicitly into account the fact that a union is not an aggregated group of identical workers and that its development relies, as with any organization, on the higher implication of some of its members, a research agenda focused on the study of union leaders should

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[1]As about 80% of union representative are men, we have chosen to adopt the convention to refer to union representatives whose gener is unknown by "he" or "him" rather than "she" or "her".

[2]Union representatives are also called shop stewards in the UK.

improve our current understanding of the determinant of collective action. In section 2.2, I review the existing theories unions and on the determinants of collective action. I then discuss how these theories could be improved by taking into account explicitly the role of union leaders.

France is a country of open shop unionism in which only few designated workers within firms or workplaces represent all their coworkers, even those who are not unionized. Such a legal setting implies that firm-level collective bargaining between an employer and the workers takes naturally the form of an "individual bargaining" between the employer and the union representative. Two main features differentiate this bargaining from a classical Nash bargaining. First, the union representative is under the authority of the employer as a salaried worker. Using a more theoretical language, it means that one of the bargaining groups has an idiosyncratic power on the negotiator of the other group. Second, the union representative defends the interest of a community of workers that did not elect him through a democratic process and that does not necessarily support and monitor him. There are no systematic mechanisms guaranteeing that his own interest is aligned on his coworkers' interest, implying that the bargaining problem is coupled with an agency problem on the workers' side.

The last part of section 2.2 proposes a model of intra-firm bargaining that explicitly takes into account the two features detailed in the previous paragraph. The model supposes that the employer can offer a compensation package to the union representative that is different to the wage rate bargained for the entire workforce. Depending on the stake of the bargaining and how well the representative is monitored by his coworkers, the employer and the union representative will cooperate or not. In the cooperative case, the employer offers individual benefits to the union representative in exchange for social peace. In the non-cooperative case, the union representative fully defends his coworkers whereas the employer discriminates against him.

One reason that explains the absence of studies on union representatives is the

absence of empirical data. To my knowledge, there does not exist any individual data sources in which union representatives can be directly identified. In section 2.3, I develop an econometric technique that allows me to estimate a wage differential between union representatives and their coworkers using only indirect information. I use a linked employer-employee dataset from the French private sector to compare union representatives' wages to their coworkers' wages. On the employee side of the data, I only know if the surveyed workers are unionized or not. The empirical difficulty is thus the impossibility to distinguish, among the unionized workers, those who are a union representative from those who are only a member of a union without being a union representative. To sidestep this problem, I use available information in the employer part of the data on the number of union representatives (there can be more than one) and the number of unionized workers in each workplace. These variables enable to construct the workplace-level probability for a randomly drawn worker to be a union representative. This probability is equal to 0 for the workers declaring that they are not unionized (since union representatives have to be unionized) and is equal to the proportion of union representatives among unionized workers in their workplace for the workers declaring that they are unionized. I use this probability variable to split the directly observable wage differential between unionized and non-unionized workers into two differentials: one between union representatives and non-unionized workers and another one between unionized workers who are not a union representative and non-unionized workers. Assuming that these two differentials do not vary with the probability variable (or vary according to a parameterized curve), I show that they can be estimated consistently, conditional to workers characteristics and firm-level fixed effects. The estimation relies on the fact that the observed wage differences between unionized and non-unionized workers are more likely to be wage differences between union representatives and non-unionized workers in workplaces in which the proportion of union representatives among unionized workers is higher.

Estimating a series of standard wage determination models that control for individual and firm-level characteristics, I find that unionized workers taken as a whole are paid 2 to 3% less than non unionized ones. When the technique described above

is used to split this directly observable wage differential, I find that union representatives are paid around 10% less than non-unionized workers whereas the other unionized workers are paid equivalently or slightly more than non-unionized workers.

There are three main potential explanations for the large wage differential between union representatives and their co-workers: unobserved adverse selection (their unobserved ability is lower), compensating wage differential for the legal advantages they get from their situation (protection against layoffs and working discharges) and the non-cooperative strategic interaction they have with their employer. In the last part of section 2.3, I propose additional empirical tests that favor this last explanation.

Section 2.4 is a study of the union representatives' own opinions concerning the impact that their role of representative has had on their career. Their answers appear to be very much in line with the results obtained from the study of their wages and they are fully consistent with the wage penalty for union representatives being due to discrimination.

Section 2.5 starts with a series of additional pieces of evidence concerning the strenth of the job protection offered to union representatives. First, the average dismissal rate of union representatives is estimated and appears to be higher than the average dismissal rate in firms with more than 10 employees. Second, the union representatives with the lowest wages are also those with the highest estimated dismissal rate. These two results suggest that the lower wages for union representatives are not compensating a better job protection. Section 2.5 then provides a brief survey of the existing civil and legal procedures for "union discrimination" and of their functioning. It provides much anecdotal evidence on union discrimination and shows that more than one hundred French union representatives have sued their employer for discrimination since the end of the 90s. Hence, even if it is new to scholars, the question of union discrimination is certainly not new to lawyers or to unions themselves.

From the theoretical and empirical material presented in this chapter, I conclude in section 2.6 that one potential answer to our initial research question could be: workers are so reluctant to become union representatives despite all the apparent advantages they would get because if they do so, they would be rationally discriminated by their employer due to their role of bargainer.

2 Theoretical analysis

This theoretical analysis starts with a quick review of the theoretical literature on unions. A theoretical model that encompasses both the decisions to become a union member and to become a union representative and that details the subsequent possible actions and roles of these two types of workers is then presented. The literature review serves as an introduction for the theoretical model. Its main objective is to underline the aspects of union bargaining that may have been under-investigated and the possible missing bits in the current state of the art of the literature. The model then proposes an approach of firm-level bargaining that takes in account these possible missing bits. The model also serves as the basis for interpreting the results found in the empirical section.

2.1 Literature review

Labor economists devoted much effort to understand the determining factors of unionism and the impact of these institutions on wages, employment and welfare. This subsection provides a quick summary of the abundant theoretical literature on unions, from the earlier debates in the fifties between Dunlop and Ross to more recent contribution in the eighties that use median voter models (Atkinson and Stiglitz, 1980) or social custom models (Akerlof, 1980).

2.1.1 Dunlop versus Ross: the origin of a longstanding debate

As explained by Besancenot and Vranceanu (1999), modern union analysis usually draws on the classical study of Dunlop (1944). Dunlop was the first to argue

that unions, like other economic agents, maximize some objective function subject to various constraints. He favored as an objective the wage bill of the union members and considered two constraints: a standard labor demand function and a membership function which is supposed to be increasing with the wage rate and to reflect the union leaders' views concerning the willingness of the workers to become affiliated. The final wage can then be deduced from the maximization of the wage bill under these two constraints.

Ross (1948) challenged Dunlop's views and argued that "the wage policy of unions (...) is not to be found in the mechanical application of any maximization principle". "It is the beginning of wisdom in the study of industrial relations to understand that the union, as an organisation, is not identical with its members, as individuals", he said. Ross considered that the objective of unions, especially when not yet fully established, was to survive and grow. Accordingly, he argued that membership should be seen as the goal rather than the constraint, especially in open-shop firms where union membership is not mandatory when unions are recognized. In this context, the wage rate is drawn up by union leaders, so as "to harmonize the various pressures which are focused upon them in the bargaining process" (p. 43).

2.1.2 Following Dunlop: the neoclassical analysis of unions and wages

In the earlier neoclassical analysis of unions, a union was seen as a monopoly operating on the labor market. The main property of a monopoly firm is to operate alone on a given market and to be as a consequence price maker on the market. The profit-maximizing monopoly considers the demand function as given and maximizes its profit subject to this demand function. The monopoly union is supposed to operate in the exact same way on the labor market: it can set the price at which it sells its members. The firm(s) then adjusts its demand for labor as a function of the price of labor – the wage level – set by the union. The monopoly union will thus choose the wage level that maximizes its objective function subject to the labor demand function of the firm: when the union set the wage, it understands how the firm will respond.

The assumption that the union can set the wage unilaterally has been considered as too strong by many scholars. As written by Layard *et al.* (1991): "The union never gets what it wants. It bargains. Thus we reject an excessively simple model in common usage – the model of the monopoly union". Two major attempts have been made to model the bargaining between a union and a firm. First, the so-called right-to-manage model considers that the wage level is bargained in a first step between the union and the firm but that the firm remains entirely free to adjust employment in a second step. Second, the efficient bargaining model considers that the union and the firm bargain simultaneously both on wage and employment, so that the final outcome is Pareto-optimal (see Mcdonald and Solow, 1981 and Oswald, 1985 for a survey). The efficient bargaining model has also been adapted to include other potential dimensions of the bargaining such as working hours (see Cahuc and Zylberberg, 2004, for a survey of these last models). In all cases, the bargaining was modeled using the so-called "Nash bargaining", following the axiomatic approach developped by Nash (1950, 1953) and the new developments in game theory in the eighties that gave more serious microeconomic foundations to the outcome of the Nash bargaining (Rubinstein, 1982; Binmore *et al.*, 1986; Sutton, 1986). For example, the bargaining power of the negotiating parties is completely exogenous in the axiomatic approach whereas it is derived from economic parameters such as the preference for the present in the game-theoretical approach. However, the latter parameters remain usually difficult to measure and to put into the data and there is certainly room for improvement in our understanding of what determines the bargaining power of the different negotiating groups. There is also some room to adjust the firm's and union's outside options in the bargaining. The union outside option is often the workers' reservation wage or the amount of unemployment benefits whereas the firm outside option is often considered as being the zero-profit situation. But the union outside option can also be what the workers would get if they go on strike. On the firm side, Grout (1984) was the first to underline the fact that the bargaining can lead to under-investment by the firm because the union will capture part of the future returns to any investment made (see also Malcomson, 1997).

Another strand of the literature tries to understand the role of strikes in the

bargaining. The main problem faced by this literature is to understand how a strike can be Pareto-optimal *ex ante*. Workers going on strike are indeed hurting both their employer and themselves. If both parties are rational in a perfect information setting, they should therefore agree on the outcome of the strike *ex ante*, thereby avoiding the strike and its associated costs: this is the Hick's paradox (Hicks, 1963). To understand strikes, the literature has thus developed along two lines: first, under the hypothesis that workers are not rational and, second, under the hypothesis that there is asymmetric information. Ashenfelter and Johnson (1969) initiated the first line by developing a model in which the union has an *ad hoc* "concession schedule" that indicates the wage acceptable to union members after a strike of given length (see also Farber, 1978a). The second line followed the developments in repeated game theory (Rubinstein, 1982 *i.a.*). In models developed by Hayes (1984), Hart (1989), Card (1990), Crampton and Tracy (1992), Kuhn and Gu (1999), the firm has private information about its own profitability. In these dynamic models, the bargaining process enables the union to reveal information about the firm profit and the strike is thus *ex ante* Pareto-optimal. A recent experimental study by Tournade and Villeval (2004) has confirmed that information on the stake of the bargaining does play a role: the strike incidence is lower when there are information spillovers between comparable pairs of bargainers. However, unions do not exploit fully the information spillovers and their striking strategy is not necessarily Pareto optimal. Other motives, such as social comparisons and envy among unions also play a role.

There is finally a long standing debate on the union objective function. Dunlop considered that the most convincing objective function was maximization of the total wage bill of the membership. This is simply the product of the wage level and of the number of union members that are finally hired by the firm(s). An alternative trade union objective which is quite similar to maximization of the total wage bill is rent maximization (see Rosen, 1969; de Menil, 1971; Calvo, 1978). For example, de Menil assumes that the union cares about the real wage surplus, that is, the difference between the real wage bill in the union sector and that in the perfectly competitive sector. Then comes the utilitarian objective function which is simply the sum of the union members' individual utilities. Finally, the expected

utility approach considers that the union maximizes the expected utility of union members, that is, the weighted sum of their utility when they are employed and when they are unemployed, the weights being the share of union members being respectively employed and unemployed.

The study of the union objective function can arguably be considered as an old debate. To make some progress in the understanding of the union objectives, it is necessary to better understand why workers organize in a trade union and what their exact motives to do so are. This leads us to the theories that tried to understand the determinants of collective action.

2.1.3 Mancur Olson and the determinants of collective action

In his famous book *The Logic of Collective Action* (1965), Mancur Olson theorized the free-riding problem inherently associated with collective action. In open-shop contexts, that is, when the benefits of the collective action are not going to the union members only, there is an incentive for workers to free-ride and to benefit from the collective action without taking part in it and supporting the costs that would be incurred in that case.

In open shop countries such as France or in right-to-work states in the United States, why do some workers are unionized and pay union dues whereas they could simply be free-riders and benefit from the union contracts without getting involved? The literature has proposed two main types of explanations to solve this apparent paradox. First, according to the classical Olson explanation (Olson, 1965), if a large group exists, it must have formed either because membership is compulsory or because the group provides private goods and services accessible only to its members, with ancillary provision of the collective good as a "by-product". In open shop countries, we should thus observe that union members obtain specific advantages that are not going also to non-union members, even if contracts are supposed to cover both union and non-union members. An empirical literature has tried to measure if union members enjoy non official wage premiums. In the United States, studies by Blakemore et al. (1986), Schumacher (1999), Budd and Na (2000) and Eren (2008) find a membership wage premium around 10%. In contrast, Hildreth

(2000) and Booth and Bryan (2004) in Britain as well as Bunel and Raveaud (2008) in France do not find any wage premium for union members.

However, the specific advantages going to union members are not necessarily monetary gains. Drawing of the model of social custom developed by Akerlof (1980), Booth (1985) and Naylor (1989) developed models in which workers remain union members because they care about their reputation and because they would incur a reputation loss if they stop being union members in a context of high unionization. In such a case, being a union member is indeed a social custom, and not following the social custom is costly.

2.1.4 Following Ross: unions as political organizations

The earlier models such as the monopoly union model are based on the assumption of identical individuals and a fixed and exogenous membership level. Several attempts have been made to endogenize the decision to become a union member using social choice theory and the model of the median voter. In these models, unions are considered to be democratic organizations, with their leader elected by union members. The goal of the union leader is to be re-elected, which can be achieved by maximizing the utility of the median union member. This approach gives a good foundation for the objective function of a democratic union with heterogeneous members. Differences in union workers' preferences have been assumed to arise for various reasons, including for example age (Farber, 1978b), seniority (Grossman, 1983) or labour market outside opportunities (Booth, 1984). These differences can explain why some workers become union members and why some others do not. Consider for example that the union set a unique wage level for all union members, and that workers have different market opportunities outside the union. Then, only the workers whose market opportunities are lower than the union wage will be willing to join the union and the union membership thus depends on the wage level chosen by the union. The union thus set the wage level in order to maximize the utility of its median member under two constraints: (i) the labor demand function of the firm(s) as in the monopoly union model, (ii) a union membership function that determines the total membership for a given wage level and consequently the

nature of the median voter.

Even if it has some theoretical attractiveness, the median voter model is not applicable in most countries. To be valid, it requires the union to be both (i) a closed shop and (ii) a democratic organization. Two important traits of the French industrial relations system is that unionism is open shop and that unions are not democratic organizations, especially at the firm level. Indeed, as already said, firm-level agreements signed by union representatives cover all the workers in the firm and the union representatives are voluntary workers that are simply approved by their union to be in charge of the bargaining (see Figure 1). [3] In such a context, a median voter model cannot be used to understand the role of unions and the determinants of collective action.

Another drawback with the median voter model is that it requires the union leaders to be elected. This is rarely the case in practice. Even in the US, the country where the median voter model probably fits the best to the institutional settings, the union leaders are not necessarily elected at the local level. The presence of unions in firms results from a democratic process: the union needs to win a majority vote to be legally recognized. But union leaders themselves do not need to be elected.

Starting from Ross, early scholars have underlined the potential conflict of interests between union leaders and membership (see Berkowitz, 1954; Atherton, 1973). However, there are only very few attempts to model explicitly the role of union leaders. Pemberton (1988) proposes a version of the monopoly union model in which the union leadership sets the wage level that maximizes its own objective function. He supposes that the leadership's objective is simply to maximize membership. Besancenot and Vranceanu (1999) also develop a model in this vein[4]. Jones (1989) argues that delegation of authority to negotiators can be optimal if these negotiators have particular preferences such that even if they follow their own interest, they will also favor the other union members. This seems to apply mostly if the other union members or workers tend to have irrational behaviors that a rational negotiator could

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[3]The reader interested by a more complete description of French industrial relations system should read the second subsection of chapter 1.

[4]In their model, the union leadership maximizes its own payoff that depends positively and linearly on the unionization rate and negatively and quadratically on the number of union members.

Figure 1: Within firm industrial relations in 2004
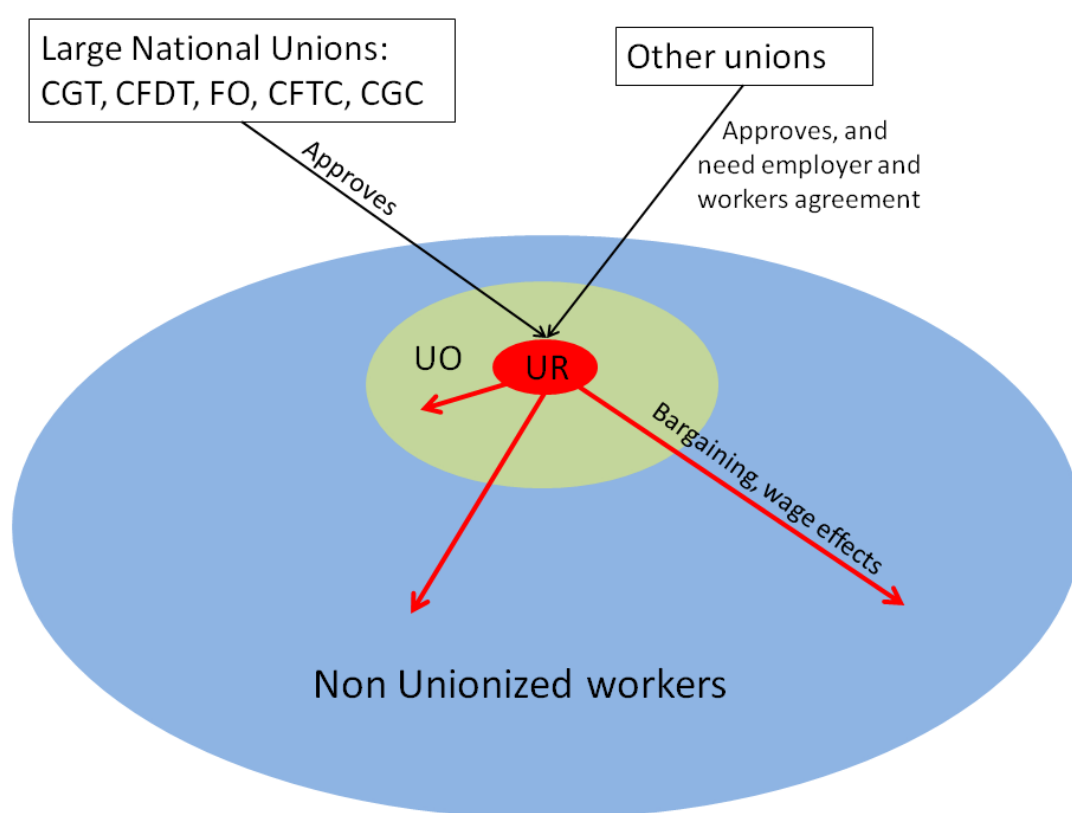
avoid. Finally, Faith and Reid (1987) develop a agency theory (with no model) of unionism and they discuss the potential agency problems that can emerge within union. In parallel to these few theoretical attempts, I am not aware of any papers that look empirically at the situation of union leaders.

Overall, the Dunlop neoclassical approach of unions had developed far more than the more political approach proposed by Dunlop. This is certainly because it conceives unions broadly as organizations that maximize an objective function under constraints and can thus be more easily translated into tractable models that can then be used in a wide variety of contexts (*e.g.* as building blocks in other models, see Pemberton, 1988).

2.1.5 What could be gained from a better understanding of within-firm bargaining and of the role of representatives?

The (very) few attempts to take into account the role of union leaders described above tend to conceive unions as bureaucratic organization. The leadership does not belong to a particular agent that maximizes his own utility function. Only Jones (1987) suggests that the individual preferences of the workers appointed as negotiators can play a role. The union leadership also appears to be broadly defined, so that it can apply to a wide range of situations. But the theories developed seems to be better suited for unions' top executives rather than for the several local-level union representatives that take at their charge the firm-level bargaining.

More precisely, what are the possible missing bits of the current theories of unions? First, union representatives are both bargaining with the employer and under his authority as salaried workers. It implies that the employer has some idiosyncratic power on the representative situation that he may use. Second, the representative's individual incentives are not automatically aligned on his coworkers' and agency problems within unions need to be considered carefully. In particular, usual political models from social choice theory (e.g median voter models) should not be applied to derive the incentives of union leaders.

The model presented in the next subsections builds on these two key ideas. The latter idea that consists in examining the agency and monitoring problems

that are likely to appear within unions has been underlined by Ross and a few scholars have proposed theories going in that direction. However, the idea that the bargaining within firms is asymmetric because the local union representatives are both negotiators and salaried workers has never been exploited (to my knowledge).

The model presented in the next section is also designed to fit well with the specific traits of the French industrial relations system and the following two main characteristics: (i) workers can become a union representative and bargain on a voluntary basis, (ii) firms are open-shop, so that firm-level collective agreements cover both union and non union members in the firm.

Nevertheless, these two features do not concern only France. The United-Kingdom for example is also open-shop and it seems that the designation of the local shop stewards that bargain in firms is not subject to a fully democratic process. Southern Europe countries such as Spain and Italy also share these features. However, the bargaining in "German" countries (Germany, Belgium, the Netherlands and Austria) and in Scandinavian countries (Sweden, Norway, Finland and Denmark)[5] appears more centralized, so that union bargainers have already quite a high position in the union and are not bargaining with their direct employer.

In the United-States, the bargaining is fully decentralized at the firm or plant level. However, it is submitted to a more democratic process, and union recognition is not just bounded to a single worker willingness to become a representative. Once a union has managed to organize a firm, it seems difficult for the employer to target the local union leader in order to avoid the union. Indeed, in that case, the recognized union has won a majority election and the representative gets a lot of support from his coworkers. If a company were to pay a union representative less, the union would use the law and the contractual grievance procedure to fight back. Since discrimination against the local union leader is unlikely to lead to the union withdrawal in the U.S. case, it seems to be just pointless[6]. However, in the U.S., there is a lot of evidence that anti-union policies and discrimination take place when a union tries to organize a firm (see Bronfenbrenner, 2009, for a recent study). Employers

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[5]see Slomp, 1998, for a classification of industrial relation systems between "German" and Scandinavian countries.

[6]The previous points derive directly from informal discussions with Chris Tilly, from UCLA.

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also discriminate against pro-union job applicants (Leap et al, 1990). Anti-union action on the behalf of employers is thus certainly not new. It seems to appear quite rational for employers to try to avoid unions. The best way of proceeding may thus vary from a country to another one, depending on the institutional context.

2.2   A theoretical model

A first attempt to integrate the specific role of union representatives in within-firm bargaining is now presented.

2.2.1   Idea

In countries with open-shop unionism (such as the UK, France and some US states), workers do not need to be union members to be covered by union contracts when a union is present in their firm. In these unionized firms, unions bargain with the employer for all workers in the firms. A few union representatives represent the unions on the job floor and are in charge of the negotiations. These representatives are designated among a pool of potential candidates.

This subsection complements some of the standard bargaining models used in labor economics or industrial relations to include both the specific role of the negotiators (the union representatives) and the role of the unionized workers. Both the workers decision to become a union member and to become a candidate to be a union representative are endogenous.

The interaction between a union representative and his employer can be best understood using the tools offered by the theory of games. On the one hand, the employer can try to buy out the representative by offering him monetary or non-monetary advantages in exchange for social peace or at least a less tough bargaining. On the other hand, the employer might also try to discourage unions by making their representatives' lives particularly difficult. The final outcome (cooperation or not between employers and union representatives) should depend on the stake of the bargaining, on the potential bargaining power of the workforce and on its capacity to monitor the union representative's actions. The union representative as a negotiator has access to crucial information on the situation of the firm and

on the potential willingness of the employer to accept workers' demands. He will be able to use this informational advantage to extract a share of the firms' rents at the expense of the other workers. However, the union representative is also at the mercy of his employer as a salaried worker. This idiosyncratic power of one of the bargaining groups on the negotiator of the other group is a particular feature of intra-firm bargaining that needs to be considered carefully. Employers might have the power to avoid bargaining by specifically targeting the union representatives.

The classical study of the determinants of unionization (Olson, 1965) can then be rethought once both the agency problem arising from the asymmetric information between the workers and their representative and the discretionary power of the employer on the representative have been accurately understood. When unionism is open shop, workers might be willing to become union members for two (economic) reasons: it would increase the bargaining power of their representative and thus their own share of the firm's rents and it would be a way to monitor what is done by the union. Unionization in an open-shop context might thus be explainable without invoking (as is usually done) the specific advantages going to union members (Olson, 1965) or a social custom (Akerlof, 1980). Conversely, the absence of unions could be explained, not by the classical free riding phenomenon, but by the higher cost that the employer might threat to inflict on the bargainers.

2.2.2 Framework

We consider a given firm that lives infinitely. Each year, the following sequence occurs:

- **Step 0:** The firm draws a random profit flow Π according to a given distribution.

- **Step 1:** Workers decide to be unionized for the year or not. μ is the proportion of unionized workers.

- **Step 2:** Some workers may want to become union representative and to bargain for all the other workers in the firm. If there is more than one candidate,

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one is picked up randomly[7].

- **Step 3:** If there is a representative in the firm, bargaining occurs between the employer and the union representative. The representative can choose two strategies:

  - In the so-called "red strategy", he does his job properly and bargain for all his coworkers with the employer. In that case, a Nash bargaining occurs and the representative's bargaining power is equal to the proportion of unionized workers μ.

  - In the so-called "yellow strategy", the representatives does not bargain and the wage level remains unchanged. Crucial in the model, the employer has some power over the representative's utility: he can inflict him a specific cost or benefit, depending on his strategy.

- **Step 4:** Unionized workers may protest if they find the bargained wage not satisfactory. In that case, they take at their charge the bargaining and all workers get the bargaining wage, as it is the case with the "red strategy". The union representative is dismissed and he is not in charge of the bargaining anymore. He may leave the firm or stay and incur a social punishment.

  We suppose that unionized workers never protest if the representative has adopted a red strategy and have a probability $p(\mu)$ to protest and reinstate the red strategy when the yellow strategy was initially chosen by the union representative. $p(\mu)$ is increasing in μ: a larger share of unionized workers increases the probability that workers react.

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[7]In practice, there can be more than one union representative in French firms. In this model, we ignore the complications implied by multi-unionism and we deliberately focus on the single-unionism case. Allowing more than one union representative in the model would not change our results providing that all representatives behave the same way. The case where different union representatives are allowed to behave differently is however beyond the scope of the model.

2.2.3 Utility functions and payoffs

A firm is composed of n homogenous workers regarding their tastes and productivity with reservation wage $\bar{w}$. Let us denote by w the final wage rate in the firm. w is identical for all workers in the firm. If there is no union representative, w is set unilaterally by the employer to the workers' reservation wage: $w = \bar{w}$. If there is a union representative but the union representative does not bargain (yellow strategy), workers also get paid the reservation wage $w = \bar{w}$. Otherwise, w is the result of a Nash bargaining between the employer and the union representative.

Workers can engage in collective action at each period, either becoming unionized (step 1), or becoming representative (step 2). There are thus 3 types of workers: non unionized workers, "only unionized" workers, and union representatives.

We suppose that utility functions are linear in the wage rate. Workers may also have long-term career perspectives in their working firm. These career perspectives derive from the implicit contract between them and their employer. Hence, the utility function of a non-unionized worker is simply $U^{nu} = w + v$, where v represents the value of the implicit contract between non-unionized workers and their employer.

This implicit contract corresponds to the positive relationship between wages and seniority which cannot be accounted for by accumulation of human capital – either firm or non-firm specific. Such a positive relationship is found empirically (*i.a.* Abraham and Farber, 1987; Topel, 1991). It is theoretically motivated by agency problems for efficiency reasons (see Lazear 1979, 1981), as it is described for example in the well known "shirking model" (Harris and Holmstrom, 1982). In our model, we do not legitimate the existence of a dynamic implicit contract. Instead, we draw on the abundant existing litterature to suppose that such a contract is optimal. We call v the present value of the implicit contract for the worker and we suppose that there is a loss of efficiency for the employer not to offer the implicit contract to workers.

Worker i simply has to pay a cost c_i to become a union member. We suppose that c_i is heterogenous across workers and distributed uniformely between c_1 and

c_2. This heterogeneity cannot be implied by union dues. However, it may reflect political views: in addition to its bargaining role, a union is often politically oriented, and the effort to join the union should be lower for workers who are *ex ante* closer to the union political identity[8]. We also consider that the decision to become a union member is not directly observable by the employer and that union members benefit from the same type of implicit contract than non-union members. Thus, for unionized worker i, we have $U_i^{uo} = w + v - c_i$, with $c_i \sim U([c_1, c_2])$.

However, the employer directly observes the union representative since he bargains with him. As a consequence, the employer can offer to the workers an implicit contract that is conditional on not becoming a union representative. In that case, he deprives the representative from the implicit contract and incurs an efficiency loss ϵ. The employer can also buy immediately the representatives and offer them a bribe $b \geq 0$ depending on their strategy. The representative's utility is then simply $U^r = w + v + b$ if the implicit contract is maintained, and $U^r = w + b$ if it is not. Discrimination toward the representative occurs if $b = 0$ and if v is not maintained. This way of modeling the positive/negative discrimination that the employer can offer/inflict to representatives reflects the fact that the employer cannot afford to immediately cut a representative's wage, due to anti-discrimination laws (see section 5). However he can offer him a worse career perspective without being easily sued for discrimination. Our modeling choice also put a natural upper bound on the discrimination: the representatives cannot lose more than the value of the implicit contract. However, representatives can be bought instantly and there is no upper bound on the premium they can get. The key aspect of the model remains that the employer can discourage workers to become a union representative for a small cost.

Representatives may also enjoy additional benefits due to their working discharge, to the protection they get against layoffs, to the informational rent they

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[8]This argument can also apply to union representatives: workers may incur a specific cost or benefit that varies with their political identitity when they become a union representative. Such a refinement is not necessary to provide the main intuitions of the model. Nevertheless, the consequences of an extension of the model along these lines are discussed latter on.

have or to the higher social status they can get from their position. They may also have to pay the cost to be unionized. To keep the model as simple as possible, these aspects are ignored at this stage.

2.2.4 Bargaining and monitoring

Each period, we define the profit flow Π by the quasi-rent available in the firm. Π corresponds to the firm's profit when all workers are paid their reservation wage. We denote $\pi = \Pi/n$ the quasi-rents per worker.

At step 3, a Nash bargaining occurs between the employer and the union representative on the current profit flow. The workers' outside option is equal to the total wage bill if they were paid their reservation wage. The employer outside option is zero profit. v represents future benefits and does not appear in the bargaining of current profits. By definition, the employer maximal surplus is Π and is obtained when workers get $\bar{w}$.

A standard bargaining (Nash 1953; Rubinsten 1982) consists in maximizing the product of the employer's and the workers' surplus respective to their threat points:

$$\arg\max \left[n(w - \bar{w})\right]^{\mu} \left[\Pi - n(w - \bar{w})\right]^{1-\mu}$$

The result of such a bargaining is as follows: the workers get the wage rate $w = \bar{w} + \mu\pi$ and their surplus respective to their outside option is $\mu\pi$, the firm final payoff is $(1 - \mu)\Pi$.

We would like to take explicitly into account the fact that the bargaining occurs privately only between the union representative and the employer. We suppose that this private bargaining occurs as follows: the union representative can either bargain the wage rate $w = \bar{w} + \mu\pi$, or he can refuse to bargain and all workers would get $w = \bar{w}$. The employer offers $b \geq 0$ to the representative if he cooperates. It is clear that the employer has never interest to bribe a fighting union representative. First, the bribe is a direct cost for the employer. Second, it also increases the bribe that is necessary to obtain the representative's cooperation. Third, it increases the probability to have a representative in the firm, which necessarily generates

additional costs for the employer. We thus immediately consider that the bribe associated with a red strategy is 0.

If the collusion between the employer and the representative is discovered, the representative is dismissed. He may exit the firm or stay. In all cases, we consider that he gets back his outside option and gets zero surplus. If he stays in the firm, he does not recover the value of the implicit contract v if he has lost it. His coworkers also have a retaliation power on him, so that his utility is brought back to his outside option level $\bar{w}$ even if a bargaining occur[9]. Finally we also suppose that the union representative keeps his premium b even if he gets dismissed [10]. The representative surplus (respective to $\bar{w}$) in case of collusion is thus b, whether or not collusion is discovered.

2.2.5   Solution of the one period game

We solve (by backward induction) the one period game in the case where the employer does not offer the implicit contract to the union representative. In that case, the employer incur a small sunk cost $\epsilon \geq 0$ due to efficiency loss. We suppose to simplify the exposition that the employer cannot credibly distinguish between the fighting and the cooperative union representatives and only deprive the fighting representatives from their implicit contract[11]. The tree of the game and players' payoffs are summarized in figure 2.

We discuss in the next subsection the conditions under which the employer's strategy that consists in discriminating against the representatives is sustainable in a repeated game environment.

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[9]This assumption simplifies the calculations: we suppose that the representative is covered by collective bargaining so that his particular wage does not alter the employer payoff in the Nash bargaining problem. He is however brought back to his outside option if he leaves the firm or accept to endure a social punishment.

[10]Whether or not the representative loses b if collusion is discovered does not change fundamentally the results.

[11]Since the cooperative union representative receives a bribe anyway, the outcome of the game would not change fondamentally if we allow him to keep his implicit contract. Our assumption is thus just a simplifying normalization. However we believe that it is more natural: once a worker has "betrayed" the terms of the implicit contract and became a union representative, he may be bribed by the employer as long as he is in charge of the bargaining. However, once he is not anymore, there is no clear reason why he should keep his implicit contract.

Figure 2: Game tree and players' payoffs
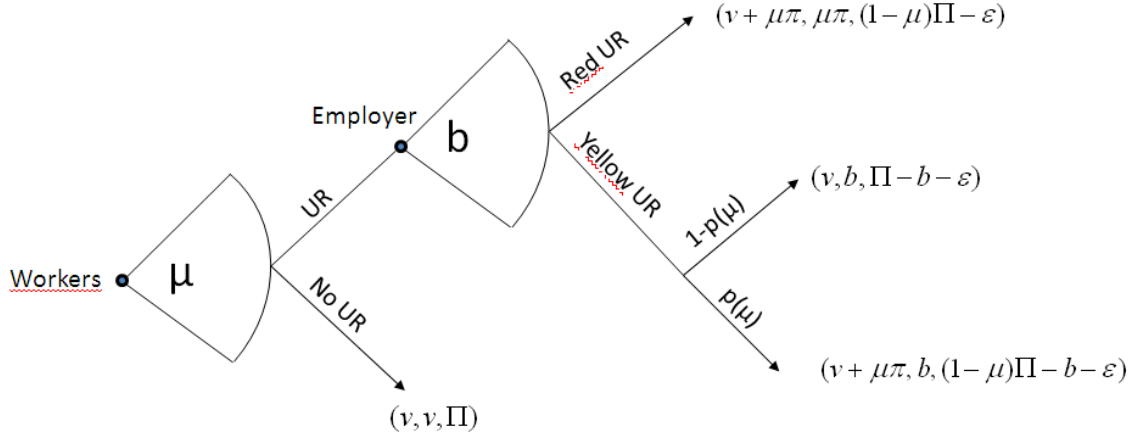
Lecture: UR stands for Union representative. Payoffs are given in the following order: (non unionized workers, union representative, employer). Union member i simply pays an additional cost c_i respective to the non-unionized workers. For workers, payoffs are given respective to their outside option $\bar{w}$.

- **At step 3:**

  Once a worker has chosen to become representative, he will cooperate with the employer if and only if the payoff under the yellow strategy is higher than his payoff under the red strategy, that is if $\mu\pi < b$. Conversely, the employer will be willing to cooperate if and only if his profit under the yellow strategy is higher than his profit under the red strategy, that is if $b < (1 - p(\mu))\mu\Pi$.

  Cooperation will thus occur if and only if the employer can set b such that the two conditions above are verified. Combining these conditions, we get that cooperation can occur if and only if $\mu\pi < (1 - p(\mu))\mu n\pi$, that is if:

$$p(\mu) < 1 - 1/n$$

  For a given μ, the probability of cooperation increases with firm size. This reflects the fact that the incentive for the employer to buy a representative is higher when the representative has more leverage, that is, when he can bargain for a potentially large number of workers. However, the probability of cooperation is independent from firms' quasi-rents per worker. Larger quasi-

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rents give an incentive to the employer to buy the representative, but they also give an incentive to the representative to fight since he will in this case get his share of the quasi-rents. The two effects cancel out, so that only the scale factor – firm size – remains. Finally, a larger μ lowers the opportunity of cooperation: when the union representative is accurately monitored by his coworkers, cooperation gets too risky.

The employer will simply set b to minimize its costs. He offers to a yellow representative the minimal premium necessary to buy him under the constraint that this premium would not cost more than entering into a Nash bargaining with the representative:

$$b = min(\mu\pi, (1 - p(\mu))\mu n\pi)$$

- **At step 2:**

  At step 2, workers decide if they want to become a union representative. Their decision does not depend on what happens at step 3. Indeed, at step 3, the employer adjust b such that the representative is just indifferent between the yellow and red strategies.

  If the red strategy is to happen at step 3, workers will be willing to become a union representative if and only if their share of the bargained profits compensate for the loss of the implicit contract. If the yellow strategy is to happen at step 3, workers will be willing to become a union representative if the bribe compensate for the loss of the implicit contract. In both cases, the condition for having a union representative is:

$$\mu\pi > v \Leftrightarrow \mu > v/\pi \tag{1}$$

  There will be a representative in firms with a sufficiently large amount of quasi-rents per worker and with a sufficient share of unionized workers. If the proportion of unionized worker is too low, then the representative will have no bargaining power and he will not be able to extract a sufficient amount of

profits to compensate the loss of his implicit contract with the employer. For a given value of v, the final outcome will thus depend on the proportion of unionized workers and of the profit flow per worker π.

Figure 3 illustrates the different possible configurations when π and μ vary. $\mu_0 = p^{-1}(1 - 1/n)$ denotes the minimum unionization rate necessary for a fighting representative.

Figure 3: Presence and strategy of the union representative as a function of the proportion of unionized workers and of the profit flow per worker
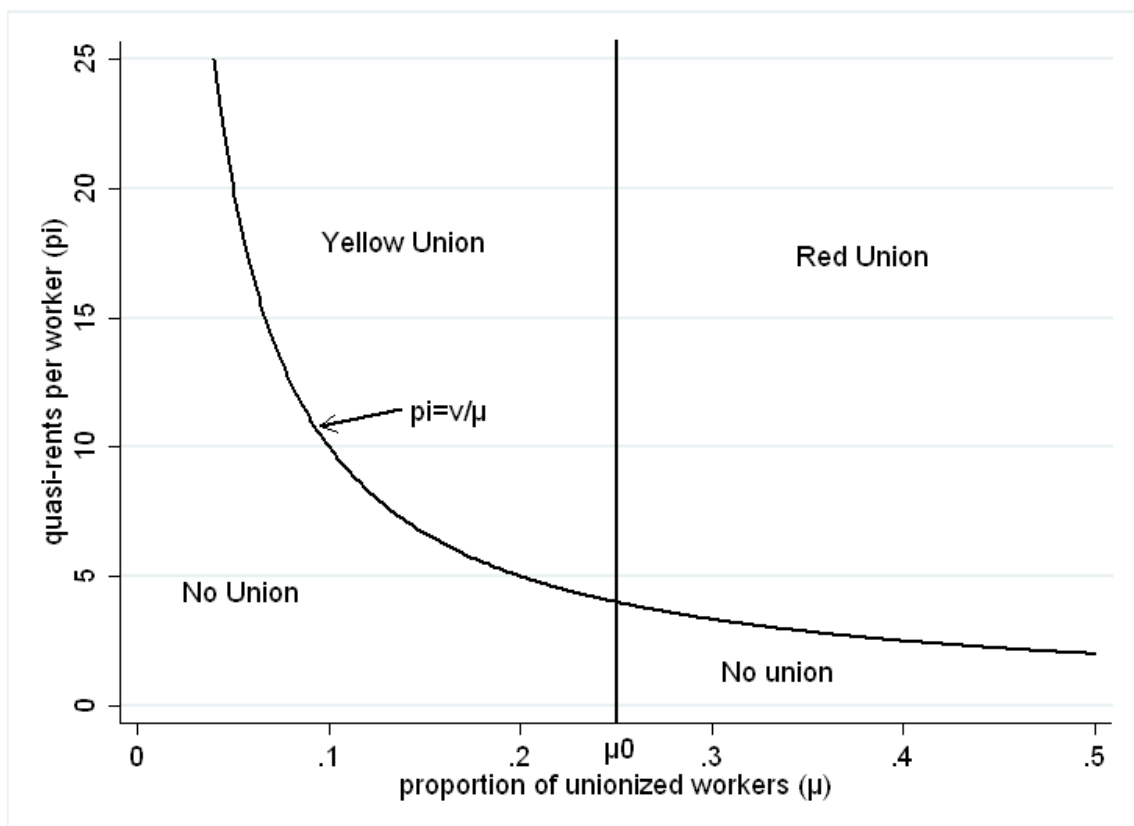
Lecture: When the profit multiplied by the proportion of union members is smaller than the value of the implicit contract, there is no union representative and thus no union in the firm. Otherwise there is a union and the union representative's strategy depends on the unionization rate μ: the representative will fight as long as μ is larger than μ_0.

- **At step 1:**

    Gain to become a union member as a function of μ:

A worker that decides to become a union member will increase the unionization rate by $1/n$. He will thus increase the union bargaining power μ by $1/n$ and the workers' reaction capacity $p(\mu)$ by $p(\mu + 1/n) - p(\mu)$. We consider that n is large enough so that we can take a first order approximation of the latter term: $p(\mu + 1/n) - p(\mu) \approx p'(\mu)/n$. Consequently, the gain g to become a union member is:

$g(\mu) = \pi/n$ if $\mu > v/\pi$ (there will be a union representative) and $\mu > \mu_0$ (the red strategy is to happen).

$g(\mu) = (p(\mu) + \mu p'(\mu))\pi/n$ if $\mu > v/\pi$ (there will be a union representative) and $\mu < \mu_0$ (the yellow strategy is to happen).

When the unionization rate reaches v/π, the firm switches from the non-union to a union configuration. Consequently, the individual decision to become a union member affects the final configuration of the firm for a unionization rate equal – or sufficiently close – to v/π. If $v/\pi < \mu_0$, the gain to become a union member at $\mu = v/\pi$ is thus equal to the gain from switching from the non-union to the *yellow* union configuration, plus the gain in bargaining power and reaction capacity that one additional union member brings in the yellow union configuration[12] (see the expressions given in the prevous paragraph). If $v/\pi > \mu_0$, the gain to become a union member at $\mu = v/\pi$ is equal to the gain from switching from the non-union to the *red* union configuration, plus the gain in bargaining power and reaction capacity that one additional union member brings in the red union configuration.

When the unionization rate is equal to μ_0, with $\mu_0 > v/\pi$, the firm switches from the yellow union configuration to the red union configuration and the individual gain from unionization at this point is the sum of the absolute gain from switching from yellow to red union plus the marginal gain in bargaining

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[12]The gain in bargaining power and monitoring capacity from one additional union member should actually be omited for a worker that moves the unionization rate from below v/π to exactly v/π when he becomes a union member. It should however be included for a worker that moves the unionization rate from just below v/π to above v/π when he becomes a union member. For simplicity, we neglect these additional refinement and consider that workers at switching points benefit from the marginal gains derived from their membership under the new configuration.

power brought by an additionnal union member under a red union.

Unionization rate at equilibrium:

A given unionization rate μ is an equilibrium if and only if for this value of μ, no worker wants to switch from union member to non-union member or vice versa. Let us call F^{-1} the inverse Cumulative Distribution Function (CDF) of the unionization costs. We can characterize equilibrium solutions as follows:

Proposition 1: Characterization of the equilibrium unionization rates

- **No union trap:** $\mu^* = 0$ is always an equilibrium if one union member is not sufficient to ensure the presence of a union representative, that is, if $\pi/n < v$.

- **Interior solutions:** for $\mu^* \in]0, 1[- \{v/\pi, \mu_0\}$, μ^* is an equilibrium solution if and only if $g(\mu^*) = F^{-1}(\mu^*)$ and $\frac{\delta g(\mu^*)}{\delta \mu} < \frac{\delta F^{-1}(\mu^*)}{\delta \mu}$.

- **Corner solutions:**

  • if $v/\pi < 1$: $\mu^* = 1$ is an equilibrium if and only if $g(1) \geq F^{-1}(1)$.

  • if $v/\pi < \mu_0$: $\mu^* = \mu_0$ is an equilibrium if and only $g(\mu_0) \leq F^{-1}(1)$ and $\mu_0(1 - p(\mu_0))\pi + g(\mu_0^-) \geq F^{-1}(\mu_0)$ with $g(\mu_0^-) = \lim_{\mu \to \mu_0^-} g(\mu)$.

  • if $v/\pi < \mu_0$: $\mu^* = v/\pi$ is an equilibrium if and only if $g(v/\pi) \leq F^{-1}(v/\pi)$ and $p(v/\pi) * v \geq F^{-1}(v/pi)$

  • if $v/\pi \in [\mu_0, 1]$: $\mu^* = v/\pi$ is an equilibrium if and only if $g(v/\pi) \leq F^{-1}(v/pi)$ and $v \geq F^{-1}(v/pi)$.

Proposition 1 simply reflects an adaptation to our specific context of more general results of public good provision. Formally, we have a n players game. Players decide on paying heterogenous costs to contribute to the provision of a public good – which is in our case a mix between bargaining power and monitoring of the union representative –. We naturally have free-riders (non unionized workers) and multiple Nash equilibria. Proposition 1 simply characterizes the Nash equilibria by the proportions of unionized workers for which there can be no workers willing to swicth from union member to non-union members or vice versa. Interior solutions can be more easily characterized

since both the cost and gain functions are continuous at these points. For interior solutions, there is only one distribution of workers across union and non-union members that actually corresponds to a Nash equilibrium. This distribution corresponds to the case where workers with the lowest unionization costs always become union members first.

Figure 4 illustrates the possible interior solutions for two different functions $p(\mu)$. We assume on figure 4 that workers with the lowest unionization costs become union members first.

On the top panel, for an initial $\mu \in [0, v/\pi[$, there is no gain to become a union member for any worker and union members have interest to become non-unionized. The firm converges towards $\mu = 0$. For $\mu \in [v/\pi, \mu^*[$, there are non-unionized workers who would gain from unionization and the unionization rate increases to reach μ^*. For an initial $\mu \in]v/\pi, 1]$, there are unionized workers who would gain from becoming non-unionized and the unionization rate decreases to reach μ^*. Providing that the workers with the lowest unionization costs are the union members, no worker has interest to switch from union to non-union member or vice-versa at μ^*.

On the down panel, the firm will converge to μ^* for any initial value of μ that is initially higher than μ_C. We thus have 2 possible equilibria: one with no union and no unionized workers and one with a few unionized workers and a yellow union representative. The function $p(\mu) = 1 - (1-p)^{n\mu}$ (with $p = 0.2$) chosen in the down panel can be microfounded: it corresponds to the case where each union member has an equal probability p to react and dismiss the union representative.

Figure 4: Determination of the proportion of unionized workers: 2 examples of interior solutions
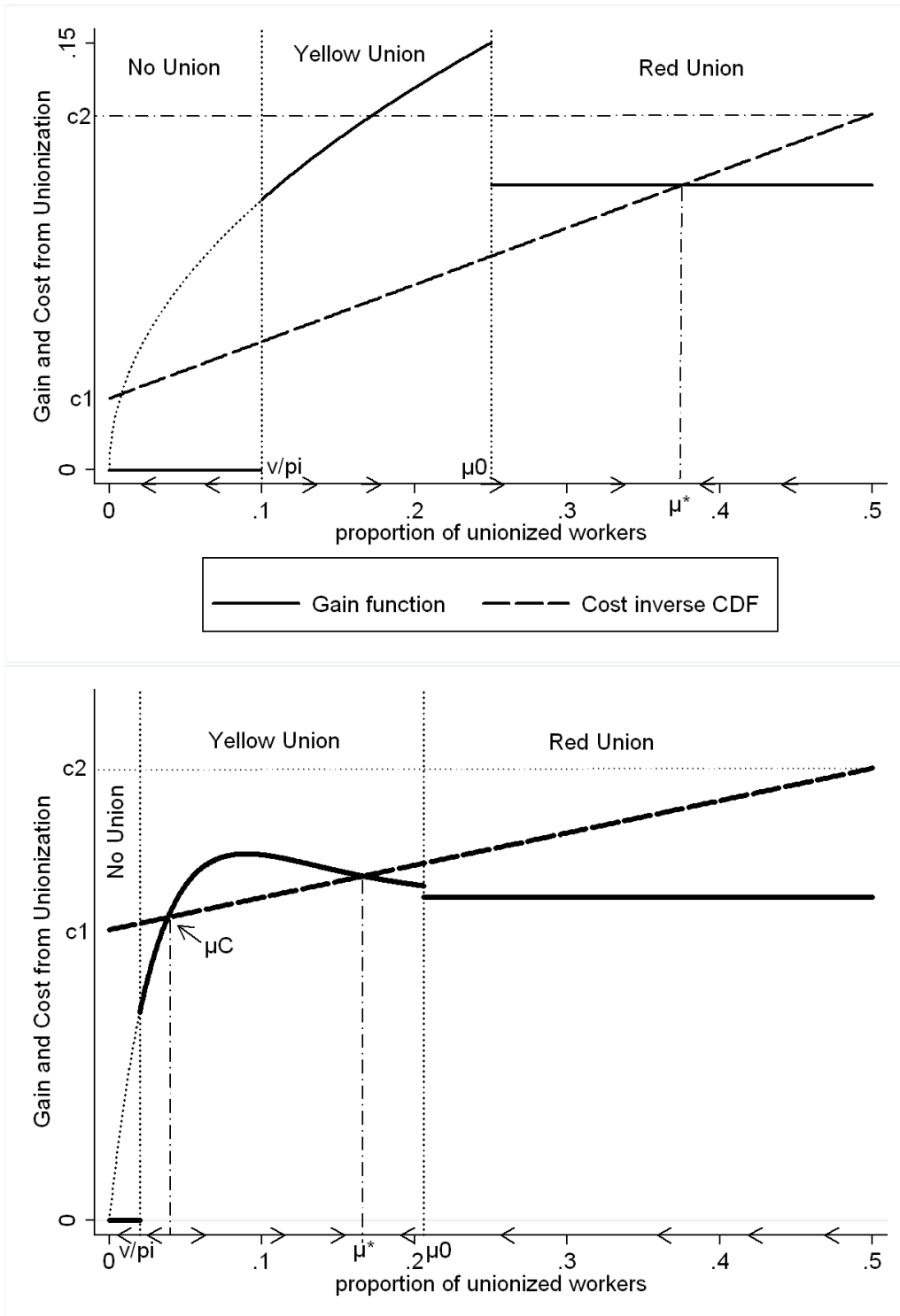
Notes: CDF: Cumulative Distribution Function. Parameters' values: $v = 1$ and $n = 100$ in both panels. In the top panel, $\pi = 10$ and $p(\mu) = 2\sqrt{\mu}$. In the down panel, $\pi = 50$ and $p(\mu) = 1 - (1 - 0.2)^{n\mu}$.

Lecture: When the gain from unionization is higher (resp. lower) than a worker's individual cost, this worker becomes union member (resp. non union member) and the unionization rate increases (resp. decreases).

Remember that the corner solutions are switching points, that is points where the workers decision affect the final configuration of the firm (no union, yellow union or red union). The gain to become a union member at this points is equal to the gain from switching from a configuration to another one, plus the usual marginal gain in bargaining power or reaction capacity that one additional union member brings in the new configuration. In addition, if an equilibrium exists at a swiching point, the discountinuity of the gain function implies that many distributions of the workers across union and non-union member can be sustainable at equilibrium. The equilibrium is thus not unique in that case.

2.2.6 The equilibrium unionization rate as a function of profit flows

We now discuss how evolves the proportion of union members μ when (π/n) varies. Since F is the CDF of a uniform distribution between c_1 and c_2, we have $F^{-1}(\mu) = c_1 + (c_2 - c_1)\mu$.

We first describe interior solutions:

- If the red strategy is to occur, that is if $\mu \in] \max(v/\pi; \mu_0), 1[$, the equilibrium μ^* is given by:

$$\pi/n = c_1 + (c_2 - c_1)\mu^* \Leftrightarrow \mu^* = ((\pi/n) - c_1)/(c_2 - c_1)$$

- To provide the equilibrium μ as a function of (π/n) under the yellow strategy, we consider the particular case in which $p(\mu) = 2\sqrt{\mu}$ (see top panel of figure 4).

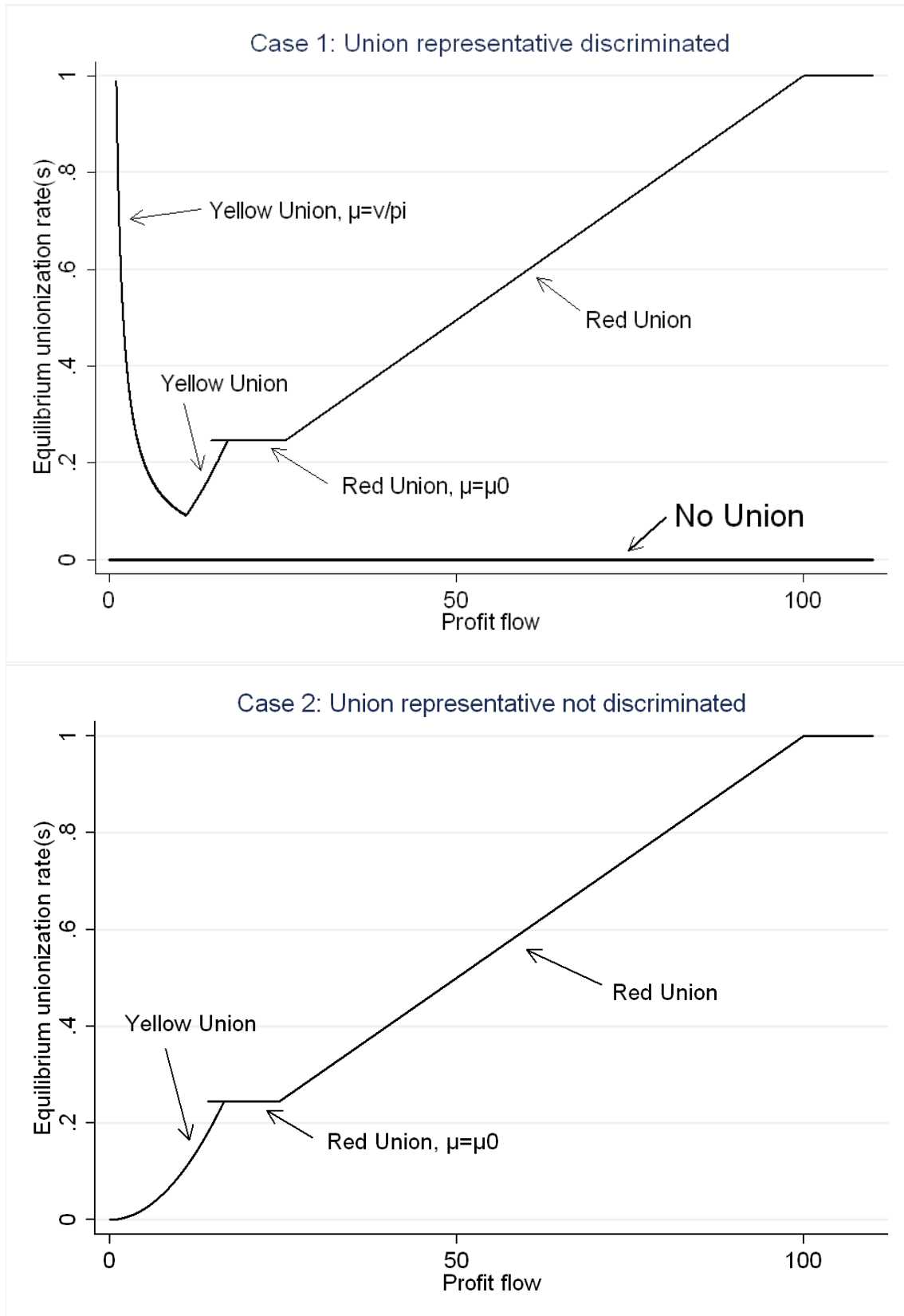Under the yellow strategy, that is if $\mu \in]v/\pi, \mu_0[$, the equilibrium μ is given by:

$$3\sqrt{\mu}(\pi/n) = c_1 + (c_2 - c_1)\mu \Leftrightarrow \mu^* = \left(\frac{3(\pi/n) + \sqrt{9(\pi/n)^2 - 4c_1(c_2 - c_1)}}{2(c_2 - c_1)}\right)^2$$

The existence of corner solutions for a given value of π can be tested using the conditions given in proposition 1. We do not present the calculations. However, the

top panel of figure 5 gives the different possible equilibria when the cost function is a standard uniform distribution (*e.g.* $c_1 = 0$ and $c_2 = 1$). Both corner and interior solutions are possible. $\mu = 0$ is always an equilibrium and $\mu = 1$ is an equilibrium for $\pi \geq 100$. There is in general one equilibrium other than 0. But for π very small (smaller than 1), 0 is the only equilibrium. Then, the non-zero equilibrium is a continuous function of π. It is first decreasing when $\pi < 10$. That can be explained easily: when π is small, the minimum unionization rate necessary to get a union representative in the firm (v/π) is a binding constraint. Since this minimum unionization rate is decreasing with π, so is the equilibrium unionization rate. When π gets higher, some workers are willing to become union member at $\mu = v/\pi$ in order to increase their payoff, and the equilibrium departs from v/π. The non-zero equilibrium unionization rate is then increasing. For π close to 20, 2 equilibria other than 0 coexist: one of them is an interior solution under yellow union representative, the other one is $\mu = \mu_0$. Then, when π gets large, the non-zero equilibrium necessarily corresponds to a red union representative. It increases linearly until it reaches 1.

Figure 5: Equilibrium unionization rate(s) when the profit varies

Case 1: Union representative discriminated

Yellow Union, μ=v/pi

Red Union

Yellow Union

Red Union, μ=μ0

No Union

Case 2: Union representative not discriminated

Yellow Union

Red Union

Red Union, μ=μ0

Notes: Parameters' values: $c_1 = 0$, $c_2 = 1$, $v = 1$ and $n = 100$ in both panels. In the top panel, the worker who becomes a union representative looses the value of the implicit contract v. In the down panel, he does not.

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2.2.7 The one period game with no discrimination:

We have now solved the one period game when the employer "discriminate" against the union representative, that is when he deprives the representative from the implicit contract. What happens if the employer does not discriminate against the representative?

In that case, the condition $\mu\pi > v$ necessary for the presence of a union representative disappears and there is always a representative in the firm (since it is costless to become a representative). The determination of the yellow and red equilibria strategies are unchanged, *e.g.* there is a red union representative if and only if $\mu \geq \mu_0$. The down panel of figure 5 shows the possible equilibria for the unionization rate when the union representative is not discriminated. For large values of π, these equilibria are identical to those obtained under discrimination. However, for low values of π, the equilibrium(a) unionization rate is small and increasing with π. Since the constraint $\mu > v/\pi$ does not exist anymore, workers that coordinate on a low unionization rate will still have a representative. A last crucial point is that $\mu = 0$ is not an equilibrium anymore. Since there will always be a union representative, the first worker to become a union already obtain some gain from its membership. As long as there are workers with a low unionization cost, there will be at least a small proportion of union members in the firm to monitor the union representative and increase his bargaining power.

More specifically, the equilibrium unionization rates depicted on figure 5 depends on the value of our parameters. The fact that 0 is never an equilibrium when the representative is not discriminated comes from the fact that $c_1 = 0$ (there is at least one worker who pays nothing to become a union member) and from the fact that even under the yellow strategy, the first union member already brings some monitoring and bargaining power. For other functions $p(\mu)$, there could be a segment $[0, \pi_0]$ on which $\mu = 0$ is the only equilibrium. However, we still have the following proposition:

Proposition 2: In the absence of discrimination against the representative and as long as $p(\mu)$ is continuous, the graph of the possible equilibrium unionization rates lower than μ_0 as a function of the firm's profit is a connected graph[13].

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[13]In the case where there is only one possible equilibrium lower than μ_0 for any given value of

Proposition 2 derives trivially from the continuity of the gain function for union members if the union represetive adopts the yellow strategy. Even its formulation is very theoric, proposition 2 has a simple meaning: in the absence of dicrimination, the unionization rate can adjust continuously to the current profit level and the equilibrium with no union members, when it exists, is not anymore separeted from other possible equilibria.

2.2.8   Repeated game and discrimination in the long run

What is the interest for an employer to penalize a union representative and to pay the cost ϵ associated with the removal of the representative's implicit contract?

There are two possible reasons. First, discriminating union representatives in high profit periods will discourage workers to become union representative in low-profit periods. The discrimination in high profit periods (*e.g.* when there will always be a representative providing there is a few unionized workers) enables the employer to save its profits in low profit periods. Second and far more crucial, $\mu = 0$ is a "no-union" trap under discrimination, meaning that workers can get stuck to this equilibrium, even in high profits periods. That is the key point of discrimination: the potential penalty for union representatives renders necessary a minimum number of union members to actually have a representative. If there are initially no union members in a firm, coordination problems make it impossible for the union to organize the firm since a minimal threshold in union membership needs to be reached in order to have a worker willing to become a representative. That is not the case without discrimination: the representative can come freely, and the unionization rate then adjusts year by year depending on the current profit flow. When profits are high, more workers pay the cost to join the union whereas the opposite happens when profits are low. In all cases, the fact that the graph of equilibrium unionization rates when the profit varies is connected ensures that the firm cannot remain stuck in a no-union trap in high profit period. That is the key idea behind proposition 2.

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the firm's profit, the proposition is equivalent to say that the function that gives this equilibrium is continuous in the firm's profit.

Let us formalize this idea: suppose that the profit flows per worker π at each period are equal to π_0 with probability p_0 and to 0 otherwise. Suppose to simplify that the non-zero equilibrium unionization rate when $\pi = \pi_0$ is equal to 1, both with and without the representative being discriminated. Assume that workers are not forward looking: they take their decision only on the ground of current profits[14]. Suppose finally that at the beginning of the game $\mu = 1$. Then the employer's payoff without discrimination is 0: the unionization rate will be 1 when $\pi = \pi_0$ and 0 when $\pi = 0$ and it will adjust instantly from one period to the next one. Under discrimination, the unionization rate falls to 0 as soon as a null profit is drawn and it remains equal to 0 afterwards. Denoting by r the actualisation rate, we can calculate easily that the overall cost C of the discrimination strategy is:

$$C = p\epsilon + p^2(\epsilon + r\epsilon) + p^3(\epsilon + r\epsilon + r^2\epsilon) = \epsilon \sum_{k=1}^{\infty} (p^k \sum_{i=1}^{k} r^i)$$
$$= \frac{(rp^2)\epsilon}{(1-p)(1-pr)}$$

In parallel, the gain G from the discrimination strategy is:

$$G = (1-p)\frac{r\pi_0}{1-r} + (1-p)^2 \frac{r^2\pi_0}{1-r} + ... = \frac{(1-p)r^2\pi_0}{(1-r)(1-(1-p)r)}$$

We see immediately that for values of ϵ reasonably small, discrimination is the best strategy for the employer.

2.2.9 Concluding remarks

The results in a nutshell:

The model presented here includes in a single framework the determinants of collective action and their potential effects or dysfonctionning. As far as we know, it is the first to model both the decisions to become a union member and to be-

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[14]This is the case if they do not know the profit distribution and have adaptative anticipations, thinking at each period that the same profit flow will come in the next period. If the hypothesis that workers are not forward looking is relaxed, the resolution become far more complicated, but the intuition remains.

come a union leader. A key aspect of the model is that the employer can easily adopt an anti-union behavior by targetting the workers that are the most visible and important in the union, that is, the workers that are in charge of the bargaining. The model underlines that such anti-union policy increases again the problem of coordination in collective action: in addition to the free-riding problems among union members in an open-shop context, the union may have difficulties to find a leader that accepts to lead the negotiations. Indeed, if such a worker is discriminated against by his employer, he will need a sufficient support (or reward) from his coworkers to compensate for this discrimination. This additional (and new) constraint makes collective action even more difficult. On the employer's side, it is clear that discrimination against the union representative, even if costly, can be beneficial in the wide range of situations in which it enables him to avoid collective action.

The role of firm size:

The present framework is not able to take correctly into account the role played by firm size. In the model, a larger firm size lowers the individual gain from becoming a union member. This is because the indivudal contribution of a worker to the total firm labor force is obviously smaller in larger firms. As a consequence, the model predicits that collective action is more difficult in larger firms and the observed unionization rate is smaller. This is in contradiction with the stylised fact that there are far more often unions in large firms (see chapter 1). To reconcile the model with empirical facts, one might argue that there is indeed more collective action in small firms but that such a collective action is less formally organized and that workers in smaller firms do not feel necessary to set up a union. The argument is debatable and hard to verify empirically. However, firm size might also be related to firm profitability: the quasi-rents per worker are likely to be higher in larger firm. As a consequence, the final outcome we would obtain in the model if we link the profit per worker to firm size remains unclear. It seems that the latter effect would need to be larger to be able to compensate the first one but no exact prediction can be made. A simple way to reconcile the model with stylised facts and with our empirical analysis in chapter 1 (section 3) is to consider that workers are heterogenous with respect to the utility they could derive if they become a union

representative. Imagine that workers differ according to thier altruism, their interest for a higher social status, or their political views. In that case, some workers enjoy a higher *ex ante* private benefit if they become a representative. For a given firm profit flow and unionization rate, there is a threshold in this private benefit above which workers are willing to become a representative. A randomly drawn worker has a probability p to be above the threshold (p depends on the distribution of the private benefits across workers). As a consequence, the probability to find a worker that is above the threshold is a given as a function of firm size n by $1 - (1 - p)^n$ and it increases exponentially as a function of firm size. Adding heterogeneity in the individual benefit a worker would get from becoming a representative is thus a simple way to find back in the model the empirical relationship between union recognition and firm size and to be fully consistent with the empirical analysis we made in chapter 1 section 3.

Model predictions that can be tested empirically:

Four of the model predictions can be tested empirically. First, the probability to have a union increases with firms' profitability or equivalently, with firms' rents. Second, the unionization rate also increases with firms' rents. Third, the union representative is more likely to be combative when the unionization rate is high. More precisely, the union representative is combative if and only if the unionization rate is above the threshold μ_0. Fourth, the probability to observe a combative union representative increases with firms' rents. This last prediction derives for the fact that only equilibria with either no union or a high unionization rate (that converges to one at the limit) and a fighting union can exist when profits are high (see figure 5).

This two first predictions has already been discussed and tested in chapter 1 using the subjective market share variable as a proxy for firms' potential rents (see table **??**). Predictions 3 and 4 will be tested in the next section of this chapter.

Implicit contracts and family firms:

Modelling discrimination as the loss of an implicit contract put a natural upper bound on the potential discrimination. It also represents the idea that wage cuts are not possible and that discrimination appears in the long run as a flat career.

But it also has a third interest by offering a simple way to understand why unions are far less present in family firms[15]. Family firms are known for their paternalist management practices and the potentially better job protection they offer to their workers. We can reasonably make the assumption that they are able to offer higher implicit contracts to their workers. In that case, the potential loss for a worker that becomes a union representative is higher, and unions are thus less likely to find a worker who is willing to bear this higher cost.

3   Empirical analysis of union representatives' wages

I now turn to an empirical analysis of the wage differential between union representatives and their coworkers.

To do so, I use the REPONSE survey which is a linked employer-employee dataset. On the employee side of the data, the surveyed workers are asked if they are unionized but we do not know which unionized workers are union representatives. On the employer side of the data, I have access to the number of union representatives and unionized workers in each firm. I use this information to construct an indicator of the firm-level probability for a randomly drawn unionized worker to be union representative. This indicator is then used to split the directly observable wage differential between unionized and non-unionized workers into two differentials: one between union representatives and non-unionized workers and another one between unionized workers who are not a union representative and non-unionized workers.

The estimation strategy used to measure the wage differential between union representatives and their coworkers is presented first. The presentation of the core results comes next. A discussion of the results and additional interpretation tests conclude.

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[15]From probit regressions using the REPONSE survey, unions are about 30% less likely to be present in a family firm than in a non-family one, even when controlling for firm size and a wide set of covariates

3.1 Empirical specifications and estimation strategy

3.1.1 General framework with constant wage premia

I first provide a precise estimation of the wage differential between unionized and non unionized workers that controls for individual-level observable characteristics and establishment-level fixed effects. To do so, I present a series of regression models of the type:

$$\ln(w_{ij}) = \alpha U_{ij} + \beta X_i + \eta_j + u_{ij} \tag{2}$$

where w_{ij} represents the hourly wage of individual i in establishment j, X_i is a set of observed skill characteristics (such as age and education) of worker i, η_j an establishment-level fixed effect and U_{ij} an indicator equal to 1 if worker i in establishment j is unionized. In some specifications, the fixed effect η_j will be replaced by a vector Z_j of establishment-level covariates.

In equation 2, α can be interpreted in log-points as the within-establishment wage premium for unionized workers conditional on their observable skill characteristics. These unionized workers can be splited in two groups: the workers who are Union Representatives (UR) and the other ones who are "Unionized Only" (UO). The wage premia for union representatives and workers who are "unionized only", conditional on their characteristics and on establishments fixed-effects, are defined similarly as the coefficients α_1 and α_2 in the following regression model:

$$\ln(w_{ij}) = \alpha_1 UR_{ij} + \alpha_2 UO_{ij} + \beta X_i + \eta_j + u_{ij} \tag{3}$$

Let us assume that the standard identification assumption $\mathbb{E}[u_{ij}|UR_{ij}, UO_{ij}] = 0$ holds. In this case, α_1 and α_2 can be estimated consistently by conventional OLS regression applied to equation (3) [16]. The problem is that the variables UR_{ij} and UO_{ij} are not observable directly in the data (see next subsection). The goal of this subsection is to recover the wage premia α_1 and α_2 using proxy variables for

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[16]Note that we do not need to suppose $\mathbb{E}[u_{ij}|UR_{ij}, UO_{ij}, X_i, \eta_j] = 0$ to get consistent estimates of α_1 and α_2. $\mathbb{E}[u_{ij}|UR_{ij}, UO_{ij}] = 0$ is a sufficient condition (see for example Wooldridge 2002).

UR_{ij} and UO_{ij} that are available in the data. In other words, we assume that the wage premia for union representatives and workers who are "unionized only" would be identified if these variables were observable directly and we try to recover an estimate of these wage premia using an indirect estimation strategy.

Let us define by p_j the probability for a surveyed unionized worker in workplace j to be a union representative. Figure 6 provides an illustration of the link between the variables U_{ij}, UR_{ij} and p_j. Notice that if workers are sampled randomly, as it is the case in the data I use (see next subsection), p_j is simply equal to the proportion of union representatives among unionized workers in workplace j[17], providing that the response rates to the survey of union representatives is equal to that of other union members[18].

The key result is that the unobservable variable UR_{ij} (resp. UO_{ij}) in equation 3 can be replaced by the proxy variables $p_j U_{ij}$ (resp. $(1 - p_j)U_{ij}$). In other words, we will still have an estimation of the desired wage premium if we replace the dummy variables for being a union representative by the probability to be a union representative. This probability is equal to the individual indicator of being unionized (U_{ij}, which is observable) times the establishment-level probability of being a union representative conditional on being a unionized worker (p_j). Formally, we have the following propositions:

Proposition 1: Let us write $e_{ij} = UR_{ij} - p_j U_{ij}$. If e_{ij} is not correlated with the error term u_{ij} in equation 3 then the wage premia α_1 and α_2 can be consistently estimated by OLS regression applied to:

$$\ln(w_{ij}) = \alpha_1'(p_j U_{ij}) + \alpha_2'((1 - p_j)U_{ij}) + \beta' X_i + \eta_j' + v_{ij} \tag{4}$$

---

[17]This is a key point in order to get identification: if instead of being sampled randomly in each workplace, workers were selected according to some of their observable characteristics (age, gender, etc), the probability for a surveyed unionized worker in workplace j to be a union representative could be different from the proportion of union representatives among unionized workers. For example, if union representatives are older than the average unionized worker and if the workers' sampling strategy over-represents older workers, then the probability for a sampled unionized worker to be representative is higher than the proportion of union representatives among unionized workers.

[18]If, for example, the response rate of union representatives is lower than that of other union members, the final proportion of union representatives among union members in the sample will be lower than p_j.

Figure 6: Link between the variables U_{ij} and UR_{ij}
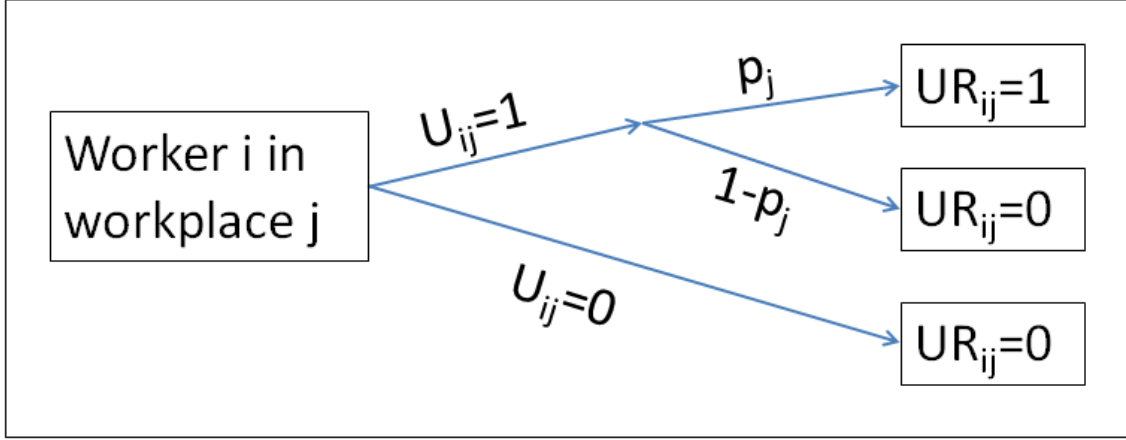
Lecture: U_{ij} is equal to 1 if worker i in establishment j is a union member and 0 otherwise.

UR_{ij} is equal to 1 if worker i in establishment j is a union representative and 0 otherwise.

Worker i in establishment j cannot be a union representative if he is not a union member. If he is a union member, he has a probability p_j to be a union representative.

Mathematically, this means that $\mathbb{E}[\alpha_1'] = \alpha_1$ and $\mathbb{E}[\alpha_2'] = \alpha_2$.

Proposition 2: If e_{ij} is not correlated with the error term u_{ij} in equation 3 then the variances σ_u^2, σ_v^2 and σ_e^2 of u, v and e are related as follows:

$$\sigma_v^2 = \sigma_u^2 + (\alpha_1 - \alpha_2)^2 \sigma_e^2 \tag{5}$$

Propositions 1 and 2 are proved in the mathematical appendix of this chapter. In the empirical section, I will estimate equation 4 by conventional (OLS). I will also correct the standard errors of the OLS estimates and provide a maximum-likelihood estimator of the desired wage differentials. These procedures are quickly described below.

Correction of standard errors and tests:

Calling $\hat{\sigma}_{\alpha_1}$, $\hat{\sigma}_{\alpha_1'}$ the usual finite distance consistent estimators of the standard errors

of α_1 and α_1' , we have from proposition 2:

$$\hat{\sigma}_{\alpha_1}^2 = \hat{\sigma}_{\alpha_1'}^2 - (X'X)_{11}^{-1}(\alpha_1 - \alpha_2)^2 \sigma_e^2 \tag{6}$$

where $(X'X)_{11}^{-1}$ designates the first diagonal coefficient (the one corresponding to α_1) of the variance covariance matrix of the regressors. This formula will be used in the empirical analysis to correct the estimated standard errors and run the appropriate Student's tests.

Maximum likelihood estimator:

There is *a priori* no reason why the OLS "indirect estimation" (IE) procedure proposed above would provide, as in the case of standard OLS, the most efficient estimators of α_1 and α_2. I thus also compute the log-likelihood of the sample under the hypothesis of normality of the residuals and show that the maximum (log)likelihood estimator (ML) provides different estimates (and not only different standard errors) than the IE estimator.

Let us consider that the data obey to the following linear model (illustrated on figure 6):

$$\begin{cases} \ln(w_{ij}) = \beta X_{ij} + v_{ij0} & \text{if } U_{ij} = 0 \\ \ln(w_{ij}) = \alpha_1 + \beta X_{ij} + v_{ij1} \text{ with probability } p_j & \text{if } U_{ij} = 1 \\ \ln(w_{ij}) = \alpha_2 + \beta X_{ij} + v_{ij2} \text{ with probability } 1 - p_j & \text{if } U_{ij} = 1 \end{cases}$$

with $v_{ij0}, v_{ij1}, v_{ij2} \sim \mathcal{N}(0, \sigma^2)$

For simplicity, I have included individual, establishment-level characteristics and the constant term in the unique vector X_{ij}. Doing this modeling, I have made two non obvious assumptions. First, the return to observable characteristics β is identical for non-unionized workers, only unionized workers and union representatives. Otherwise, I would be doing a kind of Oaxaca-Blinder decomposition estimated by maximum likelihood, which is not our goal here since we would like to estimate an equivalent of equation 3. Second, the standard deviation of the residuals σ is also identical across groups of workers, as it is the case in the OLS estimation. I will show

that under this hypothesis the ML estimator is not identical to the ME estimator. But later on, in the empirical analysis, I will allow the standard deviations to be different across groups.

We denote by w, X, U and p respectively the vectors of the N observable variables w_{ij}, X_{ij}, U_{ij} and p_j and by ϕ, the standardized normal density. The log-likelihood $\mathcal{L}(w, X, U, p, \alpha_1, \alpha_2, \beta, \sigma^2) = \ln(\prod_{i=1}^{N}(P(w_{ij}, p_j, X_{ij}, U_{ij}|\beta, \alpha_1, \alpha_2, \sigma^2)))$ can be written:

$$\mathcal{L} = -N\ln(\sigma) + \sum_{i=1}^{N} \ln[(1 - U_{ij})\phi(w_{ij} - \beta X_{ij}) \\ + p_j U_{ij}\phi(w_{ij} - \beta X_{ij} - \alpha_1) \\ + (1 - p_j)U_{ij}\phi(w_{ij} - \beta X_{ij} - \alpha_2)] \tag{7}$$

It is easy to check that differentiating equation 7 relative to β, α_1 and α_2 does not simplify as in the case of OLS. Indeed, in the case of OLS, the ln functions have as argument only one normal density function which equals $e^{-(u_i^2/2)}/\sqrt{(2\pi)}$. Consequently, maximizing the likelihood is equivalent to minimizing the sum of the square of the residuals. In equation 7, this is not true anymore because the ln functions have as arguments a sum of 3 density functions that does not simplify. Consequently, the IE and ML estimators have no reasons to be equal and estimates of the parameters that minimize the log-likelihood defined in equation 7 will be also presented in the next subsection.

3.1.2   Allowing for non-constant wage premia:

There are good reasons to think that the wage differential between union representatives and their coworkers can vary with the proportion of union representatives among unionized workers. According to the model presented in the first section for example, union representatives are more likely to be combative when the unionization rate is higher, that is, when the proportion of union representatives among unionized workers tend to be lower.

However, we have assumed in proposition 1 that the measure of the wage penalties α_1 and α_2 are constant and independent of p_j. This is a usual and implicit
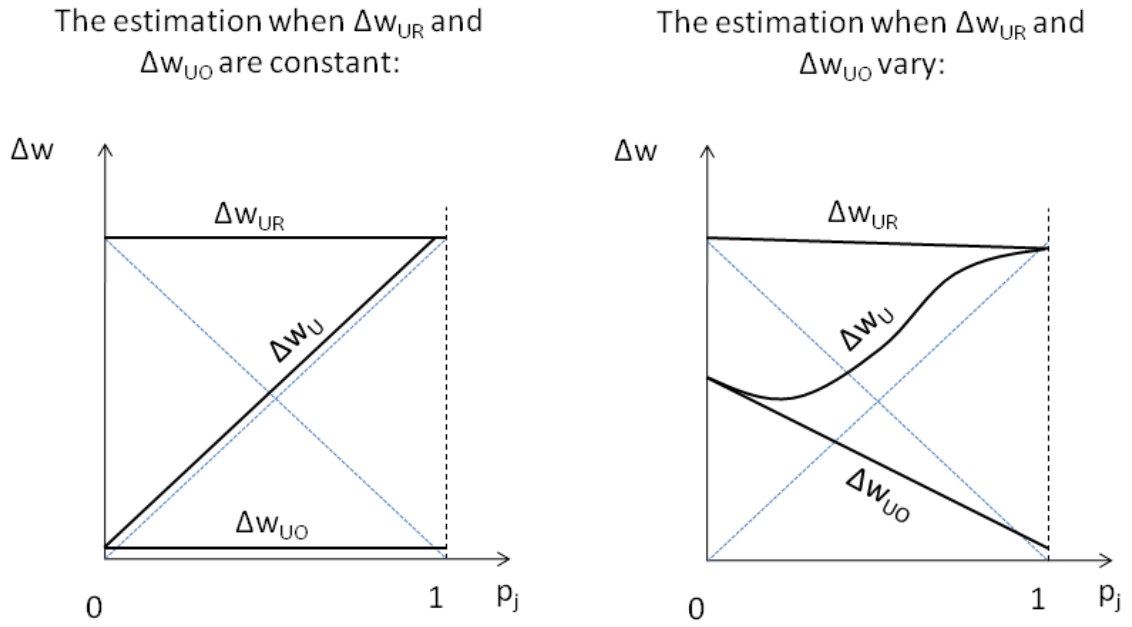
assumption that one makes when estimating a linear model. It offers a convenient way to get the effect of a variable on the mean of another one. But, in our case, the fact that α_1 and α_2 do not depend on p_j is crucial when replacing the unobserved variable UR_{ij} by the proxy $p_j U_{ij}$.

Figure 7 illustrates this point in the simpler case with no control variables. On the left chart, the wage differentials $\Delta w_{UR} = \alpha_1$ between union representatives and non unionized workers and $\Delta w_{UO} = \alpha_2$ between workers who are "unionized only" and non-unionized workers remain constant when p_j varies. The observed within workplaces wage differential $\Delta w_U = \alpha$ between unionized and non-unionized workers has for equation $\Delta w_U = [p_j \Delta w_{UR} + (1 - p_j)\Delta w_{UO}]$. It is a straight line. In this case, the estimation strategy resulting from proposition 1 simply consists in estimating the slope and the y-intercept of this straight line (which can be obtained by a simple orthogonal projection of Δw_U on the lines $y = p_j$ and $y = 1 - p_j$ represented as dashed lines on the chart). However, if Δw_{UR} and Δw_{UO} are not constant with p_j, Δw_U is not a straight line any more. This is illustrated on the right chart of figure 7. In that case, the estimation strategy resulting from proposition 1 fails to identify the wage premia for union representatives and workers who are "unionized only". In the case of standard OLS estimation, a non-constant parameter would be estimated to be equal to its mean. But in our case, the possibility to estimate a wage premium explicitly relies on the fact that this wage premium is constant. If instead α_1 and α_2 vary with p_j, their estimation through equation 4 can be completely erroneous. To overcome this problem, I propose 2 solutions:

- When $p_j = 1$, $\alpha_1 = \Delta w_{UR} = \Delta w_U$ and is thus observable directly (when a sampled worker declares itself as unionized in a workplace where only the union representatives are unionized, we know with certainty that he is a union representative). I will thus estimate α_1 on the subsample of establishments with $p_j = 1$.

- I will plot the observable wage differential between unionized and non-unionized workers for different values of p_j and see if it varies linearly such as in the left chart of figure 7.

Figure 7: Link between the different wage differentials when p_j varies

The estimation when Δw_{UR} and Δw_{UO} are constant:

The estimation when Δw_{UR} and Δw_{UO} vary:

Δw

Δw_{UR}

Δw_U

Δw_{UO}

0

1

p_j

Notes: $\Delta w_U = [p_j \Delta w_{UR} + (1 - p_j)\Delta w_{UO}]$ with Δw_U, Δw_{UR} and Δw_{UO} denoting respectively the wage penalty for all unionized workers, union representatives and only unionized workers.

3.2 The data

The dataset I use is similar to the core dataset used in chapter 1. It is the 2004 French Workplace Employment Relations Survey (REPONSE04) conducted by the Ministry of Labor towards up to 10 employees randomly drawn in each of 2929 business establishments with more than 20 employees. REPONSE04 contains extensive information on industrial relations at the workplace level and on the firms' organizational and technological structure[19]. In each surveyed workplace, union density, the name of the unions that are present and the number of their representatives are available. I will divide the total number of union representatives by the number of unionized workers (which is equal to union density at the workplace-level times the number of employees in the workplace) to get the proportion of union representatives among unionized workers. Net hourly wages in December 2003 have been retrieved from Social Security records (the Déclaration Annuelles de Données Sociales, DADS) by the Ministry of Labor for the workers surveyed in REPONSE04 and have been matched with the dataset. The REPONSE04 survey covers mainly the private sector but some public companies operating in the commercial sector are also present. After cleaning, the employee survey contains 7814 workers for whom we have the usual observable characteristics (education, gender, age) and for whom we know if they are union members or former union members.

In the REPONSE survey, exactly 10 workers are randomly drawn in each establishment and receive a written questionaire. Due to a response rate of roughly 30% – usual with written surveys –, we finally get an average of 3 to 4 workers per establishment. Table 1 gives the distribution of the workplaces in the REPONSE survey in terms of the number of their number of sampled unionized and non-unionized workers. Estimations of the wage penalty for unionized workers that include workplace fixed effects will rely on the 658 workplaces with at least one unionized and one non-unionized worker. Even if the sample size is relatively small, this number is large enough to run fixed effects estimations. A key aspect of the sample design is that the number of workers sampled does not depend on establishments' character-

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[19]REPONSE follows the same design than WERS in the U.K. See Bryson et al. (2009) for a study that uses both REPONSE and WERS to study unions and workplace performance or Blanchflower and Bryson (2008).

istics such as establishment size. This implies that our estimates will not be driven by a particular type of establishments in which more workers are sampled, so that the probability to observe a union representative would be higher in these establishments. In contrast, the sample design in the REPONSE survey is such that the *ex ante* probability to observe a union representative is identical in all establishments.

Table 1: Distribution of the workplaces in the REPONSE04 survey with respect to the **sampled** number of unionized and non-unionized workers (not weighted).

		Number of sampled unionized workers in the workplace						
		0	1	2	3	4	6	Total
Number of sampled non unionized workers in the workplace	0	0	57	25	8	3	0	93
	1	434	122	37	10	4	1	608
	2	544	145	49	9	1	0	748
	3	415	126	31	5	1	0	578
	4	289	57	10	1	0	0	357
	5	159	31	5	0	0	0	195
	6	52	11	0	0	0	0	63
	7	19	0	0	0	0	0	19
	8	7	1	0	0	0	0	8
	9	0	1	0	0	0	0	1
	Total	1919	551	157	33	9	1	2670

As explained in introduction, the REPONSE04 survey actually comprises 3 distinct surveys: a survey toward employers, a survey toward employees and a survey toward the representatives of the workforce. This last survey will be used in the next section to study the opinion of the representatives about their career opportunities and the presentation of its exact content is also left for the next section.

3.3 Results

3.3.1 Descriptive statistics

Table 2 provides summary statistics on currently unionized workers and past unionized workers who are not unionized anymore. Figure 8 shows which observable characteristics in the data affect the most the probability to be unionized. It can be seen in particular that unionized workers are more often men than women and that the probability to be unionized increases with age and increases sharply with tenure.
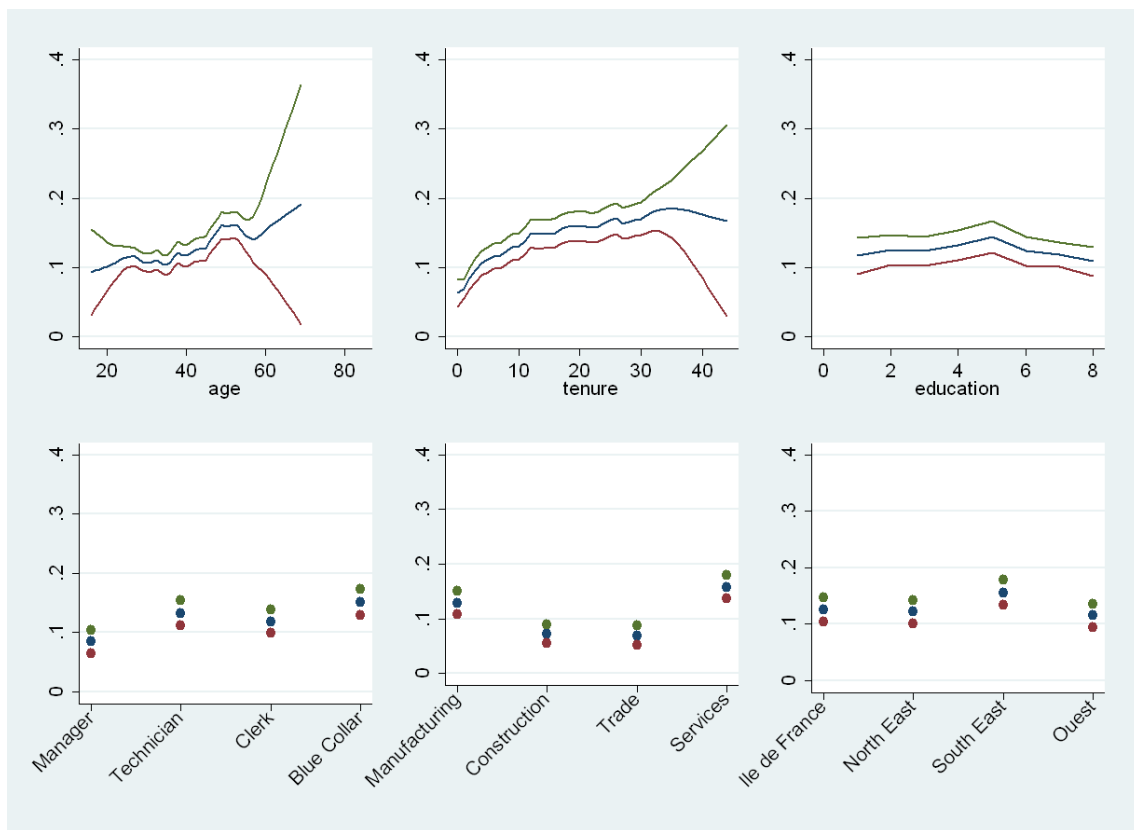
Table 2: Descriptive statistics: distribution of current and past unionized workers in terms of their observable characteristics (weighted).

	Currently Unionized	Previously unionized
Average	7,4%	13,3%
Gender:		
Men	8,6%	15,1%
Women	5,6%	10,3%
Occupation:		
Blue collar	8,2%	16,4%
Clerk	6,0%	9,6%
Technician	8,9%	14,1%
White collar/manager	5,5%	9,8%
Diploma:		
None	8,2%	14,2%
Less than Bac	8,5%	17,1%
Bac	7,6%	9,7%
More than bac	5,2%	7,5%
Working time:		
Part time	6,2%	10,7%
Full time	7,5%	13,6%
Sector:		
Industry	9,4%	17,4%
Construction	3,7%	13,5%
Trade	3,6%	9,6%
Services	8,9%	13,4%
Region:		
Ile de France (Paris)	8,1%	10,0%
North East	7,3%	16,5%
South East	10,2%	14,7%
Ouest	7,0%	12,9%

Notes: All statistics are weighted using weights provided by DARES that make employees in the survey representative of all French employees working in establishments with more than 20 employees in the commercial sector.

Source: REPONSE04 workers' survey.

Figure 8: Probability to be unionized as a function of observed characteristics (estimate and confidence interval)

It is possible to use the third REPONSE survey toward the representatives of the workforce in order to get an idea of the observable characteristics of the union representatives[20]. Table 3 uses informations from both the workers and the representatives of the workforce REPONSE surveys in order to provide (comparable) descriptive statistics on the individual characteristics of all employees, union members, representatives of the workforce, union representatives and union representatives from the CGT union. It appears that women represent 39% of the workers in establishments with more than 20 employees. The proportion of women among union members is lower and becomes even twice lower among union representatives

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[20]See the next section for a detailed description and exploitation of this third survey

from the CGT union. The average and median of both age and tenure appear to be higher for representatives of the workforce than for the average worker.

Statistics on education provide interesting stylized facts. Union members are slightly less educated than the average worker. However, this is not the case for all workers and union representatives (columns 3 and 4): they appear to have approximately the same level of education than the average worker and to be more educated than the average union member. This suggests that more educated workers are more likely to take responsibilities in unions. The difference in education patterns between the different subgroups is particularly high concerning workers with no diploma: their proportion is about twice lower among representatives. The occupations of the representatives of the workforce are very similar to those of the average worker (columns 1 and 3). There is however a higher proportion of blue-collar workers and of workers in intermediate occupations among union members. The proportion of blue-collars is also higher among union representatives at the expense of the proportion of clerks. The proportions of managers and workers in intermediate occupations are very close among union representatives and among all workers. Overall, the differences in occupation patterns between all workers, union members, all representatives of the workforce and union representatives remain small. In contrast, the union representatives affiliated to the CGT are far more often blue-collars and far less often managers than the workers in the other groups. This shows that we need to control for occupations, at least in some empirical specifications.

Table 3: A comparison of individual attributes of all workers, unionized workers, representatives of the workforce and union representatives in 2004.

	All workers	Union members	All representatives	Union representatives	CGT union representatives
Gender					
% Women	39	30	29	22	17
% Men	61	70	71	78	83
Age					
Average age (in year)	39	43	44	46	46
Median age (in year)	39	44	45	47	47
Tenure					
Average tenure (in year)	11	15	19	21	22
Median tenure (in year)	8	14	17	21	23
Education					
% No degree at all	12	13	4	4	6
% Vocational training	45	52	51	55	66
% High school degree	14	14	17	15	12
% Some college	14	12	13	12	9
% Col. or Univ. degree	15	9	15	13	7
Occupation					
% Blue-collars	35	39	34	39	55
% Clerks	22	18	21	18	13
% Intermed. Occupation	25	30	27	25	26
% managers/supervisors	18	13	18	17	6

Notes: Statistics in the two first columns are calculated from the employee part of the REPONSE survey. They are weighted using weights provided by DARES that make employees in the survey representative of all French employees working in establishments with more than 20 employees in the commercial sector.

Statistics in the 3 last columns are calculated from the representatives of the workforce' part of the REPONSE survey. The column for all the representatives of the workforce also includes the union representatives. They are not weighted (no weights available). The representatives interviewed come from the most important workers organization in each establishment. Consequently, they are not representative of all representatives of the workforce in the French commercial sector.

3.3.2 Wage differential between unionized and non-unionized workers

The hourly wage of union members – being either union representative or not – is in average 7% higher than that of workers that have never been a union member (table 4, col. 1: specification with no control variables). The hourly wage of former union members is also higher – 6% in average – than that of workers that have never been a union member[21].

We use alternatively two sets of control variables for workers in our empirical analysis. The first one ("Mincer") only includes the predetermined and more exogenous workers' characteristics: age, square of age, education and gender. The goal, when using this first set of controls, is to estimate wage differentials that are conditional on these more exogenous characteristics. Possible interpretations of our estimates are left for the next section. At this stage, there is not any causal interpretation behind the statistics we produce: they are only *measured differentials* and not *effects*. When workers' "Mincer" controls are included in a wage regression, as well as controls for establishments' size, industry, region and age, the wage differential between union and non-union members vanishes entirely (col. 2).

The second set of workers' controls that we use contains, in addition to "Mincer" controls, tenure, the square of tenure, workers' occupation, the number of hours worked and a dummy for part-time workers. The goal when using this second set of controls is to produce measures that better control for differences in workers' characteristics. However, this second set includes more endogenous variables that are potentially codetermined with being a union representative (tenure for example). When using this second set of control variables rather than the "Mincer" controls, the estimated wage differential between union and non-union members is slightly higher (col. 3) and it becomes singificantly positive at the 10% level.

Establishments controls can be replaced by establishments fixed effects. When doing so, we observe that union members are paid 3 to 4% less than their co-workers that have never been a union member (col. 4 and 5). The gap is slightly smaller for

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[21]In the REPONSE04 survey, the workers are also asked if they were unionized in the past. In all specification I add a dummy variable for workers who have been unionized and are not unionized anymore. This implies that the omitted group to which the unionized workers are compared is the group composed by the workers that have never been unionized.

former union members (*e.g.* 2 to 3%) [22].

Table 4: Wage differential between union and non-union members – various sets of controls.

	dependant variable: log of hourly wage				
	(1)	(2)	(3)	(4)	(5)
Union member	0.068***	-0.001	0.015*	-0.045***	-0.029***
	(0.013)	(0.011)	(0.009)	(0.012)	(0.010)
Former union member	0.057***	-0.005	0.011	-0.039***	-0.017*
	(0.014)	(0.011)	(0.010)	(0.011)	(0.010)
Observations	7826	7814	7814	7814	7814
R-squared	0.004	0.523	0.648	0.781	0.845
workers' controls	No	Mincer	Detailed	Mincer	Detailed
Establishments' controls	No	Standard	Standard	Fixed effects	Fixed effects

Notes: The "Mincer" workers' controls are education (9 groups), age (in years), the square of age and gender. The "detailed" workers' controls also include tenure, the square of tenure, occupation (4 groups), the number of hours worked, and a dummy for part-time working contracts. The "standard" establishments' controls are establishment size (5 groups), industry (16 groups), region (10 groups), age (5 groups) and a dummy for the presence of a union representative (union recognition).

Establishment age, union recognition, workers' occupation, tenure and hours worked have been treated for missing values: when any of these variables is missing, we recode it as equal to 0 and we include a dummy in the regression taking value 1 only when the variable is missing. Doing so, we recover about 400 additional observations. The "Mincer" workers' controls have not been retreated for missing, so that specification (4) for example is free of any treatment for missing.

Robust standard errors in parenthesis. *: significant at the 10% level. **: significant at the 5% level. ***: significant at the 1% level.

3.3.3 Wage differential between union representatives and non union-ized workers

I now turn to the key estimation of the chapter : I split the 2.5% negative wage differential between unionized workers and their coworkers found in table 4 (col. 5) in two differentials, one for union representatives and one for the other unionized workers. To do so, I use the variable p_j, that is the proportion of union representative among unionized workers in each workplace.

Among establishments in which unions are present, the number of union representatives mainly varies between 0 and 5 (figure 9, left chart). The corresponding proportion of union representatives in the total workforce is usually quite low (lower

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[22]For a thorough study of the "union membership" premium, see Bunel and Raveaud (2008). For typical estimates obtained for the control variables, see the more detailed tables of results presented in chapter 1 and obtained from specification that are close from those in this chapter.

than 2% in 3/4 of the sampled establishments – see figure 9, right chart). The majority of the estabishments have unionization rates between 0 and 20% (figure 10). Finally, the variable p_j (the proportion of union representatives among the unionized workers) varies quite much across workplaces, which gives scope for identification. The distribution of p_j exhibits a decreasing profile. p_j is lower than 0.2 in 60% of the establishments, but there is also a non neglectible share of the establishments that have a large p_j. For example, p_j is equal to 1 in 10% of the sampled establishments. These establishments are either (i) establishments that have declared that a union representative is present and a 0% unionization rate, or (ii) establishments that have declared a strictly positive unionization rate and an equal or even higher share of union representatives. The first case corresponds to a completly isolated union representative with no other union member in its establishments and it seems to occur occasionally (according to what union leaders say). I have not applied any cleaning of the p_j variable in this case. The second case may correspond to establishments that have declared an anormally high number of union representatives, higher than the legally authorized number[23]. I have therefore built two alternative variables for the proportion of union representatives among union members. The first one has a missing value for all establishments that have declared a number of union representative higher than legally authorized for any of the unions present in the establishment. The second variable is built by imputing the maximum number of union representatives legally recognized to establishments that have declared a higher number of representatives. The empirical analysis presented in this section has been entirely reproduced with these 2 alternative variables and it gives very similar results (results not reported).

It has been possible to construct the variable p_j for 7597 employees working in 2570 workplaces. 28 of these employees are union members in an establishment in which p_j is equal to 1 and are identified with certainty as union reprsentatives

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[23]The number of union representatives per union that can be legally recognized for bargaining at the establishment-level varies with establishment size as follows. Between 10 and 999 employees: 1 union representative. Between 1000 and 1999 employees: 2 union representatives. Between 2000 and 3999 employees: 3 union representatives. Between 4000 and 9999 employees: 4 union representatives. Above 9999 employees: 5 union representatives. See Article R2143-2 of the French *code du travail*.

(if there is no measurment error). Since the other union representatives cannot be identified with certainty, we cannot be sure of their total number in the sample. However, $p_j U_{ij}$ is the individual probability for a sampled worker to be union representative. Taking the sum of this variable over the entire REPONSE04 sample gives the expectation of the total number of union representatives in the data. It is equal to 128.

Figure 9: Distribution of the number and proportion of union representative across workplaces where unions are recognized (e.g. with at least one union representative).
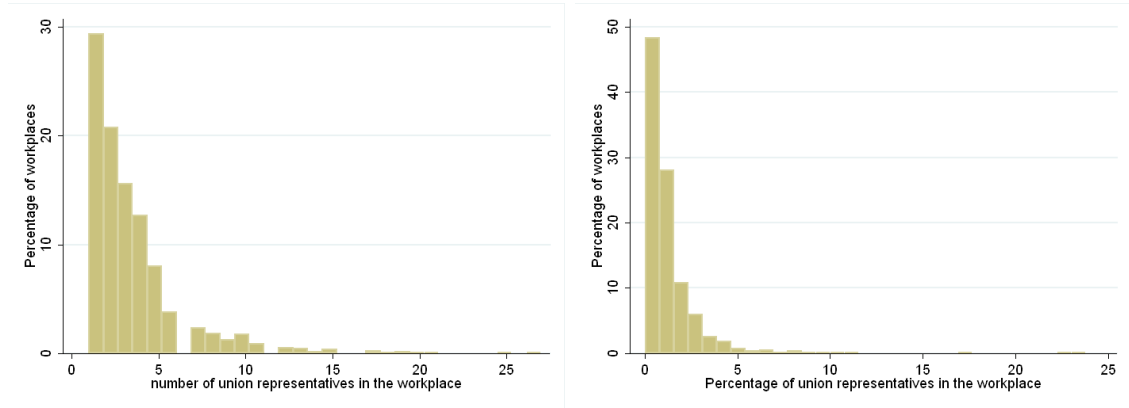

Table 5 displays the results obtained when estimating equation 4 by OLS (the so-called IE estimation strategy) and when maximizing the log-likelihood function 7 (the so-called ML estimation strategy). The results are striking: in all specifications, a large wage penalty of around 10% appears for union representatives whereas the other union members have wages equivalent or even higher than their non-unionized counterparts. The raw wage penalty (with no controls) for union representatives is estimated at 0.09 points of logarith (col. 1) and is statistically significant at the 10% level only. However, when controls for observable workers' and establishments' characteristics are included in the regression, the penalty for union representative is comprised between 12 and 15% (col. 2 and 3). Finally, this same penalty is slightly lower (around 8%) in specifications that include establishments' fixed effects (col. 4 and 5). For all produced estimates, I present both standard errors corrected using equation 6 and standard errors not corrected but clustered at the level of the "treated units", that is, clustered by groups of workers being in the same establishment with

Figure 10: Distribution of the proportion of unionized workers across workplaces where unions are recognized (e.g. with at least one union representative).
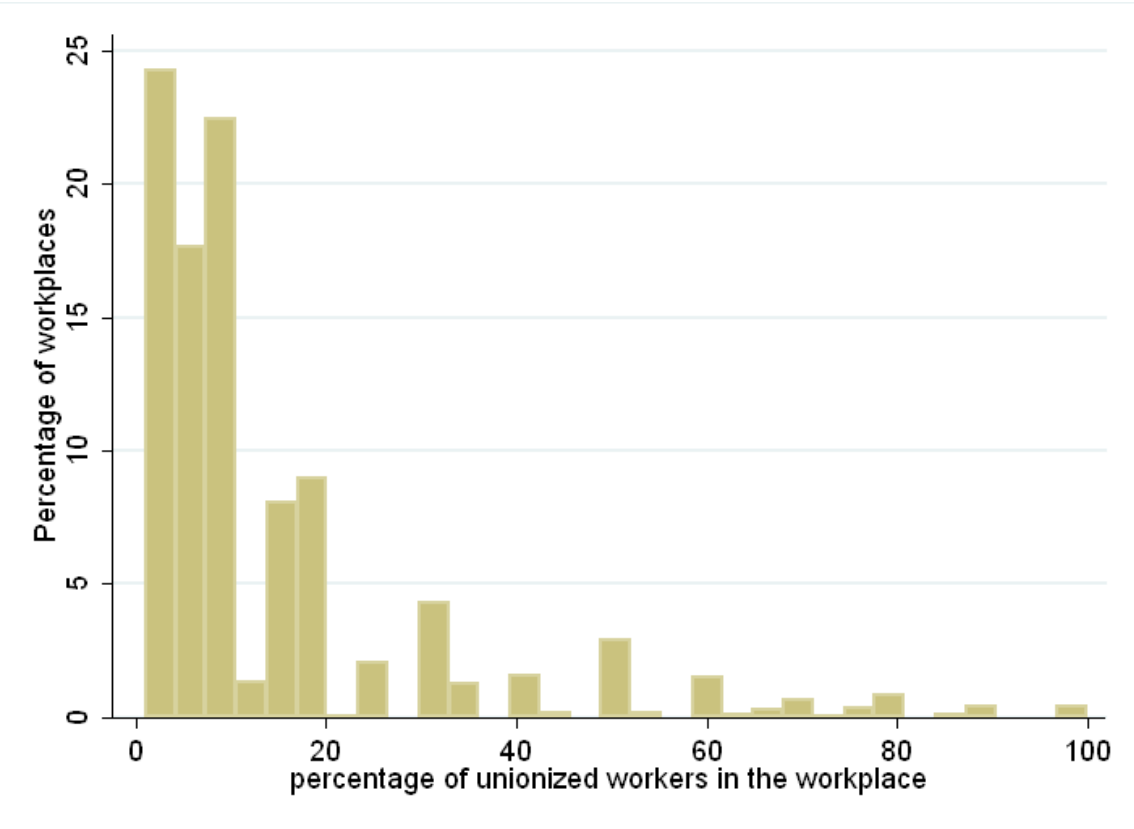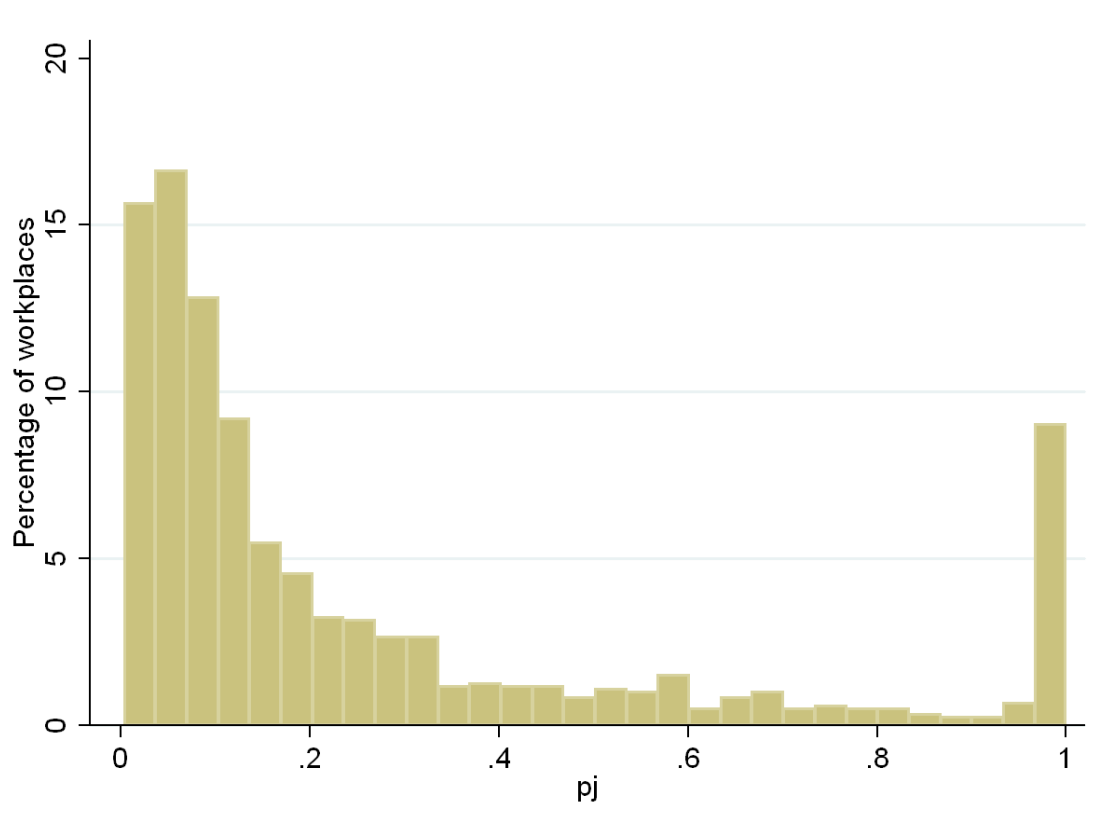
Figure 11: Distribution of the variable p_j (ratio between the proportions of union representatives and union members) across workplaces where unions are recognized (e.g. with at least one union representative).

the same union membership status (either union member or non-union member). The two types of standard errors are always very close, showing that the correction derived from equation 6 remains small. The p-value of the estimates of the wage penalty for union representatives is smaller than 1 per thousand in specifications without fixed effects and smaller than 5 percent in specifications that include fixed effects.

The estimates obtained by maximum likelihood (col. 6 and 7) in specifications without fixed effects[24] are consistent with those obtained by the OLS indirect strategy. As discussed earlier, these estimates have no reason to be perfectly equal to those obtained through the indirect estimation strategy. They are the most efficient that can be obtained at finite distance under the hypothesis of normality of the residuals. These estimates are even slightly more precise than those obtained through the OLS indirect strategy. The wage of the union representatives is estimated to be 10 to 13% lower than that of non-union members whereas the other union members are paid between 1 and 3% more than non-union members.

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[24]I have not been able to produce estimates by maximum likelihood from specifications that include fixed effects: the algorithm I used to maximize the log-likelihood function did not converge after running more than one month and I had to stop it.

Table 5: Indirect Estimator (IE) and Maximum Likelihood estimator (ML) of the wage differentials between union representatives, only unionized workers and non-unionized workers.

	dependant variable: log of hourly wage						
Estimator	(OLS: Indirect Estimator)					(Maximum Likelihood)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Union representative	-0.090*	-0.152***	-0.126***	-0.081**	-0.087**	-0.137***	-0.109***
Standard error	(0.049)	(0.040)	(0.034)	(0.041)	(0.035)	(0.033)	(0.028)
Corrected standard error	(0.058)	(0.040)	(0.034)	(0.043)	(0.037)	-	-
Only unionized worker	0.080***	0.021	0.040***	-0.031**	-0.016	0.018	0.037***
Standard error	(0.021)	(0.016)	(0.014)	(0.014)	(0.013)	(0.014)	(0.012)
Corrected standard error	(0.020)	(0.014)	(0.012)	(0.016)	(0.014)	-	-
Observations	7587	7576	7576	7576	7576	7576	7576
R-squared	0.002	0.526	0.650	0.785	0.848	-	-
Workers' controls	No	Mincer	Detailed	Mincer	Detailed	Mincer	Detailed
Establishments' controls	No	Yes	Yes	Fixed effects	Fixed effects	Yes	Yes

Notes: In specifications (1) to (4), the non-corrected standard errors have been clustered by groups of workers with the same observable union status (unionized or not) in the same workplace. Corrected standard errors are obtained from equation 6.
The control variables are defined in the note of table 4.
*: significant at the 10% level. **: significant at the 5% level. ***: significant at the 1% level. Significativity threasholds are computed using the clustered standard errors.

As discussed earlier, the results in table 7 would be biased if the wage penalty for union representatives varies with p_j. We can get around by focusing only on workers for whom we know with certainty either or not they are a union representative (these are all workers for whom $p_j U_i j \in \{0; 1\}$). When we restrain to these workers, we still find a wage penalty ranging from 10 to 15% for union representatives and no penalty for union members that are not a representative (table 6, rows 1 and 2 [25]). Point estimates in these specifications are a bit larger (in absolute value) and standard errors are a bit higher, but the results obtained with the indirect estimation strategy or by maximum likelihood are corroborated. Our second proposed robustness check consists in examining directly if the observable wage differential between union and non-union members (conditional on their observable characteristics) is a linear function of p_j, as should be the case if the wage penalty for union representatives is constant with p_j. Figure 12 plots the observable wage differential between unionized and non-unionized workers for different values of p_j. More precisely, I have reported the estimated wage differential between union and non-union members (conditional on observable characteristics) in the 2 groups of establishments with $p_j = 0$ and $p_j = 1$ (those are identical to the estimates in the last columns of table 7). I have then divided the workplaces having p_j strictly between 0 and 1 in 4 quartiles and reported on the plot the average p_j and the average conditional wage differential in each of these groups. In each case, the wage differential increases regularly from virtually 0 in establishments where $p_j = 0$ to 10% or more in those where $p_j = 1$. Even though the estimated functions $\alpha(p_j) = \Delta w_u(p_j)$ are not perfectly linear as in the theoretical case exposed on the left panel of figure 7, they do not exhibit any abnormal point and they present a globally increasing profile. Considering the small number of observations on which is based the estimation of the representatives' wage penalty (the expected number of representative in the data is 128), this second test is rather reassuring: it shows that our estimates do not rest only on a few particular establishments and that they draw on the full set of variations of the share of representatives among the union members.

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[25]Results in table 6 are presented with detailed workers' controls only. They are similar in substance when using the "Mincer" controls instead of the detailed controls.

Table 6: Wage differential between the union representatives and their co-workers for directly identified representatives, and by establishment size and sector subgroups.

Sample	Establishment controls	Observations	Union Representative		Unionized only	
$p_j \in \{0;1\}$	Industry, size, region, age	6950	-0.157***	(0.049)	0.019	(0.027)
	Fixed effects	6950	-0.094*	(0.055)	-0.015	(0.021)
Estab. Size:						
20-100 salaries	Industry, size, region, age	2919	-0.112***	(0.042)	0.042*	(0.024)
	Fixed effects	2919	-0.129***	(0.041)	-0.006	(0.020)
100-200 salaries	Industry, size, region, age	1489	-0.162**	(0.079)	0.096***	(0.035)
	Fixed effects	1489	-0.092	(0.076)	0.028	(0.027)
200-500 salaries	Industry, size, region, age	1193	-0.084	(0.104)	0.009	(0.035)
	Fixed effects	1193	0.077	(0.107)	-0.065*	(0.034)
sup 500 salaries	Industry, size, region, age	1975	-0.078	(0.137)	0.002	(0.025)
	Fixed effects	1975	-0.102	(0.120)	-0.049*	(0.026)
Sector:						
Services	Industry, size, region, age	2929	-0.107**	(0.042)	0.041*	(0.022)
	Fixed effects	2929	-0.061	(0.046)	0.007	(0.020)
Construction	Industry, size, region, age	470	-0.075	(0.130)	0.035	(0.061)
	Fixed effects	470	0.037	(0.094)	-0.013	(0.070)
Manufacturing	Industry, size, region, age	2929	-0.166**	(0.073)	0.028	(0.021)
	Fixed effects	2929	-0.140*	(0.073)	-0.038*	(0.020)
Retail sector	Industry, size, region, age	1248	-0.157*	(0.093)	0.029	(0.038)
	Fixed effects	1248	-0.115	(0.081)	-0.064*	(0.037)

Notes: Standard errors given in parenthesis are clustered by groups of workers with the same observable union status (unionized or not) in the same workplace. The control variables are defined in the note of table 4. *: significant at the 10% level. **: significant at the 5% level. ***: significant at the 1% level.

Figure 12: Estimation of the wage differential between unionized and non unionized workers when the probability for unionized workers to be union delegate increases
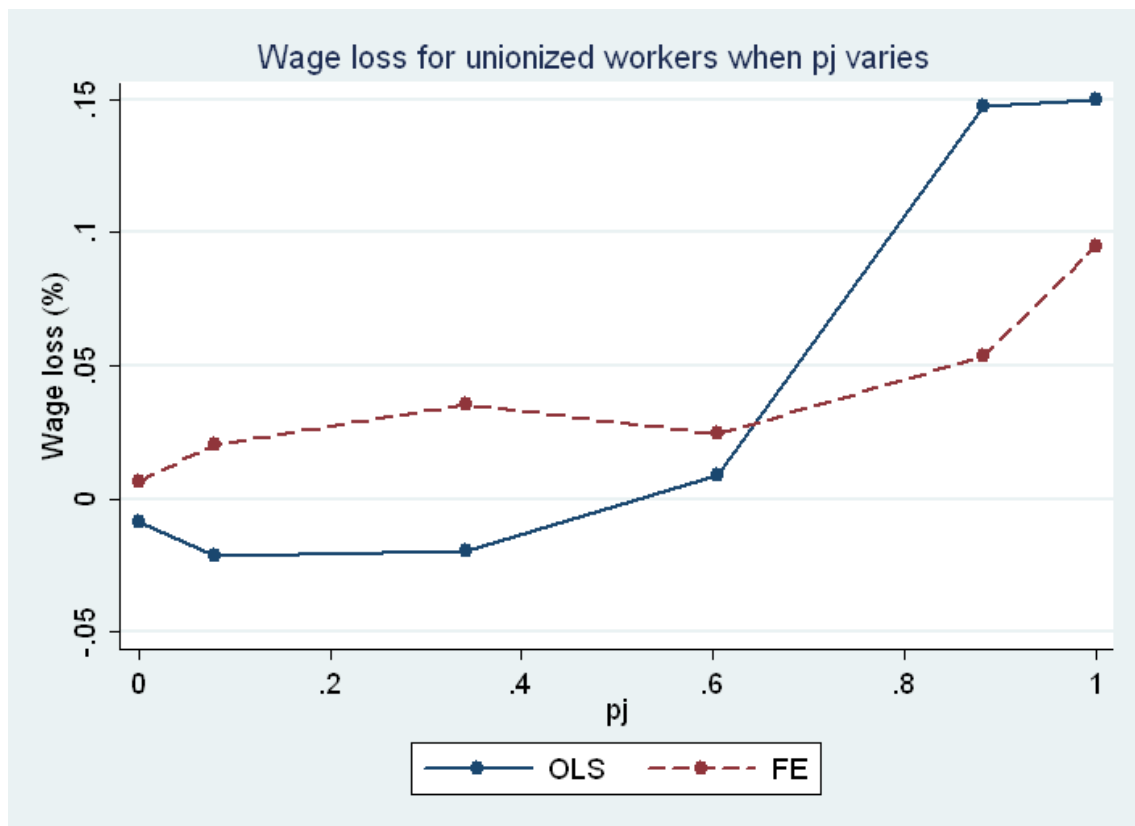
Notes: The estimates are obtained by running on 6 subsamples of the dataset OLS regressions of the individual wages on a dummy for union membership as well as detailed controls for individual characteristics and either controls for workplaces characteristics or workplaces fixed effects.

The first subsample (corresponding to the estimates on the left of the chart) comprises all workers in establishments where $p_j = 0$. The 4 next subsamples are obtained by dividing in 4 quartiles the workplaces where p_j is strictly comprised between 0 and 1. The last subsample (corresponding to the estimates on the right of the chart) comprises all workers in establishments where $p_j = 1$.

The robustness of the estimates is further confirmed when we focus on subgroups of establishments with different sizes or operating in different sectors. The wage penalty seems higher in smaller establishments and in the retail and manufacturing sector (table 6), but all establishment size groups and sectors experience a wage penalty for the representatives. Of course, the estimates produced on each subsample are to be considered cautiously because they rely on a small number of representatives[26]. However, the general robustness of the results between the dif-

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[26]The estimates can sometimes appear unstable: see for example the difference between the

ferent sub-groups indicates that we are not measuring only a local phenomenon. In particular, the larger penalty found in small establishments shows that the phenomenon does not concern only the large firms among which there is (a lot of) anectodical evidence concerning legal actions undertaken for "union discrimination" (see section 5).

3.4 Discussion and interpretation tests

Why are union representatives so badly paid? Two usual explanations are possible: discrimination and adverse selection. Keeping the previous notations (without the j subscript) and denoting by θ_i the productivity of worker i, we can give a mathematical definition of these 2 usual statistical notions in the context of this study:

$$\begin{cases} \text{- Discrimination (taste based):} & \mathbb{E}[w_i|\theta_i, UR_i = 1] < \mathbb{E}[w_i|\theta_i, UR_i = 0] \\ \text{- Adverse selection:} & \mathbb{E}[\theta_i|X_i, UR_i = 1] < \mathbb{E}[\theta_i|X_i, UR_i = 0] \end{cases}$$

Adverse selection reflects the fact that, for identical observable characteristics, the union representatives are less productive than their co-workers.

Statistical discrimination on wages is impossible in the long run. Indeed, there is statistical discrimination if the employer does not observe a worker productivity and lower this worker's wage regarding an observable non productive characteristic (such as gender, race or union status) because he knows or thinks that this unproductive characteristic is correlated with some unobservable component of productivity (for example laziness is unobservable and affects productivity and the employer thinks that unionized workers are more lazy). In the long run, unionized workers average productivity is observed by the employer and lower wages can only reflect adverse selection (unionized workers are indeed more lazy) or taste based discrimination

estimates without and with establishments' fixed effects among the sub-group of establishments having between 200 and 500 employees.

(unionized workers are not more lazy, the employer knows it but still he pays them a lower wage, see Becker, 1971).

The legal settings in France tend to isolate the union representatives on the field and to turn collective bargaining into a more individual bargaining between the employer and the representative. Consequently, a specific strategic interaction can then take place between the employer and the few union representatives in the firm. A careful look at the incentives of the employers in this strategic game shows that they can rationally have interest to hurt the representative to discourage other workers to become representatives and to discourage further attempts to organize (see the theoretical section of the chapter). In that sense, the term "taste based discrimination" is misleading even though the employer consciously pays to the union representatives wages that are lower than their productivity. From a statistical point of view, we can speak about discrimination. However, from an economic point of view, the potential discrimination should probably be seen as the result of a non-cooperative strategic interaction between the employer and the union representatives.

The lower wages for the union representatives could also be explained by the theory of compensating wage differentials. According to this theory (see Rosen, 1986), market forces imply under perfect competition that identical workers reach at equilibrium the same level of utility. Workers with a lower wage need to be compensated accordingly by non-monetary advantages. The lower wages for union representatives could thus be compensated by other aspects, such that a better job protection or a less stenuous work. Notice that our definition of wage discrimination is not incompatible with the existence of compensating wage differentials. Wage discrimination means that identically productive workers are paid differently. This does not mean that these differences in pay are not compensated by something else. As workers have the choice to become a union representative[27], it is clear that the few ones who do so become better off and are compensated on other dimensions for any wage discrimination they may suffer from (see the model in the previous section for example).

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[27]This is not the case for the usual sources of discrimination: gender or ethnicity cannot be modified (except for some rare exceptions).

To avoid any confusion, we need to distinguish between two types of compensations: (i) *global* compensating wage differentials that would apply potentially to all workers that become a union representative (such compensations are for example directly attached to the position of union representative) and (ii) *specific* compensating wage differential that only result from the particular individual preferences of the workers that are willing to become a union representative (more altruist, more militant, more willing to struggle, etc.). It is likely that the representatives do not have the same preferences than their co-workers and that it can explain their commitment in unions despite a potential discrimination. We do not discuss this point. However, the existence of *global* compensating wage differentials – to which the economic theory traditionny refers – needs to be discussed. Such differences could indeed justify the lower wages for union representative from a normative point of view since they would be in that case systematically compensated by some objective advantages.

Some arguments plead for the existence of *global* compensating wage differentials that may also lead to an adverse selection. First, the law gives in average 3 hours a week of time off (work discharge) for their union work. From a legal point of view, the employer should not pay these workers less because of their work discharge. These work discharges are indeed a legal duty whose the cost has in theory to be entirely borne by the employer. But from an economic perspective, if union representatives work less, they might well be paid less as a consequence. Second, the union representatives are protected against layoffs: an authorization from the labor inspection is necessary in order to fire them. This protection gives an incentive to become a union representative for workers that are at risk to be fired and can induce a selection biais. However, the protection benefiting to union representatives does not seem to be very effective (see the detailed study presented in section 5).

I do not have an experimental design that enables to identify with certainty the causal explanation of the wage penalty for union representatives. Two informal argument supports the "discrimination interpretation". The union representatives are drawn among the unionized workers and they share with these unionized workers a lot of socio-economic characteristics (see table 3 in the next section). This implies

that they are not very likely to be far less productive than the other unionized workers (table 3 shows for example that they are more educated than the average union member). Hence, the high wage differential between union representatives and the workers who are "unionized only" is unlikely to reflect a selection process. Such a selection process should concern only the representatives but not the other unionized workers who do not appear to be paid less than their non-unionized counterparts. Second, the wage penalty for the union representatives is larger among small establishments. Unions are present in only 34% of the establishments that have between 20 and 200 employees whereas they are present in 90% of the establishments that have more than 200 employees (weighted statistics from the REPONSE04 survey). It is thus among the small establishments that the employers are more likely to be able to avoid the presence of unions if they behave strategically (since among large establishment, the presence of unions is almost systematic). As a consequence, if the wage penalty for union representatives reflects a rational strategy from the employers, it is logical to find a larger penalty in smaller establishments.

I now present two tests that reinforce the idea that the wage penalty for union representatives reflects a discrimination rather than a lower productivity or a compensation in exchange of other institutionnal advantages such as the working discharges or the protection against layoffs.

The first test I provide consists in separating the representatives according to their tenure. If discrimination is at play, it cannot happen instantly. In practice, it can take the form of a lower rate of promotions and pay raises for the representatives. However, if the "bad workers" select themselves among the union representatives, this means that the representatives are drawn from the bottom of the wage distribution (conditional on their observable characteristics). In that case, we should already observe a negative wage differential between the representatives with a short tenure in their working establishment and their coworkers. Denoting by ST_i a dummy variable equal to 1 for workers having less than 5 years of tenure in their establishment,

I estimate in table 7 (col. 1 and 2) the following equation[28]:

$$\ln(w_{ij}) = \alpha_1^{ST}(p_j U_{ij} ST_i) + \alpha_1^{LT}(p_j U_{ij}(1 - ST_i)) + \alpha_2((1 - p_j)U_{ij}) + ST_i + \beta X_i + \eta_j' + v_{ij}$$
(8)

In both specifications, the wage penalty for union representatives is borne by those having more than 5 years of tenure in their working establishment. Since union representatives with short tenure are given the same work discharge than the ones with longer tenure, the results in table 7 (col. 1 and 2) show that work discharges do not explain entirely the wage penalty for union representatives. Two potentially important caveats need to be mentioned. First, equation 8 provides consistent estimates of the wage penalty for union representatives with low and high tenure only if tenure is orthogonal to p_j, that is if $\mathbb{E}[ST_i U_i | p_j] = 0$. This assumption is not verified if for example union representative have more tenure in average than other union members, which appears to be indeed the case (see table 3). Second, if discrimination is indeed at play, the accurate determinant of discrimination in the long run is the seniority of the workers as union representatives and not their tenure in their working establishment. In table 7, I implicitly assume that tenure in the establishment is a good proxy for the seniority as a representative in the establishment. This questionable assumption will be discussed in the next section. More generally, the first test proposed here of the relationship between tenure and the wage penalty for union representatives will be completed and reinforced by a precise analysis of representatives' opinions in the next section.

My second approach to suggest that discrimination and strategic interaction is at play is to look at the wage penalty for representatives from different unions and to correlate the results to the behavior of each particular union. In the REPONSE survey, the managers are asked the number of union representatives of each of the French main unions. It is thus possible to compute the proportion p_j of union representatives among unionized workers for each main union and to apply the IE and ML techniques to obtain consistent (IE) or most powerful (ML) estimators of

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[28]Unionized workers with less than 5 years of tenure represent exactly 25% of the sample of unionized workers.

the wage penalty for the union representatives of these different unions. Due to the relatively small sample size of the data, I have done it only for the 3 largest unions and I do not present estimates for the other unions. These 3 largest unions are the "Confédération Générale du Travail" (CGT), the "Confédération Française Démocratique du Travail" (CFDT) and "Force Ouvrière" (FO). CGT and CFDT have almost the same size and FO is slightly smaller. Almost 70% of the union representatives belong to these unions (about 27% belong to CGT, 27% belong to CFDT and 15% belong to FO). CGT is historically a communist union. Even though since the mid '90s communism no longer stands out as the dominant ideology driving the organization, its concrete counterpart of class struggle still characterizes the action of CGT today. According to a large sociological literature, CGT can be seen as more aggressive and less willing to make concessions than CFDT, its more direct rival. As a matter of fact, statistics from the Ministry of Labor show that, in 2004, the number of strikes initiated by the CGT union was more than twice higher than the number of strikes initiated by the CFDT union, even though the two unions are equally implanted within firms (Carlier et De Oliveira, 2005). Finally, the results in chapter 1 (see additionnal material of section 1) indicate that CGT is probably the union that bargains the largest wage premium for all the workers in the establishments in which it is represented, suggesting that it indeed adopts a combative strategy (in the sense of the model) and cannot be bribed easily in exchange for a less tough bargaining.

Among the largest unions, union representative from the CGT union are particularly badly paid (table 7, col. 3, 4 and 6). CGT union representatives appear to be paid around 20% less than non-unionized workers in all specifications. CFDT union representatives seem to be paid roughly 10% less when using the indirect estimation strategy with no fixed effects but this result is not very stable and not statistically significant in other specifications. The union representatives affiliated to the FO union representatives do not appear to be paid differently than non-unionized workers. The fact that union representatives from CGT, who are the most fighting and the more able to bargain better wages for the workers in their firm, are less paid than union representatives from other unions reinforces the idea that they play a

non-cooperative game with the employers which leads the employer to pay them poorly[29]. The results in table **??** also strongly contradict the fact that union representatives are paid less because of their institutionnal advantages (work discharge and protection against layoffs). Indeed, if this were the only explanation, we should observe an identical wage penalty for the representatives of each union since they are all granted the same work discharge.

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[29]It should be kept in mind that these last results rely on a small number of "observations". The expectation of the number of CGT, CFDT and FO union representatives on the sample is respectively 38, 41 and 26 individuals. In addition, those workers union status is not observable directly. But yet results for CGT are very significant. This probably means that, conditional on observables, almost all the few workers identified as likely to be CGT union representatives experience far lower wages. Of course, standard errors and confidence intervals are large too and direct data on the workers' union status would be necessary to assess precisely what is the size of the gap. Yet, the 95% confidence interval for the wage penalty experienced by CGT union representatives is close to [-25%,-15%].

Table 7: The representatives' wage penalty as a function of their tenure and of the union they are representing

| | dependant variable: log of hourly wage | | | | | |
| | (OLS: Indirect Strategy) | | | | (ML) | |
	(1)	(2)	(3)	(4)	(5)	(6)
Union rep. *tenure≤5 years	-0.046	0.022			-0.050	
	(0.053)	(0.067)			(0.054)	
Union rep. *tenure>5 years	-0.155***	-0.125***			-.131***	
	(0.040)	(0.036)			(0.033)	
Union rep. from CGT			-0.207***	-0.243***		-0.21***
			(0.078)	(0.062)		0.059
Union rep. from CFDT			-0.141**	0.003		-0.075
			(0.059)	(0.073)		(0.053)
Union rep. from FO			-0.011	-0.006		-0.044
			(0.081)	(0.078)		(0.083)
Union rep. from other unions			ns	ns		ns
Observations	7494	7494	7576	7576	7494	7576
R-squared	0.650	0.850	0.650	0.848		
Workers' controls	Detailed	Detailed	Detailed	Detailed	Detailed	Detailed
Establishments' controls	Standard	Fixed effects	Standard	Fixed effects	Standard	Standard

Notes: Standard errors given in parenthesis are clustered by groups of workers with the same observable union status (unionized or not) in the same workplace. The control variables are defined in the note of table 4. Corrected standard errors are not reported. *: significant at the 10% level. **: significant at the 5% level. ***: significant at the 1% level.

3.5 Testing the model's predictions

It is possible to go beyond the discussion of the possible interpretations of our econometric results and to test directly some hypothesis derived from the theoretical model. Unfortunately, the quality of the data on union representatives does not allow us to design too sophisticated tests and the use of an indirect strategy to recover representatives' wages renders necessary to make additional identification assumptions.

An obvious and direct prediction of the model is that the combative union representatives are discriminated whereas the other ones are not. The comparison we made between the wage penalties incurred by representatives from different unions confirms this simple prediction. If we suppose, in the spirit of the model, that CGT union representatives cannot be bribed (because they are always well monitored or because representatives that refuse to be bribed select themselves in the CGT union). Then, only the non-cooperative equilibrium is possible with the CGT union and it is logical to observe a higher wage penalty in that case.

Let us restate quickly the four other main testable predictions from the model. First, the probability to have a union increases with firms' profitability or equivalently, with firms' rents. Second, the unionization rate also increases with firms' rents. Third, the union representative is more likely to be combative when the unionization rate is high. Fourth, the probability to observe a combative union representative increases with firms' rents (as depicted in figure 5).

The two first predictions has already been discussed and tested in chapter 1 using the subjective market share variable as a proxy for firms' potential rents (see table **??**). We now propose a test of the third and fourth predictions. Unfortunately, we cannot observe directly if union representatives follow the yellow or the red strategy (e.g. if they are combative or not). However, according to the model, and as confirmed by the comparison of the representatives from the different unions, only the union representatives adopting the red strategy are discriminated. We can thus simply try to see if the wage penalty against union representatives is higher in establishments having a high unionization rate or a high market share. To do so, we have split establishments in two groups according to their unionization rate

or to their market share[30]. Both in specifications with and without establishments' fixed effects, the wage penalty for union representatives is higher in establishments whose market share is higher than 25% than in establishments whose market share is lower than 25% (table 8 col. 1 to 4).

Similarly, the wage penalty for union representatives is higher in establishments with a unionization rate higher than 10% than in the other establishments (table 8 col. 5 to 8). The difference in the wage penalty for union representatives between establishments with less and more than 10% of union members is statistically significant at the 1% level (whereas the equivalent difference across market share groups is not). Another potential caveat needs to be mentioned here. The proportion of union representatives among union members that we use to estimate the representatives' wages is different across groups of establishments with different unionization rate. The average proportion of union representatives among union members is equal to 19% among establishments with less than 10% of union members, and to 7% among establishments with more than 10% of union members. This difference appears because, for a given number of union representatives, a higher unionization rate translates into a lower proportion of union representatives among unionized workers. When we estimate the representatives' wages on subsamples of establishments with different unionization rates, we consequently also exploit another section of the support of the distribution of p_j to get our results. If the wage penalty for union representatives varies with p_j, this might be a problem.

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[30]More detailed desegregations are also possible. Overall, they give similar results. However these results appear less stable and less significant. Due to the limit of the data sample, we only provide a rough test of the model's prediction and we present results obtained when separating the sample in only two sub-groups

Table 8: Testing the model's prediction: Wage differential between the union representatives and their co-workers by establishment unionization rate and market share subgroups.

Sample	Market share lower than 25%		Market share higher than 25%		Unionization rate lower than 10%		Unionization rate higher than 10%	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Union representative	-0.095	-0.065	-0.161**	-0.121*	-0.100***	-0.077**	-0.331**	-0.235**
	(0.066)	(0.067)	(0.063)	(0.073)	(0.035)	(0.036)	(0.129)	(0.098)
Only unionized worker	0.0009	-0.061***	0.049*	-0.008	0.034*	-0.023	0.050**	-0.020
	(0.022)	(0.021)	(0.028)	(0.026)	(0.020)	(0.019)	(0.024)	(0.019)
Observations	3,001	3,001	1,940	1,940	5,029	5,029	1,614	1,614
R-squared	0.66	0.84	0.68	0.87	0.67	0.85	0.61	0.85
Workers' controls	Detailed	Detailed	Detailed	Detailed	Detailed	Detailed	Detailed	Detailed
Etablissements' controls	Yes	Yes	Fixed effects	Fixed effects	Yes	Yes	Fixed effects	Fixed effects

dependant variable: log of hourly wage

Notes: The "detailed" workers' controls are education (9 groups), age (in years), the square of age, gender, tenure, the square of tenure, occupation (4 groups), the number of hours worked, and a dummy for part-time working contracts. The establishments' controls are establishment size (5 groups), industry (16 groups), region (10 groups), age (5 groups) and a dummy for the presence of a union representative (union recognition).

Establishment age, union recognition, workers' occupation, tenure and hours worked have been treated for missing values: when any of these variables is missing, we recode it as equal to 0 and we include a dummy in the regression taking value 1 only when the variable is missing. Doing so, we recover about 400 additional observations.

Standard errors given in parenthesis are clustered by groups of workers with the same observable union status (unionized or not) in the same workplace. The control variables are defined in the note of table 4. *: significant at the 10% level. **: significant at the 5% level. ***: significant at the 1% level.

Interpreting the wage penalty for union representatives as the result of their non-cooperative interaction with their employers enables us to solve our initial apparent paradox: even though union recognition at the workplace level only depends on the presence of a volunteer worker to be a union representative, unions are only present in 36% of private sector workplaces with more than 20 employees. How comes so few workers accept to become representatives even though it apparently looks to be a privileged position (union representatives have a direct access to important information about their firm, they participate to work councils, they get working discharges and they might also enjoy a form of social reward by getting the esteem of their coworkers and a higher social status)? If true, the fact that workers are discriminated and have to renounce partly to their professional career when they become a union representative could be the hidden factor that makes such a decision difficult to take.

4 The opinion of representatives concerning the impact of their position on their career

I use in this section the additional survey on union representatives to provide some results on their opinion concerning the impact that their role of representative has had on their career.

4.1 The data used

The REPONSE survey also comprises a survey toward the representatives of the workforce. There are many different types of representatives of the workforce : union representatives, "mandated workers", elected members of the establishment or firm work council, members of the work council representing a union, workers' delegate or members of the health and safety commitee of the firm. Among these various types of representatives, only the union representatives, the mandated workers and the members of the work council representing a union are necessarily unionized. The other types of representatives may or may not be unionized. There is a representative

of the workforce (of any type) in 1,970 of the 2,930 establishments of the REPONSE survey. In these establishments, a representative from the most influencial workers' organization in the workplace (according to the view of the employer) has been interviewed[31]. He was asked questions about himself and his perception of the firm[32]. In particular, the representatives of the workforce were asked if they think that their participation in a workers' organization has had a positive or a negative impact on their career. I use this information with two objectives: first, test if the empirical analysis of the wage differential between union representatives and their coworkers correspond to the views of representatives themselves; and second, provide additional evidence suggesting that this wage differential results from discrimination.

4.2   Results

The representatives' opinions concerning the impact of their participation in workers' organization on their career[33] appear to vary strongly with the type of position they have. As shown by figure 13, 80% of the representatives who are not member of a union (they can be elected members of the work council or workers delegates for example) think that their participation in a workers' organization has had no impact on their career. They are only 8% thinking that it has had a negative impact. The opinion of the representatives who are union members is quite different. The proportion of unionized representatives thinking that their position has had a negative influence on their career varies from 31% for those who are not a union representative and not affiliated to the CGT union, to 50% for those who are both union representatives and affiliated to the CGT union. These figures reinforce the idea that the wage penalty for union representatives could be a negative outcome of their interaction with their employer and reflect discrimination for at least three reasons. First, the proportion of representatives thinking that their participation in

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[31]In small establishments, there is only one representative of the workforce who is in this case automatically interviewed.

[32]Unfortunately, there is no information on representatives' wages in the survey toward representatives, which explains why I used the employee survey to estimate the wage differential between union representatives and their coworkers.

[33]The exact question asked to representatives is: "Concerning your career opportunities inside your working establishment, would you say that your position of representative of the workforce has been a benefit, a handicap or has had no effect?

a workers' organization has had no impact on their career is higher for union repre-sentatives than for other types of representatives. Since only union representatives officially take part to the bargaining – the other types of representatives act as the voice of workers in their day to day relationship with the employer but they do not officially negotiate with him –, this result indicates that being a negotiator makes it more likely to feel discriminated. Second, the proportion of union representatives thinking that their position has had a negative impact on their career appears to be quite high in absolute value, ranging from 42% for those who are not member of the CGT union to 50% for those affiliated to CGT. Third and also consistent with earlier results, members of the CGT union who are known to be more combative seem to be more exposed to discrimination (according to their own beliefs).

Figure 16 in the next section will present a very similar pattern concerning job security: the proportion of representatives thinking that their position is a threat for their job is higher for union representative and representatives who are members of the CGT union[34].

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[34]However, for all types of representatives, the proportion of representatives feeling that their position affects negatively their job security is a lot smaller than the proportion feeling that it affects negatively their career. This is certainly due to the fact that representatives are protected against layoffs by the law. The next section provides an extensive discussion on this point.

Figure 13: The opinion of the different types of representatives of the workforce about the impact of their participation in workers' organization on their career (from the representatives' interviews in REPONSE04)
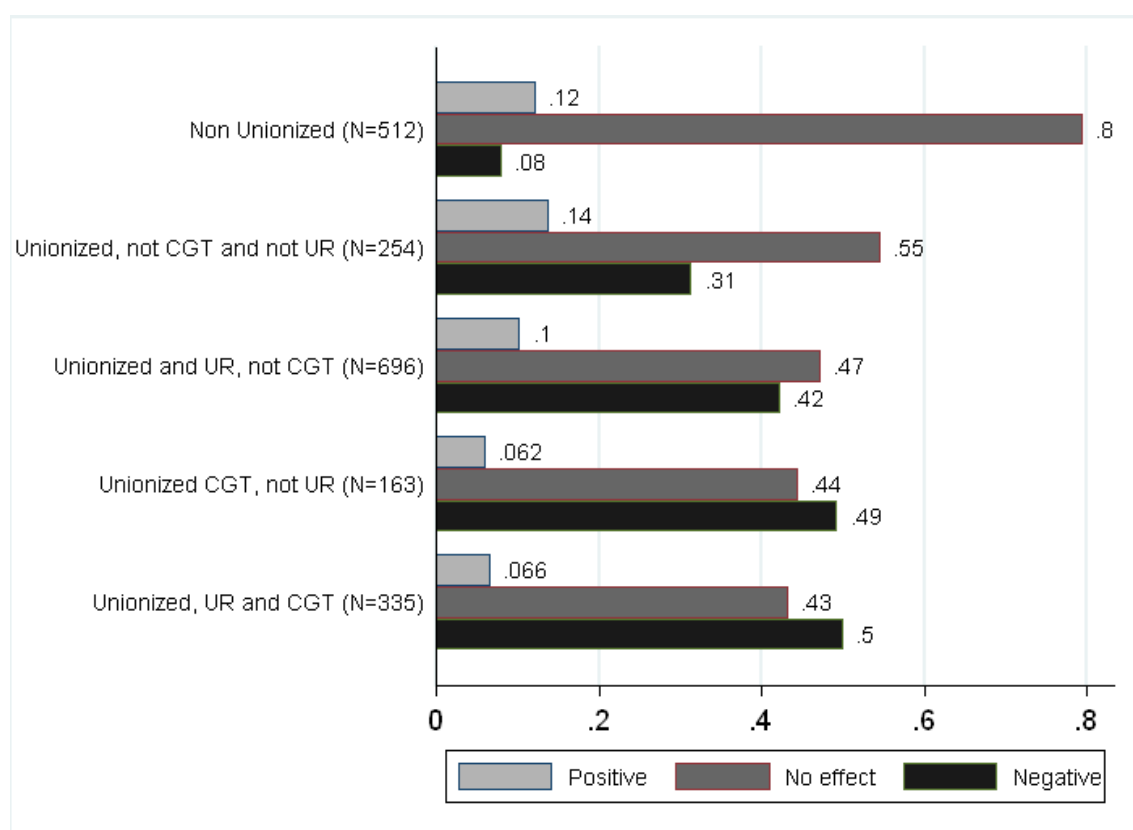
Lecture: "UR" means Union Representative. 80% of the 512 representatives in the sample who are not union members declare that the fact to be a representative did not affect their career. 50% of the union representatives who are members of the CGT union think that their position has a negative effect on their career.

Source: REPONSE survey. Representatives of the workforce part.

Note: The surveyed representatives of the workforce come from the main workers' organization in the establishment. As a consequence, they cannot be considered as statistically representative of all the representatives of the workforce in the economy.

The stylised facts presented in figure 13 could be driven by unobserved confounding factors. For example, if unqualified blue-collar workers are paid the minimum wage, it might be difficult to wage discriminate against them. Table 3 in the previous section also showed that union representatives are more tenured and more often blue-collar workers than other types of representatives.

In order to better control for some of the potential factors that could drive the stylized facts emerging from figure 13, I estimate the determinants of the representatives' opinions concerning their careers using a series of ordered logit models that allow me to control for the effect of all the relevant observable characteristics available in the data. Table 9 provides the estimates. The individual characteristics included in model (1) are those described in table 3 – except education dummies that are first ommited due to their high correlation with occupation –, as well as 3 dummy variables for being a union member, being a union representative and being a union member affiliated to the CGT union and the seniority as a representative within the workplace. Control variables for establishments' size, industry and region are also included.

The stylized facts appearing in figure 13 are fully confirmed: union members declare more often than non union members that their position of representative has a negative effect on their career. This is even more the case if they are a union representative or affiliated to the CGT union. The second column gives the marginal effect (at the mean) of these variables on the probability that a representative declares that his position has a negative impact on his career. The latter probability is 12% higher for union members than for non union members and 21% higher for union representatives than for non union members.

It also appears in model (1) of table 9 that the probability to declare a negative impact on the career increases by almost 0.5 percent per additional year of seniority as a representative within the establishment. This result is consistent with the idea that the representatives' answers reflect actual discrimination. As already said, if there is indeed some discrimination, it will not appear instantly since employers cannot cut representatives' wages overnight. In contrast, if discrimination is at play against representatives, it should appear gradually from the time when a worker

becomes a representative and it should thus increase with the representatives' seniority. The fact that more senior representatives declare more often that their participation in a worker organization has had a negative impact on their career is thus consistent with the idea that representatives are discriminated.

Concerning the other results presented in model (1): there are no differences in the representatives' opinions between men and women and qualified blue-collar workers are those who think the most that their participation in a worker organization has had a negative impact on their career. The higher probability to declare a negative impact for qualified blue-collars with respect to non-qualified ones could simply be due to the fact that the latter cannot be discriminated since they have almost no career opportunities (Beaud and Pialoux, 1999) and get a wage often close to the national minimum wage.

Model (2) is similar to model (1) but with a control for tenure in the establishment instead of the control for seniority as a representative within the establishment[35]. In contrast to seniority as a representative, it appears that tenure has no significant effect on the opinion of representatives concerning the impact of their position on their career. Such a result is even a bit surprising since tenure is highly correlated with seniority as a representative (the coefficient of correlation is 0.77) and might be suspected to play the role of proxy for the latter variable. This was actually the assumption underlying the test of the relationship between tenure and the wage penalty for union representatives that we made in table 7. The absence of link between tenure and the feeling of discrimination suggests that the former assumption was maybe too strong and it confirms that the results on the relationship between tenure and the wage penalty for union representatives should be interpreted cautiously. However, this absence of link between tenure and the representatives' opinions goes against the idea that representatives are adversely selected. If the "bad workers" select themselves among the representatives, they might get confused and believe that they are penalized in term of career because of their position as a representative, while they are actually penalized due to their lower ability. But

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[35]Since seniority as a representative and tenure are highly correlated, I first include them separately in the regressions, before putting them together in model 3.

if such a confusion is at play, the representatives' actual penalty in term of career and their statement about this penalty should vary with their tenure rather than with their seniority as a representative.

Model (3) includes simultaneously control variables for seniority as a representative within the establishment and tenure. An additional control for the seniority as a representative in any establishment is also included. The three variables are highly correlated and it might be difficult to disentangle between their respective effects on the feeling of discrimination[36]. This high correlation might explain that the coefficient for the seniority in the establishment jumps off in model (3) whereas the coefficient for tenure falls down as compared to their values in the previous specifications. The results from the previous econometric models are nonetheless confirmed: seniority within the establishment keeps driving the representatives' answers. The fact that the total seniority as a representative does not play a role is an additional indication that these answers reflect actual discrimination rather than an adverse selection of the representatives.

Finally, model 3 also includes a set of control variables for the educational attainment of the representatives. Representatives with no education have a lower probability to declare a negative impact than those who have more than a high school degree. However, here again, educational attainment and occupations are probably too much correlated to allow us to disentangle fully their respective effects. The estimated coefficient for blue-collars has indeed jumped off when we have included controls for education. I have also run an ordered logit regression with control variables for education but not for occupations and I found the estimates of the effect of education on the representatives' opinions in this last model to be non significant (results not reported). All together, these results suggest that occupation matters more than education and that the higher probability to declare a negative impact for qualified blue-collar workers is robust to controlling for education.

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[36]The correlation matrix between these variables is:

	Tenure	Seniority as a rep.	Seniority as a rep. in the estab.
Tenure	1.0000		
Seniority as a representative	0.6583	1.0000	
Seniority as a rep. in the estab.	0.7701	0.9374	1.0000

Table 9: When do representatives think that their participation in a workers' organization has had a negative impact on their career? Estimation from a series of ordered logit regression (REPONSE04)

Dep. var.: representatives' opinion concerning the impact of their position on their career (variable taking values −1 for a positive impact, 0 for no impact and 1 for a negative impact)				
	(1: estimate)	(1: marginal effect)	(2)	(3)
Individual characteristics (ref.: non unionized male manager with at least some college education)				
Union member	0.57***	*0.12***	0.56***	0.60***
	(0.16)	*(0.03)*	(0.16)	(0.16)
Union Representative	0.22*	*0.05*	0.25**	0.20
	(0.121)	*(0.03)*	(0.12)	(0.12)
Member of CGT union	0.39***	*0.09***	0.42***	0.38***
	(0.12)	*(0.03)*	(0.12)	(0.12)
Seniority as a representative	0.020***	*0.0044***		0.05***
within the workplace	(0.007)	*(0.001)*		(0.02)
Seniority as a representative				-0.018
				(0.016)
Tenure			0.0012	-0.018**
			(0.006)	(0.009)
Age	0.0031	*0.00067*	0.0141*	0.0163*
	(0.007)	*(0.002)*	(0.008)	(0.008)
Woman	-0.02	*-0.005*	-0.04	-0.03
	(0.12)	*(0.026)*	(0.12)	(0.12)
Non-qualified blue-collar	0.23	*0.052*	0.26	0.53**
	(0.23)	*(0.053)*	(0.23)	(0.25)
Qualified blue-collar	0.388**	*0.087**	0.42***	0.67***
	(0.16)	*(0.037)*	(0.16)	(0.19)
Clerk	0.29*	*0.065*	0.32*	0.47**
	(0.17)	*(0.038)*	(0.17)	(0.18)
Intermediate occupation	0.107	*0.024*	0.14	0.27*
	(0.15)	*(0.033)*	(0.15)	(0.15)
Manager/Supervisor	REF	*ref*	REF	REF
No education at all				-0.46***
				(0.173)
Vocational training				-0.31**
				(0.14)
High school				-0.25*
				(0.15)
More than high school				REF
industries, regions, age dummies	yes	yes	yes	yes
Observations	1,941	1,941	1,939	1,919

Notes: All estimates include 16 indicators for industries, 10 indicators for regions and 5 indicators for establishments size. The dependent variable takes values -1, 0 and 1 and is ordered from being a representative having a positive impact to a negative impact on the career. The second column present the marginal effect (at the mean) on the probability to declare that being a representative has a negative impact on the career for the covariates included in model (1).

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

To conclude this section on the opinion of representatives concerning the impact of their position on their career, figure 14 provides a visual summary of the relationship between these opinions and the seniority as a representative. Results are obtained using a non-linear simultaneous smoothing technique that allow both to control for other determinants of the representatives' opinions and to take into account the potential non-linearity of the relationship between seniority as a representative and these opinions. Figure 14 confirms that tenure and age are not strongly related to the representatives' answers whereas the seniority as a representative within the workplace affects them strongly and positively. Seniority as a representative in any workplace affects representatives' answers negatively. Once again, the effects of the two seniority variables might compensate each other. However, seniority as a representative within the workplace is clearly the strongest determinant of the representatives opinions: the probablilty to declare that being a representative has had a negative impact on their career goes from 10% for representatives with no seniority to 70% for those who have been a representative in their workplace for 30 years.
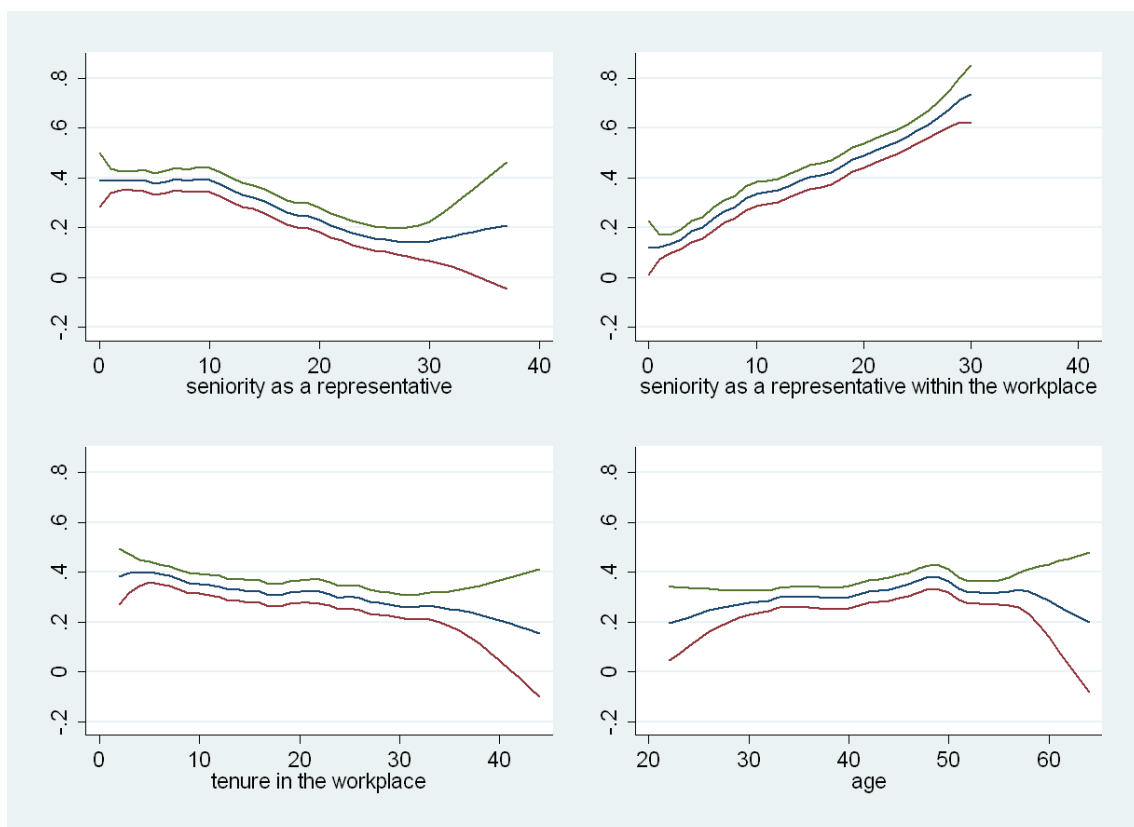
Overall, the results on the potential discrimination felt by the representatives confirm the earlier study of the wage penalty for union representatives. Put together, the pieces of evidence presented on both representatives' wages and opinions in this section and the previous one strongly suggest that representatives are discriminated. To conclude this study of union representatives, I now present elements on the strengh of the protection against layoffs offered to union representatives and on existing lawsuits for union discrimination.

5 Procedure for layoff of protected employees and lawsuit for union discrimination

This section presents elements on both procedures used to lay protected employees off, and on legal actions undertaken for anti-union discrimination.

The first part provides information about how layoff procedures for protected

Figure 14: The relationship between seniority as a representative and the fact to declare that being a representative has had a negative impact on the career

employees work, and notably statistics on their rate of use and rate of success. Without further analysis, it is difficult to know exactly to what extent protection against layoff is really effective. However, given the available studies and statistics, it appears that protection against layoff leaves some latitude to employers and does not particularly protect representatives so much.

The second part briefly presents the history of the many actions undertaken for anti-union discrimination and how they work. It should be seen as an illustration of the statistical estimation of wage gaps presented above. It also has a legal interest *per se*, notably because the statistical methods originally developed to invoke union discrimination are also applied to the much wider field of gender discrimination.

5.1   The layoff of protected employees

The employees covered by protective legislation are first of all workforce representatives: workers delegates (*délégués du personnel*), work council members (*membres du comité d'entreprise*[37]), health, safety and working conditions committee members, union representatives, union members of the work council, unique workforce commission representatives (*membres de la délégation unique*). But other categories of employees are also protected: delegates in industrial courts (*conseillers aux prud'hommes*), occupational physicians, workers representatives in companies put into receivership, workers advisors (*conseillers du salarié*) since 1991, mandated employees (*salariés mandatés*) since 1998 and representative of a union section (*représentants de la section syndicale*) since 2008. The law also protects, under certain conditions, employees who ask for organization of workers delegates elections (*élections professionnelles*) in their firm, whether or not they will be candidates thereafter. Finally, the protective procedure is applicable to both candidates in elections and former representatives during one year after the end of their term.

Any employer wishing to lay off, dismiss or transfer a protected employee to another establishment must first ask permission to the labor inspector (*inspecteur du travail*), who may authorize or reject it. The employer or the protected employee

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[37]We provide a systematic French translation of the specific vocabulary related to industrial relations or legal affairs.

can contest the labor inspector's decision and lodge an informal administrative appeal (*recours gracieux*) to the inspector, and / or an administrative appeal (*recours hiérarchique*) to the Labor Ministry, and / or a contentious appeal (*recours contentieux*) to the administrative court (De Oliveira, 2006).

From herein, we include in "lays off" all types of dismissals but we exclude transfers from an establishment to an other one. In the early 2000s, there were about 12,000 requests for layoff of protected employees each year. More precisely, the number of applications has risen from 10,463 in 1998 to 12,145 in 2004 (De Oliveira, 2006). About 70% of these requests are made for economic reasons and more than 80% of them result in a layoff authorization from the Labor Inspection.

The regular analysis conducted by the DARES on protected employees (Merlier, 2000; Merlier, 2002, De Oliveira, Merlier and Zilberman, 2005; De Oliveira, 2006; Carlier, 2009), as well as some legal studies (Weidenfeld, 2003; Maggi Germain, 2006) reveal a number of stylised facts :

1. Requests for layoff of protected employees are often accepted and recourses from employees are rare.

As indicated above, over 80% of requests for layoff of protected employees are accepted by the Labor Inspection. Employees very rarely contest the decision and lodge an administrative appeal: they do it in less than 2% of cases. On the contrary employers contest much more frequently refusals: about once in three. When lodging an appeal, employees and employers get the cancellation of the original decision of the Labor Inspection in about 25% of cases. Table 10 provides detailed statistics on appeal rates over the decade 1990-2000.

Table 10: Rates of employers' and employees' appeals and rate of confirmation of the Labor Inspection decisions by the Ministry, all types of layoffs.

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Number of layoff requests											
Denied by the Labor Inspection (against the employer's request)	1,517	1,736	2,406	3,522	2,254	2,209	2,251	2,400	1,727	1,917	1,817
Authorized by the Labor Inspection	9,299	12,086	14,345	15,282	12,499	11,309	11,815	13,521	10,953	13,348	12,852
All	10,816	13,822	16,751	18,804	14,753	13,518	14,066	15,921	12,680	15,265	14,669
Number of cases investigated following an appeal lodged by:											
Employers who contest against a layoff refusal	na	380	496	874	806	518	535	677	647	587	na
Employees who contest against a layoff authorization	na	181	224	257	224	191	203	201	216	197	na
All	576	561	720	1,131	1,030	709	738	878	863	784	842
Recourse rate (in %):											
By employers	na	22	21	25	36	23	24	28	37	31	na
By employees	na	1	2	2	2	2	2	1	2	1	na
All	5	4	4	6	7	5	5	6	7	5	6
Number of Ministry confirmations											
Of refusal decisions contested by employers	na	na	na	730	598	420	401	536	541	442	na
Of authorization decisions contested by employees	na	na	na	156	171	133	167	144	154	135	na
All	na	na	na	856	769	553	568	680	695	577	608
Ministry confirmation rate (in %)											
Of layoff refusals	na	na	na	84	74	81	75	79	84	75	na
Of layoff authorizations	na	na	na	61	76	70	82	72	71	69	na
All	na	81	84	78	75	78	77	77	81	74	72

Notes: Source: Merlier, 2002. Données traitées par la Direction des Relations de Travail, DARES.

The information published annually by the DARES also reveals a deterioration in the condition of protected employees since the early 1990s. The numbers of requests for layoff of protected employees is cyclical and it tends to increase over time. The proportion of approved requests by the Labor Inspection, has also increased over time. This does not seem to be explained neither by a hypothetical increase in the number of representatives, nor by economic conditions (see Merlier, 2002 for a deeper analysis of time trends). Besides, the existing legal studies (Weidenfeld, 2003) show a number of dysfunctions of the protective mechanism: employees do not seem to be able to fully exploit the legal devices intended to protect them, while employers manage more frequently to set up strategies to circumvent the law.

Since our goal is not to detail all the known information about protected employees, the following points focus on aspects directly related to the results presented in this chapter.

2. The dismissal rate of protected employees seems close to the average layoff rate in establishments with more than 10 employees.

This section proposes a comparison between the layoff rates of protected employees versus all employees. Available figures on the number of protected employees, on the one hand, and the rate of layoff of all employees, on the other hand, are not necessarily of high quality and controversial (Serverin and Valentin, 2008). However, there are good quality estimates of the average layoff rates in establishments with more than 10 employees based on the use of the data and survey on workforce movements: the *Données sur les Mouvements de Main d'Oeuvre* (DMMO) and the *Enquêtes sur les Mouvements de Main d'Oeuvre* (EMMO). Since there are no workers' representatives in firms with less than 10 employees and therefore no protected workers, it is judicious to compare the layoff rate of workers' representatives to the average layoff rate in firms with more than 10 employees. As a consequence, the fact that the DMMO-EMMO data do not include smaller firms is not a problem for our comparison and the DMMO-EMMO sample provides a good comparison group[38].

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[38]The layoff rate appears to decrease with firm size. Estimates of layoff rates obtained on the whole market sector (establishments with less than 10 employees included), using data on enrollments at the ANPE following a layoff, are therefore higher.

Based on DMMO-EMMO, I try to use all available information to produce a comparison of the layoff rates of protected employees versus all employees in firms with more than 10 employees. The results are mainly illustrative.

The Dares estimated to be 550.000 the number of protected employees in the late 90s (Merlier, 2000) [39]. At the same time, 15.921 requests for layoff of these employees were made in 1997 and 12.680 in 1998. The result is a request rate equal to 2.9% in 1997 and 2.3% in 1998. 85% of the requests were accepted in 1997 and 86% in 1998. To finely assess the level of layoff of protected employees, it is normally necessary to take into account not only the decisions of the Labor Inspection, but also the subsequent court decisions in case of appeal. Available statistics show that employees almost never contest the decisions of the labor inspector when laid off (they do it in about 2% of cases) while employers contest in about 30% of cases when the decision is not in their favor. Then, when there is an adminsitrative appeal, the Ministry often confirms the decision of the Labor Inspection (in about 75% of cases in 1998, whether the appeal is from the employee or the employer). These figures allow us to evaluate that the final proportion of accepted requests for layoff, before or after an adminsitrative appeal, is close to 85%. The final layoff rate of protected employees would be then around 2.6% in 1997 and 2.1% in 1998.

The DMMO-EMMO data allow us to know quite precisely the request rate for layoff in establishments with more than 10 employees. This field excludes very small firms but, as there are very few workers representatives and therefore protected employees in very small firms, it seems to provide a good comparison group[40]. Annual rates of layoff requests are estimated at 2.7% in 1997 and 2.5% in 1998 (Martin Richet, 2003). These figures are very close to those obtained for protected workers. Unprotected employees can also lodge an appeal to industrial court when laid off. They are almost a third to do so following a dismissal, and it seems that they get

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[39]The method used to get this estimate does not take into account the fact that a protected employee can hold concurrently several positions in workers' organizations and probably leads to overestimate the actual number of protected employees. The layoff rate that will be estimated for protected employees could then be undervalued because of this problem. Details on the methodology and sources used to estimate the number of protected employees are presented in the notes of the Table 11 below.

[40]The layoff rate appears to decrease with firm size. Estimates of layoff rates obtained on the whole market sector (establishments with less than 10 employees included), using data on enrollments at the ANPE following a layoff, are therefore higher.

compensation or reinstatement in about 25% of cases. We unfortunately do not know the relative proportion of reinstatements and layoffs. I made the cautious (and arbitrary) assumption that reinstatements were relatively rare and obtained in only 10% of appeals (in the other 15% of cases, employees only receive damages). This leads to estimate that 98% of layoff for unprotected employees are finally effective, which gives an actual layoff rate close to 2.6% in 1997 and 2.4% in 1998. The estimate of the proportion of layoff requests which are finally accepted after appeal (90%) is obviously questionable. However, even assuming that all requests are accepted, we get actual layoff rates extremely close (they would be 0.1% higher).

Table 11 sumarizes the results and presents a comparison of different rates in 1997 and 1998, as well as detailed notes on methods and sources used to construct these estimates. It follows: (1) that the estimated rates of layoff for protected employees are very close to those for all employees in establishments with more than 10 employees, (2) that both the estimated rates of layoff for all protected employees and for all employees in establishments with more than 10 employees are lower than the layoff rates estimated for union representatives.

Table 11: Assessment of request rate and actual layoff rate for protected employees in 1997 and 1998

Year	1997			1998		
Sample	(1) All employees	(2) Protected employees	(3) Union representatives	All workers (4)	(5) Protected employees	(6) Union representatives
Number of employees concerned [a]	23,327,300	550,000	39,450	23,780,500	550,000	39,450
Layoff requests [b]	≈ 1 million	15,921	1,636	≈ 800,000	12,680	1,559
Appeal rate if layoff for economic reasons [c]	2%			2%		
Appeal rate if dismissal for personal reasons [c]	≈35%			≈35%		
Acceptance rate by the Labor Inspection [d]		85%	80%		86%	78%
Final acceptance rate of demands [e]	≈98%	86%	77%	≈98%	87%	80%
Rate of request for dismal [f]	2.7% (DMMO)	2.9%	4.1%	2.5% (DMMO)	2.3%	3.9%
Actual layoff rate [g]	2.6%	2.5%	3.2%	2.4%	2.0%	3.1%

Notes:

[a]: Columns (1) and (4): total employment on 31th, December of that year (Source: INSEE, localized estimates of employment). The estimated numbers of protected employees and union representatives come from various sources (see Merlier, 2000). The final estimate - column (2) and (5) - is obtained by summing estimates for different categories of protected employees: 115.000 elected employees and 115.000 deputies in work councils in 1996 (Ruelland, 1997), 265.000 workers representatives in 1994 (Hamon-Cholet, 1996), 39.450 union representatives in 1993 (Deville, 1996), 7.317 industrial tribunal advisors, 4.160 workers advisors and 13.000 mandated employees. Therefore it does not consider the plurality of positions held and so may overestimate the number of employees actually protected. The estimated number of union representatives dates from 1993, four years before the period 1997-1998. As the unionization rate has declined over the period (from 9.8% in 1993 to 8.3% in 1998), it is unlikely that the number of union representatives has increased significantly between 1993 and 1997-1998.

[b]: Source: Merlier, 2000. Data on the layoff of protected employees identified by the Ministry of Labor through the sections of the Labor Inspection and the local governement body for labor, employment and vocational training.

[c]: Appeals to the industrial court. The vast majority of appeals are related to dismissals. Source: Serverin and Valentin, 2009. Obtained from the *Répertoire Général Civil*.

[d]: Source: Merlier, 2000. The acceptance rate for requests for layoff by the Labor Inspection is not provided for union representatives directly in the available data. I have considered instead the average acceptance rate for all unionized protected employees (calculated from data provided by Merlier, 2000, Table 4, p.5).

[e]: The final acceptance rates (ie after any legal appeal) of requests for layoff have been estimated from various sources:

For all employees, there is no precise estimate but it seems that about 25% of appeals following a dismissal lead to the rehabilitation of employee (Serverin and Valentin, 2009). In other cases, the appeals do not necessarily fail, but most often lead to the payment of compensation by the employer. In the late 1990s and early 2000s, layoffs have been divided between redundancies and dismissals in proportions close to 2/3-1/3 (eg DARES INDICATORS, February 2011 - No. 014 , Figure 5). Assuming that the appeals after redundancies are routinely lost, we obtain the final acceptance rate shown in columns 2 and 5. The figures are nevertheless subject to considerable uncertainty.

For protected employees and union representatives, the data provided by the DARES allow estimating that employers dispute about 30% of the decisions of the Labor Inspection with a success rate of about 25% of these disputes. Employees contest their layoff only rarely. Applying these rates for both all protected employees and union representatives, we obtain the figures in columns 3, 4, 6 and 7.

[f]: In columns (1) and (4), it is the average layoff rate in the sample of establishments with more than 10 employees estimated from DMMO (Richet-Martin, 2003). Another estimate, which would also include small firms, is possible using the job applications registered by the ANPE following layoff. However, the fact that there is virtually no workers representatives in small firms and that the ANPE data are declarative led me to discard them.

The rates for protected employees (including union representatives) are obtained by dividing the number of requests by the number of protected employees.

[g]: Obtained by applying the final acceptance rate to layoff request rate. In columns (1) and (4), the acceptance rate is calculated from statistics on all layoffs, while the rate of layoff requests only applies to establishments with more than 10 employees. This assumes implicitly that the acceptance rate of requests is the same for establishments with more and less than 10 employees.

3. There are more layoff requests against CGT protected employees, but these requests are less frequently accepted.

About a third of requests for layoff of protected employees involve unionized employees (4,778 requests compared to a total of 13,440 in 2003). The figures in Figure 15 show that there are many more claims against workers affiliated to the CGT union compared to claims against workers affiliated to the CFDT union, even though the two unions are close in size (similar number of members, professionnal election results and total estimated number of union representatives on the shop floor). In 2004, 38.1% of requests for layoff of unionized protected employees relate to the CGT union, while, for example, only 27% of union representatives from establishments with more than 20 employees are CGT members (see Table 1.1). This overrepresentation of the CGT among layoff requests of protected employees is not occasional since it occurs all years from 1998 to 2004.

Figure 15 also shows that requests for layoff of workers affiliated to the CGT union are less often accepted that requests against protected employees affiliated to other unions and non-affiliated. This result appears to be stable over time. From a statistical estimate for the years 2001 to 2003 which controls for observable characeristics of protected employees and of their working establishment (occupational status, number and type of positions held, establishment size, industry and reason for the layoff), De Olivera et al. (2005) have shown that the probability that the Labor Inspection refuses a request for layoff is always stronger when it is a claim against a worker affiliated to the CGT union. All these results could indicate that more employers would try to lay GGT representatives off in a manner contrary to labor law. We then have an additional clue about the particularly negative strategic interaction that could occur between some unions and employers.

4. Protected employees that are members of a union seem more exposed

There are no data on the number of unionized protected employees. It is therefore not possible to compare the rates of layoff request for unionized and non unionized employees. However, it is possible to compare the rates of authorizations granted

Figure 15: Requests for layoff (all reasons) depending on union affiliation: number and proportion authorized by year. 1998-2004
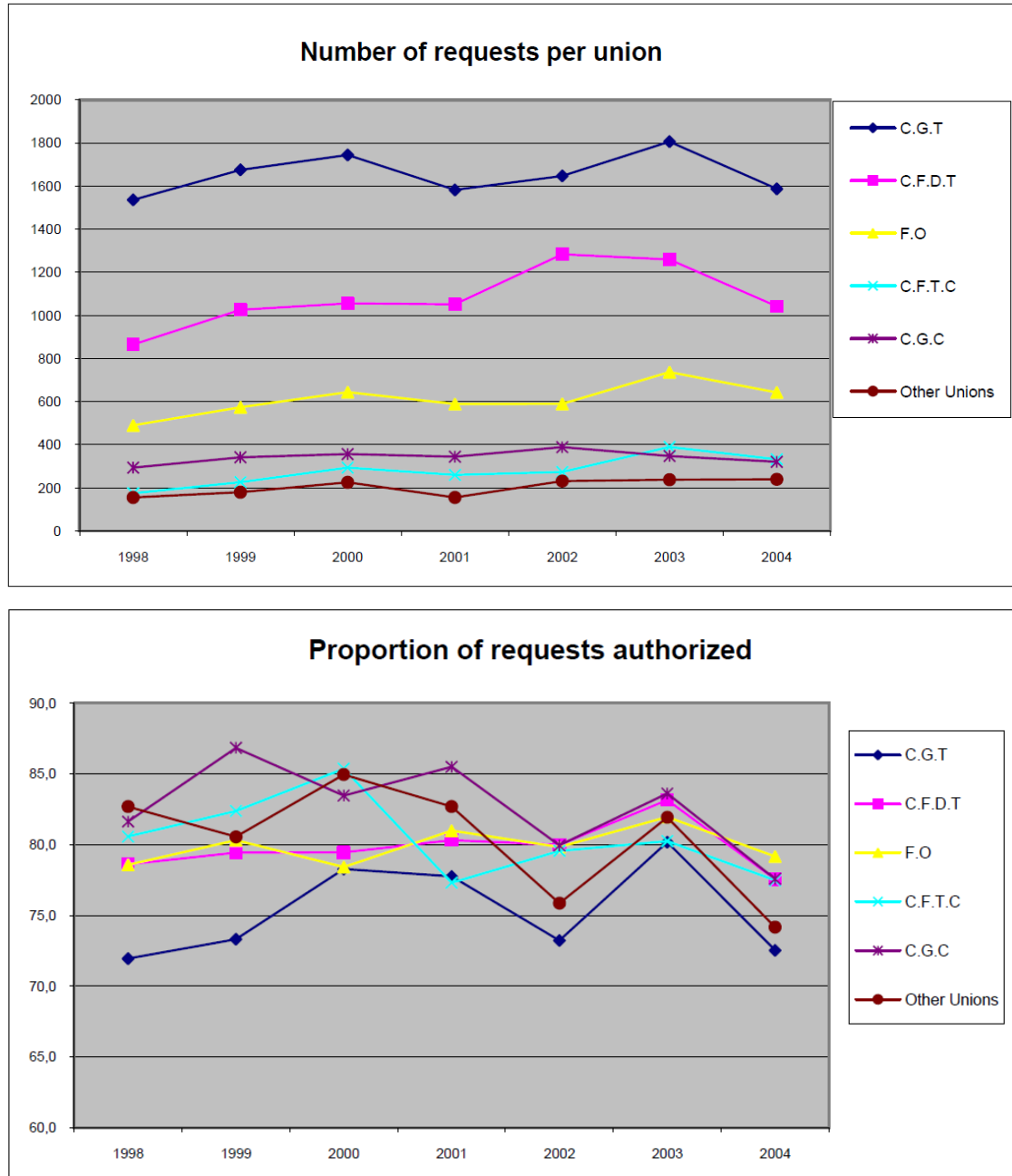
Lecture: In 2004, for a total of 1,587 requests for layoff for a protected employee affiliated to the CGT union, 72.5% of them were authorized by the Labor Inspection. Transfers between firms or establishments are not included. *Source*: Data on protected workers, Dares.

by the Labor Inspection for unionized and non-unionized employees. In 2004 the Labor Inspection has accepted 87.6% of layoff requests for non-unionized protected employees but only 75.7% of requests for unionized protected employees. The table below shows that such a trend already existed in the late 90s. The previous paragraph has shown that there were, in proportion, more layoff requests for protected employees affiliated to the CGT union, and more frequent refusals from the Labor Inspection. Similarly, the much higher rate of layoff refusal from the to Labor Inspection for unionized employees may indicate a greater propensity of employers to wish to get rid off them in a manner contrary to law. In this sense, the highest rejection rate of the Labor Inspection for unionized employees is an indication of their greater exposure.

	1997	1998	2003	2004
Union members:	76%	78%	81.6%	75.7%
Non union members:	89%	90%	88.4%	87.6%

5. The previous stylized facts are confirmed by the opinion of representatives concerning the impact of their position on their job security

I use the additional survey on union representatives to provide some results on their opinion concerning the impact that their role of representative has had on their job security. The present analysis is conducted similarly to what was done in subsection 4 to analyze the opinion of the representatives concerning their career.

Two main observations emerge from Figure 16. First, most representatives believe that their role of representative is neither a protective nor a threat to their jobs. This result is consistent with the idea that the protection against layoff which benefits to representatives is only moderate. Second, union representatives feel more often than the other representatives that their position of representative is a threat to their jobs: they are 9.4% in this case among non delegates, 14% among delegates and 19% among those who are affiliated to the CGT union. Again, employees' opinions seem consistent with the statistics provided by the Dares.

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Figure 16: The opinion of the different types of representatives of the workforce about the impact of their participation in workers' organization on their job security (from the representatives' interviews in REPONSE04)
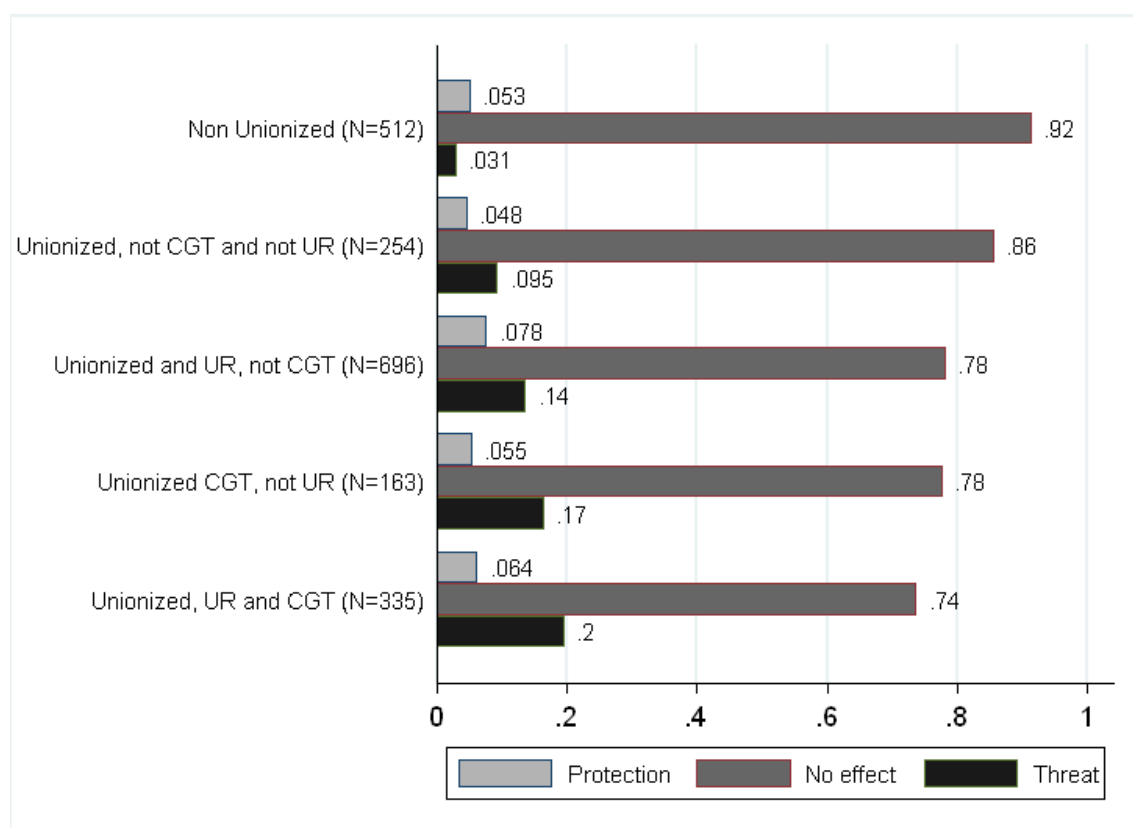
Lecture: "UR" means Union Representative. 92% of the 512 representatives in the sample who are not union members declare that the fact to be a representative has no effect on their job security. 20% of the union representatives who are members of the CGT union think that their position has a negative effect on their career.
Source: REPONSE survey. Representatives of the workforce part.
Note: The surveyed representatives of the workforce come from the main workers' organization in the establishment. As a consequence, they cannot be considered as statistically representative of all the representatives of the workforce in the economy.

In order to better control for some of the potential factors that could drive the stylized facts emerging from figure 16, I estimate the observable determinants of the representatives' opinions concerning their job security using a series of ordered logit models that allow me to control for the effect of all the relevant observable characteristics available in the data. The control variables used in these models are strictly equivalent to the ones used in table 9. The estimates are presented in Table 12.

The previous stylized facts are globally confirmed: union members declare more often than non union members that their position of representative has a negative effect on their job security. This is even more the case if they are affiliated to the CGT union. However, the opinion of union representatives is similar to that of representatives that are union members without being a union representative. The second column gives the marginal effect (at the mean) of these variables on the probability that a representative declares that his position has a negative impact on his career. The latter probability is 3% higher for union members than for non union members and 6% higher for union members affiliated to the CGT union than for non union members. It also appears that the probability to declare a negative impact on the career increases by almost 0.17 percent per additional year of seniority as a representative within the establishment. Finally, the probability that a representative declares a negative impact of his position on his job security increases with establishment size. All these results are robust to the inclusion of additional controls (see models 2 and 3) [41].

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[41]The reader interested in additional keys concerning the construction of table 12 and the interpretation of its results should look at the discussion going with table 9.

Table 12: When do representatives think that their participation in a workers' organization has had a negative impact on their job security? Estimation from a series of ordered logit regression (REPONSE04)

Dep. var.: representatives' opinion concerning the impact of their position on their job security (variable taking values −1 for a positive impact, 0 for no impact and 1 for a negative impact)				
	(1: estimate)	(1: marginal effect)	(2)	(3)
Individual characteristics (ref.: non unionized male manager with at least some college education)				
Union member	0.335*	*0.0303*	0.335*	0.355*
	(0.20)	*(0.02)*	(0.20)	(0.21)
Union Representative	0.0444	*0.00427*	0.0672	0.0420
	(0.15)	*(0.01)*	(0.15)	(0.16)
Member of CGT union	0.369**	*0.0381**	0.404***	0.355**
	(0.15)	*(0.02)*	(0.15)	(0.15)
Seniority as a representative	0.0180**	*0.00173**		0.0593**
within the workplace	(0.01)	*(0.00)*		(0.02)
Seniority as a representative				-0.0334
				(0.02)
Tenure			0.00453	-0.0182
			(0.01)	(0.01)
age	-0.000854	*-8.21e-05*	0.00626	0.00528
	(0.01)	*(0.00)*	(0.01)	(0.01)
woman	0.0358	*0.00347*	0.0298	0.0319
	(0.15)	*(0.01)*	(0.15)	(0.15)
Non-qualified blue-collar	0.00899	*0.000868*	0.0414	0.0121
	(0.30)	*(0.03)*	(0.30)	(0.32)
Qualified blue-collar	0.191	*0.0190*	0.212	0.140
	(0.21)	*(0.02)*	(0.21)	(0.24)
Clerk	-0.0143	*-0.00137*	0.0157	-0.0209
	(0.22)	*(0.02)*	(0.22)	(0.24)
Intermediate occupation	-0.0383	*-0.00365*	-0.0130	-0.0170
	(0.19)	*(0.02)*	(0.19)	(0.20)
Manager/Supervisor	REF	*ref*	REF	REF
No education at all				0.260
				(0.22)
Vocational training				0.0691
				(0.19)
High school				-0.222
				(0.20)
More than high school				REF
Establishment characteristics: (ref: more than 500 workers)				
20-50 Workers	-0.244	*-0.0220*	-0.285	-0.202
	(0.22)	*(0.02)*	(0.22)	(0.22)
51-100 Workers	-0.355	*-0.0309**	-0.377*	-0.316
	(0.22)	*(0.02)*	(0.22)	(0.22)
101-200 Workers	-0.220	*-0.0202*	-0.234	-0.197
	(0.18)	*(0.02)*	(0.18)	(0.18)
201-500 Workers	-0.426**	*-0.0367**	-0.440**	-0.387**
	(0.19)	*(0.01)*	(0.19)	(0.19)
industries and regions dummies	yes		yes	yes
Observations	1936		1934	1914

Notes: All estimates include 16 indicators for industries and 10 indicators for regions. The dependent variable takes values -1, 0 and 1 and is ordered from being a representative having a positive impact to a negative impact on the job security. The second column present the marginal effect (at the mean) on the probability to declare that being a representative has a negative impact on the career for the covariates included in model (1).

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

5.2 Legal proceedings for anti-union discrimination

In parallel with the so far complete absence of data (and then studies) on how union representatives are treated, there are many anecdotical evidence of "anti-union discrimination". Legal proceedings for anti-union discrimination are indeed frequently initiated by union representatives. The CGT union has won legal proceedings in more than one hundred firms. 169 militants have received financial compensation from Peugeot, more than 700 from Renault and 230 from Airbus. In 2004, negotiations were completed in large groups including Dassault, EDF, EADS, or SNPE Tracma. Others were in progress at Thales and Valeo. Finally, about sixty cases were under way before courts in 2004 (Semaine sociale Lamy, November 15, 2004, no. 1190) [42].

This contrasts with the situation of discrimination between men and women. The wage differential between men and women is well known and measured, and is closely followed by statisticians and researchers worldwide. Many studies allow attesting that women remain paid about 15% less than men in France. This good knowledge of the wage gap between men and women has certainly provided the basis for the development on March 23th, 2006, of the law on gender diversity and on professionnal equality between men and women. The law followed the inter-professionnal agreement dated March 1st, 2004. It imposed the social partners to negotiate each year to define and program actions to suppress the gender wage gap before December 31st, 2010, as part of the annual negotiations on salaries both at the branch and at the firm level. In parallel with this good statistical knowledge and with the subsequent legislative progress, there are paradoxically relatively few cases of gender discrimination trial.

This section quickly presents the genesis and functioning of legal actions for anti-union discrimination, and the junctions possible, in terms of law, between anti-union

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[42]The press, including *Le Monde* and *Libération*, regularly reports on trials for anti-union discrimination. See for example the articles available online at the site of *Libération* :
- a good article on the positions of the various actors concerned: http://www.liberation.fr/economie/0101408350-discrimination-syndicale-les-entreprises-se-rachetent-une-conduite
- on Peugeot: http://www.liberation.fr/economie/0101254978-peugeot-regularise-ses-syndiques-promotio
- on Michelin: http://www.liberation.fr/economie/0101470508-discrimination-syndicale-michelin-relaxe
- on Nestlé: http://www.liberation.fr/economie/0101593171-le-syndicaliste-qui-valait-608-000-euros

discrimination and men / women discrimination.

Genesis of legal actions for anti-union discrimination

The first collective legal battle against union discrimination took place in the late 1990's at Peugeot in Sochaux. It is the result of an individual combat, that of François Clerc, a CGT militant particularly determined. In 1994, the CGT union representatives in Peugeot began to collect their payroll and comparing their career to the career of their non-unionized or non representative colleagues. They brought their case to the industrial tribunal of Paris in December 1995. The tribunal made a favorable decision, as well as the Court of Appeal of Paris in June 1996. After two more years of failed negotiations and judicial adventures, compensation for discriminated representatives were finally negotiated in spring 1998 with the new management of the group (Jean-Martin Folz), who is more conscious of social dialogue.

Legal action as a mean to defend its interests is not obvious at all to a union, especially a union like the CGT, whose anarcho-union trend is enshrined in its constitution. The judiciary milieu is perceived as a middle or upper-class one. Using the legal instrument means using the instrument of the class opponents. The method itself, its slowness, its inertia, the principle of the rule of *res judicata* do not fit in the tradition of spontaneous revolutionary action originally advocated by the CGT. Last point, which is perhaps the most interesting one: career sacrifice is seen by activists as a normal situation. On the one hand because they are perfectly used to this situation and have never really seen the possibility of a different situation. Moreover, because the militants are attached to their martyr situation and seem inclined to be satisfied with a position of victims that they are not ready to give up (Beaud and Pialoux, 1999). They would have the culture of sacrifice. About an indemnity agreement, Fred Dijoud, the CFDT activist quoted by Liberation explains: "Some friends have refused to benefit from the agreement. They feel they were aware of the risks of their commitment to the union." Besides a CGT member also argues that "being discriminated is the proof that we are not bribed by the management".

For all these reasons, the legal battle led by François Clerc and his fellow militants of the CGT Peugeot Sochaux has initially received no support from the union confederation, who was originally opposed. More than 10 years later, attitudes have changed a bit: François Clerc is now permanent headquarters of the CGT (at the metallurgy confederation) where he is helping grassroots militants in their efforts to lodge an appeal for anti-union discrimination. However, the use of the legal tool remains a source of divisions at the CGT and is still far from unanimous[43].

Functioning of legal actions for anti-union discrimination

First approximative, the method used by union representatives to prove that they are the subject of discrimination is now well established. They start collecting for each potentially discriminated unionized worker what they call a "panel of comparisons", by finding career evolution of employees who joined the company along with them and were equally qualified. To do this, they use the single register of workforce which contains the age, seniority, gender, employment and qualification of each employee, as well as the preparatory document to wage negotiations which contains the average wages. Once a folder containing facts is well established, union representatives solicit the Labor Inspection who carries out, on its side, comparisons of career curves from more comprehensive data (unlike union representatives Labor Inspection has access to the individual salary of all employees). When the Labor Inspection reaches the same conclusions as the representatives (which is almost always the case), they alert the management that they are able to establish the existence of an anti-union discrimination. If the management is willing to discuss negotiations are open. If not (in most cases), representatives lodge an appeal, civil or criminal.

From a statistical point of view, trade unionists try to show the judges that the careers of some of them stop exactly when they take a trade union office, while most of their colleagues continue to progress. This method (the "Clerc method") has gradually established itself and has been recognized by courts as a valid method

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[43]A sociography of representations associated with the function of a union representative is far beyond the scope of this thesis. Such a study as well as a work on the evolution of attitudes towards union discrimination trials could offer a particularly fertile ground for those wishing to understand the recent changes in trade unionism in France

to indicate a presumption of discrimination [44]. The "method Clerc" provides an easy way to calculate the damages: it is a simple calculation of the integral over time of wage differences between the militant (from the date on which he took its mandate) and the average salary of his colleagues who arrived in the company at the same time and equally qualified. The former professional worker François Clerc explains: we trace the evolution curve of the militant wage, the wage evolution curve of employees of its panel of comparisons and the amount of damages is equal to the area of the triangle between the two curves.

The principle of the presumption of innocence is enshrined in the Declaration of the Rights of Man and the Citizen of 1789 and it is therefore constitutional in France. One of its immediate consequences is that the burden of proof rests on the prosecution. For discrimination at work, demonstrating a difference in treatment (through comparisons of career profiles) cannot constitute evidence of discrimination. The difference in treatment between different employees may in fact reflect a difference in competence. Furthermore, individual measures for employees, even right to subjective assessment, are essential prerogatives of the employer. Thus, an employee who is suing his employer for discrimination must both be able to show that there is a difference in treatment between him and his colleagues and that this difference does not reflect his lower skill level. This second point is very complex in practice to prove as the "competence" or "productivity" of an employee is essentially impossible to measure. The prosecution can work around this difficulty if the employer did not offer training to the potentially discriminated employee. Indeed, employers have a duty to provide re-skilling training to employees whose skills become outmoded or obsolete. Thus, an employer who did not offer vocational training to an employee during his career should not be able to argue that the employee is less paid because he is less competent. However, such situations seem to remain difficult to demonstrate in practice.

Article L1134-1 of the Labor Code introduced by the Act of November 16th,

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[44] Here again, the study of the appropriation of statistical tools in the legal field is beyond the scope of this thesis, but seems to offer a promising subject for study.

2001, now regulates the unilateral power to employers in the execution of the work relationship and seems to have fundamentally changed the legal proceedings relating to discrimination at work. Article L1134-1 sets up what is commonly called the "shifting of the burden of proof" (*"aménagement de la charge de la preuve"*) or even the "reversal burden of proof" (*"renversement de la charge de la preuve"*) in civil proceedings. It defines (section 4) that the allegation of proof relies on the employee while the burden of proof is now up to the employer: "In case of dispute on the application of the preceding paragraphs, the employee concerned (...) presents facts suggesting the existence of a direct or indirect discrimination. In view of this, the defendant has to prove that his decision is justified by objective factors unrelated to any discrimination. The judge gives his conviction after ordering, if necessary, all investigative measures he considers to be necessary" (translation by the author).

Since then, the procedure seems relatively well mapped for potentially discriminated employees. They start establishing a file and carrying out career comparisons between potentially discriminated employees and their colleagues. Then, they solicit the Labor Inspection for confirmation of their claims and try to open negotiations with their employer. If they fail, they can initiate a civil or criminal proceeding for anti-union discrimination. The reversal of the burden of proof introduced by the Act of November 16th, 2001, for civil proceedings seems to greatly facilitate their work and give them a good view of the potential outcome of the trial. The many successes appear to attest it[45].

6   Conclusion

The theoretical examination of the interaction between union representatives and employers has underlined that an accurate modeling of intra-firm bargaining should take into account two crucial specificities of such a bargaining. First, the union representative is both bargaining with the employer and under her authority as a salaried worker. It implies that the employer has some idiosyncratic power on the

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[45]In 2008, a law reducing to five years the duration of the limitation period for a large number of civil proceedings has almost closed union discrimination trials. This was finally not the case. See legal appendix for more details.

representative situation that she may use. Second, the representative's individual incentives are not automatically aligned on his coworkers'. A careful modeling of the potential agency problems within the union are thus necessary in order to be able to make accurate predictions on the possible outcomes of the bargaining.

The empirical part of this chapter has shown that union members in France are slightly less paid than their non-unionized coworkers. When this wage gap is broken apart between union representatives, who bargain for all the employees in their workplace with the employer, and the workers who are only unionized, a clear pattern appears: only unionized workers earn as much or even slightly more than non-unionized ones whereas union representatives are paid 8 to 11% less, even in specifications that control for workplaces fixed effects.

A non-cooperative game probably takes place between employers and union representatives, which leads the employer to discriminate against the representatives. Such an exclusive interaction which does not comprise the other workers is made easier by the French legal context in which union representatives are not democratic representatives of their coworkers (they are not elected). Empirical results reinforce the idea that a non-cooperative game takes place: the most penalized union representatives are precisely those from the least cooperative union and those with the longest tenure.

To my knowledge, this research is the first on union representatives. It has the virtue to reveal an unknown important statistical fact that concern many workers: in France, even if unionization rates are low, there are still more than 1 million unionized workers in the private sector and, in 2004, probably more than 100,000 of them are union representatives[46]. The other types of representatives of the workforce may also have, at least in some extent, lower wages than the workers who are not a representative.

But the phenomenon does not concern only the representatives. Every worker is affected by within firm collective representation or bargaining. Beyond being a possible case of discrimination against some workers, the potential wage penalty for representatives can also imply an absence of collective bargaining in some cases or

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[46]According to my own estimations made using the REPONSE survey in 2004 .

a dysfonctionning collective representation in some other cases. Before discussing the possible interpretations of the wage penalty for union representatives, this research indeed indicates a potential disfonctionning of the French system of industrial relations: whatever the reason is, it does not look normal that the within-firm negotiators get wages that are 10% lower than the wages of the workers for whom they bargain.

Finally, union representatives are not observable directly in the data and their potential number (128) is relatively small. Further research on this topic and direct data collection on union representatives would be necessary in order to get more precise estimates of the exact value of the wage differential between union representatives and the workers they represent. Such data should be available soon. Indeed, when the scientific committee in charge of the 2011 REPONSE survey met for the last time during the spring 2010, I already had first results on the union representatives' wages and I could convince them to include a direct question on union representatives in the workers part of the next survey. In the 2011 REPONSE survey which should be available in January 2012, workers will thus be asked both if they are a union member and a representative of the workforce. With these two pieces of information, a deeper empirical analysis will be made possible. The new data should also allow to test more sophisticated theoretical predictions and to link far more closely theory and evidence than this study currently does. As a consequence, our current understanding of the negotiations between union representatives and employers could be greatly improved. This looks like a promising research avenue that can potentially have implications going far beyond the single field of industrial relations. We are still far from there, but a better understanding of the ins and outs of within firm bargaining should make it possible to provide solutions to improve the workers' bargaining power – either directly through solutions given to unions and workers, or through the design of adequate public policies. This in turn can have implications on overall inequalities. Fiscal policies seem politically difficult to implement in order to put an end of the recent increase in income inequalities (see Piketty, 2001 and Landais, 2007 for France). In this context, solving the main dysfonctionning of our industrial relation system(s) in order to increase the bargaining

power of workers appears as a more direct and natural solution.

7 Mathematical appendix: Proof of propositions 1 and 2.

The term $e_{ij} = UR_{ij} - p_j U_{ij}$ can be seen as a measurement error: the difference between the fact and the probability to be a union representative. By construction, this term verifies 2 properties enonced in the following lemmas:

Lemma 1: $\mathbb{E}[e_{ij}] = 0$

Proof: We have $\mathbb{E}[e_{ij}|U_{ij} = 0] = 0$ (because non-unionized workers cannot be union representatives) and $\mathbb{E}[e_{ij}|U_{ij} = 1] = P(UR_{ij} = 1)(1 - p_j) + P(UR_{ij} = 0)(-p_j) = p_j * (1 - p_j) + (1 - p_j) * (-p_j) = 0$. This implies Lemma 1.

Lemma 2: $Cov(p_j U_{ij}, e_{ij}) = 0$

Proof: First, $Cov(p_j U_{ij}, e_{ij}) = \mathbb{E}[(p_j U_{ij} - \mathbb{E}[p_j U_{ij}])(e_{ij} - \mathbb{E}[e_{ij}])] = \mathbb{E}[p_j U_{ij} e_{ij}]$. Next, we have:

$$
\begin{aligned}
\mathbb{E}[p_j U_{ij} e_{ij}|U_{ij} = 0] &= 0 \\
\mathbb{E}[p_j U_{ij} e_{ij}|U_{ij} = 1] &= \mathbb{E}[\mathbb{E}[p_j e_{ij}|UR_{ij} = 1]P(UR_{ij} = 1) \\
&\qquad + \mathbb{E}[p_j e_j|UR_{ij} = 0]P(UR_{ij} = 0)|U_{ij} = 1] \\
&= \mathbb{E}[p_j(1 - p_j) * p_j - p_j(-p_j) * (1 - p_j)] \\
&= 0
\end{aligned}
$$

Consequently, $Cov(p_j U_{ij}, e_{ij}) = 0$ [47].

Noticing that $UO_{ij} = U_{ij} - UR_{ij} = (1 - p_j) * U_{ij} - e_{ij}$ and plugging $p_j U_{ij}$ and $(1 - p_j)U_{ij}$ in equation 3. We get:

$\ln(w_{ij}) = \alpha_1(p_j * U_{ij}) + \alpha_2((1 - p_j) * U_{ij}) + \beta X_i + \eta_j + u_{ij} + (\alpha_1 - \alpha_2)e_{ij}$.

$\mathbb{E}[u_{ij}|p_j U_{ij}] = \mathbb{E}[u_{ij}|UR_{ij} - e_{ij}] = 0$ because we have assumed that $\mathbb{E}[u_{ij}|UR_{ij}] = 0$ and supposed that u_{ij} and e_{ij} are not correlated. $\mathbb{E}[e_{ij}|p_j U_{ij}] = 0$ also follows from Lemmas 1 and 2.

Denoting $v_{ij} = u_{ij} + (\alpha_1 - \alpha_2)e_{ij}$ the residual in the econometric equation above, we

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[47]Note that e_{ij} should not be seen as a classical measurement error. Indeed, the classical error in variable assumption that econometricians would have in mind when dealing with measurement errors would be $Cov(UR_{ij}, e_j) = 0$, that is, the measurement error is not correlated with the true value of the considered variable. This assumption is obviously wrong here since $\mathbb{E}[e_{ij}|UR_{ij} = 0] < 0$ and $\mathbb{E}[e_{ij}|UR_{ij} = 1] > 0$.

finally have $\mathbb{E}[v_{ij}|p_j U_{ij}] = 0$, which is a sufficient condition to prove that the OLS estimation of 4 provides consistent estimates of α_1 and α_2.[48]

Also, if u_{ij} is uncorrelated with e_{ij}, we immediately have that $\sigma_v^2 = \sigma_u^2 + (\alpha_1 - \alpha_2)^2 \sigma_e^2$.

QED.

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[48]Note that the estimates of β and η_j could be biased if $\mathbb{E}[v_{ij}|X_i, \eta_j] \neq 0$. That will occur if $\mathbb{E}[e_{ij}|X_i, \eta_j] \neq 0$. The measurement error e_{ij} actually plays the role of an omitted variable: not having it in the regression biases the estimation for the variables that are correlated with it. As, by construction $p_j U_{ij}$ is not correlated with e_{ij}, it follows that the estimates of α_1 and α_2 are unbiased.

8   Legal appendix: recent developments and extension of proceedings to men/women discrimination

Legal action has been much more developed in terms of anti-union discrimination than in matters of gender discrimination, even though discrimination between men and women is much better known and studied and probably a little more statistically significant. One possible explanation for this phenomenon is the progressive involvement of union organizations in legal proceedings. Using the legal tool seems actually very difficult for a single employee who does not benefit from the support of a large organization with its own legal unit and financial resources.

The methods used in the case of anti-union discrimination and the relatively consistent associated jurisprudence begin to be applied to cases of men / women discrimination. The case of Marie-Guyty Niel, trader at BNP-Paribas and a graduate from HEC, is an emblematic case. First, because it is Francois Clerc himself, and on his behalf part of the CGT, who helped Ms. Niel to build her case for discrimination and who pleaded in her favor as an expert at the hearing to the High Authority against Discrimination and for Equality (HALDE). By a decree of May 5th, 2010, the Court of Appeal of Paris has condemned BNP-Paribas to pay nearly 200,000 euros of compensation to Ms. Niel for all damages suffered. It is not without irony that the CGT, the union historically in favor of workers, was found to be associated with the defense of a trader, whose annual gross salary still exceeds 50,000 euros in 2006 i.e. more than the salary earned by 99.9 % of workers (based on exhaustive data from the ESS2002 survey).

Beyond its symbolic force, the case of Mrs. Niel illustrates how the legal advances obtained concerning mostly union discrimination have gradually extended to the much wider field of gender discrimination. As stated in the newspaper Liberation, Ms. Emmanuelle Boussard-Verrecchia, Ms. Niel's lawyer in the case of discrimination at BNP Paribas : "What frightens employers is that after cases of unionized discriminated workers come those of women, which are many more nu-

merous".

A final legal rebound seems to indicate that the increase in trials about discrimination at work, notably in civil proceedings, is beginning to cause concern. In November 2007, Senator Jean-Jacques Hyest (UMP) has proposed an law to reduce to five years (instead of thirty years now), the duration of the prescription for civil proceedings. The law as it was originally proposed, would have completely changed the situation of discrimination in the workplace. Indeed, discrimination is slow to appear because it takes the form of non-wage increase and not of immediate decrease. Therefore long time series are needed to determine the wage differential treatment. Also, the compensation asked by the complainant relates to long periods, while the new law would have only permitted compensation over five years, greatly limiting the financial risk for companies that are discriminating.

The law was actually voted on June 17th, 2008. But the original text relating to discrimination was amended in the last minute. Thus, Article L. 1134-5 which stated in its original form that "The time limit for proceedings to get reparation of the damage suffered from discrimination is five years starting from discrimination" was ultimately edited as follows: "The time limit for proceedings to get reparation of the damage suffered from discrimination is five years starting from the revelation of the discrimination". The appearently in extremis addition of the expression revelation seems to completely eliminate the risks mentioned above. Indeed, the new law, as it is finally formulated, simply requires employees who have built a case that reveals evidence of discrimination (by comparisons of career paths) to go to court within five years after building the case. The new provision is therefore very little compelling and the "legal structure" which had been previously built by employee parties was finally saved.