

# Collective Bargaining and Firm-Level Agreements in France: How Do they Affect Wage Dynamics?\*

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## Abstract

The paper examines the extent of collective bargaining and firm-level agreements over the recent years in France, and their impact on wage dynamics. We use three unique administrative data sets collected by the French Ministry of Labour: a data set containing precise information on wage-setting agreements bargained at the sectorial level from 1994 to 2005, a data set consisting of the firm-level agreements registered from 1994 to 2005 in all firms (either covered or not by a collective agreement) and a data set with firm-level wage data drawing from a survey collected by the French Ministry of Labour. Once these data sets are matched, we estimate a selection model to measure the effect of the two types of agreements (sectorial-level and firm-level agreements) on the year-to-year variation in the average firm-wage level. We introduce an auxiliary probit equation to deal with the potential endogeneity of the occurrence of a firm-level agreement during the year. Estimates indicate that firm-level wage agreements have significant positive effects on average wage changes. On the contrary, industry-level agreements have either a null or even a negative effect on annual wage changes in the firm.

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# 1 Introduction

Many economists agree to claim that the impact of labor market institutions on economic performances depends crucially on the degree of centralization in the bargaining process. For instance, Nickell (1997) propounds that a high level of coordination among employers in the bargaining process should result in lower wage settlements and lower unemployment. Calmfors and Drifill (1988) point out that highly centralized or highly decentralized bargaining systems may conduct to lower unemployment, while intermediate levels of coordination may be less favorable. Teulings and Hartog (1998) suggest that more centralized wage-setting systems can be efficiency enhancing.

However the impact of collective bargaining on the wage structure and on the wage level is empirically found to be more ambiguous. For instance, Hartog, Pereira and Vieira (2002) analyze the bargaining regime wage-effect in Portugal. Their results indicate that wage differentials between bargaining regimes are substantial, a fact which may be related to the decentralized wage setting which prevails in Portugal. The highest wages are generated by multi-firm negotiations and the lowest are generated by sectorial contracts. Single-firm contracts align at an intermediate level in the ranking.<sup>1</sup> Using a unique data set on workers, firms and collective bargaining contracts in the same country (Portugal), Cardoso and Portugal (2005) found that the difference between contractual and actual wages reinforces the impact of worker and firm attributes on wages, while, on the contrary, it dilutes the impact of collective bargaining. Therefore, firm-specific arrangements partly offset collective bargaining, granting firms certain freedom when setting wages.

For the Netherlands, Hartog, Leuven and Teulings (2002) find small differences between firms that are covered or not by collective agreements. Distinguishing within covered firms between workers covered and uncovered by collective bargaining, including a model with partially unobserved sector selection, they find somewhat larger bargaining regime effects, and sometimes substantial coverage effects. However, they suggest that estimation of the latter could be seriously troubled by unobserved heterogeneity. A recent study by Borghans and Kriechel (2007) extends the analysis conducted by Hartog, Leuven and Teulings (2002). They examine the changes in the wage structure and labor mobility in the Netherlands from 1999 to 2003, a period in which the Netherlands experienced an increase in wage inequality. Their findings suggest that, despite the centralized system of wage negotiations in the Netherlands, market forces were the main determinant of wage growth. Variation in wage growth was mainly at the individual level. Firm-level wage increases accounted for only 12% of the total variation.

In Spain, using a large matched employer-employee data set, Card and De

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<sup>1</sup>For Belgium, Rusinek and Rycx (2007) find somewhat similar results: there is substantially more rent-sharing in decentralised than in centralised industries, even when controlling for the endogeneity of profits through a propensity score matching method. Moreover, in centralised industries, rent-sharing is found only for workers that are covered by a firm-specific agreement.

La Rica (2006) find that employees covered by firm-specific contracts earn about 10 percent more than those covered by sectorial contracts. At the establishment level, they also compare average wages under firm-level and sectorial bargaining, controlling for the propensity to negotiate a firm-specific contract. Consistent with their worker-level model, they find that firm-specific contracting raises average wages. More recently, de la Rica and González San Román (2007) have analyzed the changes over time in the wage-premium associated with firm-level contracting, as well as its impact on wage inequality, from 1995 to 2002 in Spain. For men the firm contract wage premium decreased only slightly over this seven-year period but they find a larger drop in the average firm contract wage premium for women. Moreover, they find that the Spanish centralized bargaining system did not contribute to the slight increase in wage dispersion which is observed over this period. This last result can be compared with the findings of the recent study by Kohn and Lembcke (2007). Using linked employer-employee data collected in 2001, these authors estimate that, in Germany, unions' impact through collective and firm-level bargaining mainly works towards a higher wage level and a reduced overall and residual wage dispersion. Moreover, their results show that there is no clear evidence for wage floors formed by collectively bargained low wage brackets which would operate as minimum wages.

Our paper contributes to this empirical literature by examining the extent of collective bargaining and firm-level agreements over the recent years in France, and their impact on wage dynamics (rather than on the wage level, like in most previous papers). For that purpose, we use three unique administrative data sets collected by the French Ministry of Labour (*Ministère du Travail, des Relations Sociales et de la Solidarité*). The first data set contains precise information on wage-setting agreements bargained at the industry level. These data are available each year from 1993 to 2005 for industries with more than 5,000 employees (which yields 216 industries). The second data set consists of the 350,000 firm-level agreements registered from 1994 to 2005 in all firms, either covered or not by an industry collective agreement. The third data set contains firm-level wage data coming from the survey "Activité et conditions d'emploi de la main-d'œuvre" (ACEMO hereafter) collected by the French Ministry of Labour. This survey concerns firms with more than 10 employees. The data are quarterly collected, from 1999Q1 to 2005Q1, and each quarter, about 40,000 firms are surveyed. Firms with less than 100 employees are sampled whereas firms with more than 100 employees are systematically included in the survey.

Data on firm-level agreements and wages are matched by using the firm identification number. This matching procedure enables us to characterize firms that do not negotiate. A complementary survey to the ACEMO survey provides information on the main industry-level collective agreement covering the workers employed in each firm. This information allows us to match firm-level wage with the information on industry-level agreements. Then we use a selection model to estimate the effect of the two types of agreements (industry-level and firm-level agreements) on the year-to-year variation in the average firm-wage level. The occurrence of a firm-level agreement during the year being potentially endogenous, we introduce a first equation to explain it. The model is identified

thanks to the proportion of workers employed under short-term labour contracts within the firm; this proportion is used as an instrumental variable affecting the occurrence of a firm-level agreement since it may increase the bargaining power of employers, whereas we assume that it does not directly influence the wage variation at the firm level.

Section 2 presents the institutional French context, characterized by a low union density and a high collective agreement coverage. Section 3 presents the three data sets and contains detailed descriptive statistics on observed agreements, both at the industry- and firm-levels. Section 4 is devoted to a descriptive analysis of the determinants of firm-level agreements. Section 5 presents simple evidence about the impact of bargaining on observed annual wage changes in the firm. Section 6 is devoted to the estimation of the econometric model specified at the firm level. The estimated values of the effects of the industry-level and firm-level agreements on annual wage variation are commented in a specific subsection. Section 7 concludes.

## 2 The institutional framework

This section is devoted to a brief description of the institutional framework of wage bargaining in France. The French system can be characterized by four main tendencies: a low and decreasing union density, a high and stable collective agreement coverage, an increasing decentralization and a significant regulatory role for the government.

### 2.1 A low and decreasing union density

The legitimacy of unions does not totally stem from votes and elections. At the sectorial level and in most of the biggest firms, five unions of employees are considered as representative by the law (CGT, CFDT, CGT-FO, CFTC, and CFE-CGC). Their representativeness cannot be disputable by the employers, both at the sectorial level and at the national level. To take part to the negotiations, the other unions have to prove their representativeness through different criteria (experience, activity, independence towards the employers, etc.). Employees' delegates can be either elected by employees as *délégués du personnel*, or designated by a representative union as *délégués syndicaux* (only in firms with more than 50 employees). Elections are compulsory in firms with more than 50 employees. In small firms, an employee can be delegated by unions. In France, 38.5% of employees declare that a trade union is present in their firm (source: French Ministry of Labour).

In the seventies, 20% of workers were unionized in France. Since 1990, this proportion is stabilized below 10%. Most of union members are concentrated in the public sector (15.5%; see Table 1). The lowest proportion of unionized workers is in the service industry (6%) in which this proportion is somewhat heterogeneous: 2.5% in trade versus 11% in the finance industry. Moreover, the

proportion of unionized workers depends on the size of the firm: in small firms it is lower than in big firms (see Table 1).

**Table 1: Average proportions of unionized workers in France over the years 1996-2004**

Industry	(%)	Firm size	(%)
Agriculture	10.5	Less than 50	3.5
Manufacturing	6.3	50-100	5.4
Services	5.8	100-500	8.3
Administration	15.5	More than 500	8.7

Sources: Amossé (2004), Amossé and Pignoni (2006)

The proportion of unionized workers in France is one of the lowest in the developed countries. Indeed, the highest proportions are in Nordic European countries (76% in Finland, 79% in Sweden, 74% in Denmark), whereas in most European countries these proportions are around 30% (Italy: 35%, Austria: 37%, Greece: 27%, Portugal: 24%, Germany: 25%).<sup>2</sup>. Even if the proportions in Spain (15%) or the United States (13%) are low, they are still higher than in France. However, in most countries, the strong decrease in the proportion of unionized workers may be observed.

## 2.2 A high and stable collective agreement coverage

In comparison with the proportion of unionized workers, the rate of coverage by collective bargaining is very high (98% for the whole economy; see Table 2), and the sectorial and temporal variations are low. This is a common pattern in Europe: in Austria, Belgium, Germany, Spain, the Netherlands, Finland and Denmark, this coverage rate ranges from 80 to 100% (see OECD, 2004).

The gap between the coverage by collective bargaining and the unionization of workers is closed by the representativeness of the five unions recognized by law and the common use of extension mechanisms (see below). This gap is also observed for instance in the Netherlands (Hartog et al., 2002) and in Spain (Izquierdo et al., 2001).

The bargaining institutional framework is dominated by two principles: a hierarchy in the levels of negotiations, which tends to be less important, and a regulatory role for the Government, via extension mechanisms and minimum wage setting.

## 2.3 An increasing decentralization

The French collective bargaining system consists in three levels (in descending order): the interprofessional level, the *branche* level which corresponds approximately to the industry level, and the firm level. These different levels of bargaining are organised according to a hierarchy. By the law of November 1950,

<sup>2</sup>These proportions correspond to the year 2000 (see OECD, 2004).

any negotiation must specify, enrich or widen what has been negotiated at the higher level of negotiation. At first sight, this system appears to be quite simple. Within this framework, the industry level has been considered as the most relevant level for many years. However, this hierarchy has changed since the eighties, and a tendency towards decentralization has recently appeared, which makes the situation more complex.

**Table 2: Workers covered by collective bargaining in France, 1997-2004** (in percent)

Industry	All types of agreements		Industry level agr.	Firm level agr. only	Statutory jobs
	1997	2004	2004	2004	2004
Food products	97.1	99.0	97.7	0.8	-
Consumers goods	96.5	98.8	97.5	0.3	-
Motor vehicles	99.1	99.9	99.9	-	-
Capital goods	97.9	99.3	98.9	-	0.2
Intermediate goods	97.7	99.5	99.1	0.1	-
Energy	93.8	99.1	34.8	0.6	63.7
Construction	96.6	98.7	98.4	0.1	-
Trade	94.3	98.4	97.3	0.2	-
Transport	96.6	99.4	71.3	0.9	27.2
Finance	94.5	98.7	88.4	2.3	8.0
Real estate	93.4	98.2	86.4	2.2	9.4
Services to firms	91.6	97.4	65.7	4.6	9.6
Services to households	82.3	92.5	88.6	3.5	0.4
Education and health	93.5	96.6	91.1	4.9	0.4
Administration	73.6	87.2	74.2	6.5	6.5
<b>Total</b>	<b>93.7</b>	<b>97.7</b>	<b>86.5</b>	<b>1.9</b>	<b>5.4</b>

Source : Combault (2006)

The number of firm-level negotiations has increased steadily over the last twenty-five years: it has been multiplied by six since 1982. This tendency can be explained simultaneously by an obligation to negotiate on specific topics, by larger possibilities of derogation and by the increase of fiscal incentives:

- One of the most important act regulating the negotiation system is the Auroux Act (November 1982). It introduced two important changes in the negotiation framework, namely an obligation of negotiation and a possibility of dispensation. Each year, any firm has to negotiate on wages with the unions, even if agreements are not compulsory. This law has also introduced the possibility of dispensation in certain specific fields. Note that in firms with more than 50 employees, a union representative (*délégué syndical*) must be elected, which leads to more frequent bargaining for these firms.

- Reducing workweek acts (Robien Act 1996, Aubry I Act 1998 and Aubry II Act 2000) reinforced decentralized bargaining. They widened the fields of dispensation, particularly concerning the workweek time. Furthermore, for firms with less than 50 employees, they allowed to appoint an employee (unionized or not) of the firm to negotiate (*mandatement*). They also encouraged negotiations in firms by providing fiscal incentives. The consequence of this higher flexibility is the significant increase in the number of firm-level agreements.
- Thanks to extended possibilities of dispensation, the recent May 2004 Act enhanced the tendency to a higher decentralization. Firms can now deviate from higher level agreements (except special mention, and excluding specific topics like industry-level minimum wage).

This decentralization has also been observed in Germany where the number of firms covered by a company-level agreement increased recently from 2,000 in 1990 to around 5,500 in 2003 (German Ministry of Labour).

The influence of *branches* (industries) has decreased since 1982, but it remains a strong reference for negotiations at the firm-level. Less than 50% of agreements signed in 2001 dealt with wages (versus 80% in 1984) but the number of agreements at the industry level remains stable since 1980: around 1,000 agreements are recorded each year.

The diminishing influence of industry-level bargaining can be mainly explained by heterogeneity of branches: first, there are around 700 branches but half of them cover less than 5,000 employees. Besides, the *branches* do not correspond strictly to economic sectors, so they can be considered as irrelevant from an economic point of view. Second, the frequency of negotiations is irregular. Collective agreements being less often negotiated, the industry-level minimum wage is often below the national one, which applies in that case.

Even if the agreements at the industry level are less crucial than they were, they give a common wage scale reference for all firms belonging to a given industry. In 1998, 70% of the firms indicate they use this wage scale as a reference for their wage increase. However that may be, the collective bargaining at the industry level still covers 90.4% of employees (see Table 2).

## 2.4 A significant regulatory role for the government

The French Government plays an important role in the implementation of extension procedures. A collective agreement at the industry level is signed by at least one employer federation. All firms belonging to one of these federations are covered by the collective agreement. This agreement applies to all employees (unionized or not) in its field of application. An extension procedure consists in extending, by a governmental decision, a collective agreement to all firms belonging to a given industry. A committee (*Sous-Commission des conventions et accords*) is in charge of the extension of collective agreements negotiated at the industry or at the inter-sectorial level. Employer federations, trade unions and

the Government are represented in this committee. A collective agreement extension can be requested either by the employer federations, the trade unions or the Government. From 1998 to 2005, on average, each year 700 extensions were requested and most of them were accepted. A majority of employees is covered by an extended collective agreement at the industry level. In 1995 around 80% of employees were covered by an extended collective agreement. These extension procedures also exist in many European countries. In Austria, Luxembourg or Spain, they are even automatic. In other countries, minimum requirements are needed, like a minimum level for agreement representativeness. For instance, in Germany, a minimum of 50% of employees in the field of application must be covered prior to extension (OECD, 2004). In France, there is no minimum requirement.

The Government increases each year the level of the national minimum wage. Annual minimum wage increases are basically equal to CPI inflation (for blue-collar and white-collar workers, with the exception of the tobacco industry) plus half of the change in the purchasing power of the blue-collar base hourly wage. These increases could be combined with a discrete governmental push. These minimum wage changes are not negotiated and they often occur in July. In 2005, 17% of employees were paid at the minimum wage (1,280.07 euros in July 2007). The Government must also encourage negotiations, especially at the industry level. For instance, the Government participates in committees with equal representation of unions and employers (*Commissions mixtes paritaires*) that are in charge of facilitating negotiations at the industry level. These committees are requested either by workers' unions or by the Government in case of difficulties during the bargaining process. The Ministry of Labour is at the head of the committee. In 2005, 88 branches negotiated thanks to such committees. Besides, in March 2005, the Government decided to promote negotiations at the industry level, especially for industries in which the lowest levels of the wage scale were below the national minimum wage. In 2007, 84 industry level minimum wages remain below the national minimum wage. In that case, the national minimum wage applies.

## 3 The data

### 3.1 Data sources

This study is based on three administrative data sets collected by the French Ministry of Labour (*Ministère du Travail, des Relations Sociales et de la Solidarité*).

First, we use annual reports on collective bargaining published each year by the French Ministry of Labour to build a data set of wage-setting agreements at the industry level. These data are available at an annual frequency from 1993 to 2005 for industries with more than 5,000 employees. Thus, our data set concerns 216 *branches*, including 183 national-level industries and 83 *région-*



or *département*-level industries<sup>3</sup> covering around 10 million employees (around half of the total number of employees in France). Variables included in this data set are the identification number of the industry, the number of employees covered (over the subperiod 1999-2005), the date of signature and the date of the agreement effectiveness (day, month and year), the date of extension, the bargaining outcome (agreement, employers' recommendation, etc.) and the industry-level minimum wage.

The second data set consists of firm-level agreements. In conformity with the Auroux Act (1982), whenever a firm bargains with its employees or their representatives (unionized or not), it must report to the Ministry of Labour the result of the negotiation.<sup>4</sup> For statistical use, this information is coded by the Ministry of Labour. The main variables contained in this administrative data set include the firm identification number, the date of the end of the bargaining process (month and year), the topics of the bargaining (employment, wages,...), some geographical indicators (*région* and *département*), the number of employees in the firm, its economic sector, the bargaining outcome (agreement, disagreement, employer's decision,...). Our data set contains more than 350,000 agreements from 1994 to 2005. Besides, we assume that wage-setting agreements apply for all plants belonging to the same firm. We remark that 75% of firms consist in only one plant.

Third, wage data come from the survey "Activité et conditions d'emploi de la main-d'œuvre" (ACEMO hereafter) collected by the French Ministry of Labour. It covers firms with more than 10 employees, with the exception of the farming sector. Each quarter, surveyed firms report wages of twelve workers who belong to four skill categories (blue-collar workers, white-collar workers, supervisors, executives). Data are collected from 1999 to 2005 and each quarter, about 40,000 firms are surveyed. Firms with less than 100 employees are sampled and firms with more than 100 employees are systematically observed. The observations are weighted by the number of workers in the firm. The survey provides the number of workers in each plant of the firm, the workweek duration, the monthly gross base wage (excluding bonuses, allowances, profit sharing and other forms of compensation). We calculate the gross hourly wage at the individual level. We have no information on individual characteristics of workers (education, age, labour market experience, etc.). As we assume that wage-setting is decided at the firm level, wage changes are aggregated for firms with multiple plants.

Data on firm-level agreements and wages are matched according to the firm identification number. This matching procedure enables us to characterize firms that do not negotiate. An additional questionnaire on firms included in the ACEMO survey provides information on the industry-level collective agreements that concern each firm and on the number of workers covered by . This information allows us to match wage data with data on industry-level agreements.

As the study is performed on wage-setting agreements which are signed at

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<sup>3</sup>There are 22 administrative regions and 95 *départements* in France. A *département* is approximately an American county.

<sup>4</sup>Firms do not systematically report all negotiations to the Ministry of Labour but most of agreements are supposed to be reported in this dataset.

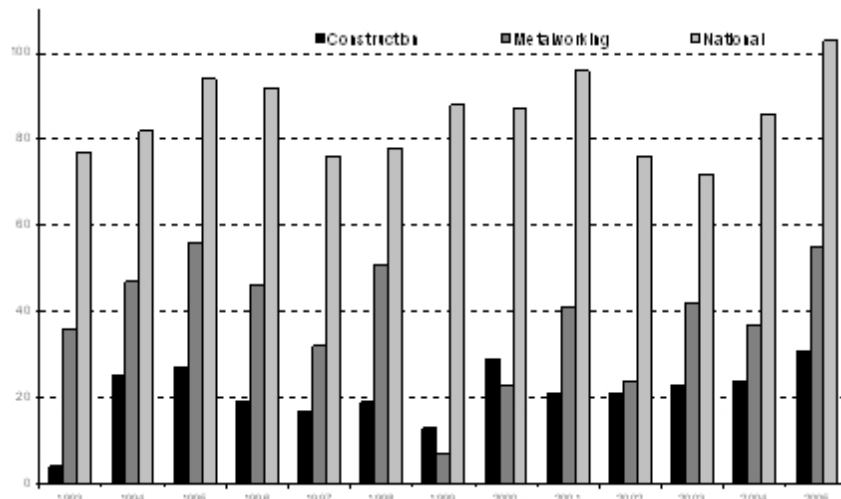


Figure 1: Annual numbers of collective agreements (at the industry level)

an annual frequency, we transform quarterly wage data into annual ones. The final sample contains around 39,000 observations (i.e. firm-level wage changes) equally distributed across years, and around 5,000 firm-level wage agreements. This data set will be used in section 6 for econometric purposes. In the following section, the whole sample of firm-level agreements is used to calculate descriptive statistics on collective agreements.

## 3.2 Descriptive statistics

### 3.2.1 Industry-level agreements

At the industry level, there exists three different geographical levels of collective wage-setting agreements: most industries negotiate national agreements while two specific industries bargain either at the regional level (construction which covers approximately 1.2 million of employees) or at the *département*-level (metalworking industry which covers approximately 2 millions of employees).

From 1993 to 2005, we observe 1,107 collective wage-setting agreements at the national level, 273 in the construction industry and 497 in the metalworking industry. Figure 1 reports the number of collective wage-setting agreements signed each year. Over this thirteen-year period no clear trend can be detected. The number of signed agreements was slightly higher in the mid-nineties and at the end of the observation period (particularly in 2005 when the government encouraged *branches* to update their wage scales). The 1998-2002 years are specific: they correspond to the period of the workweek reduction bargaining. On average, 85, 38 and 21 collective agreements were signed each year at the

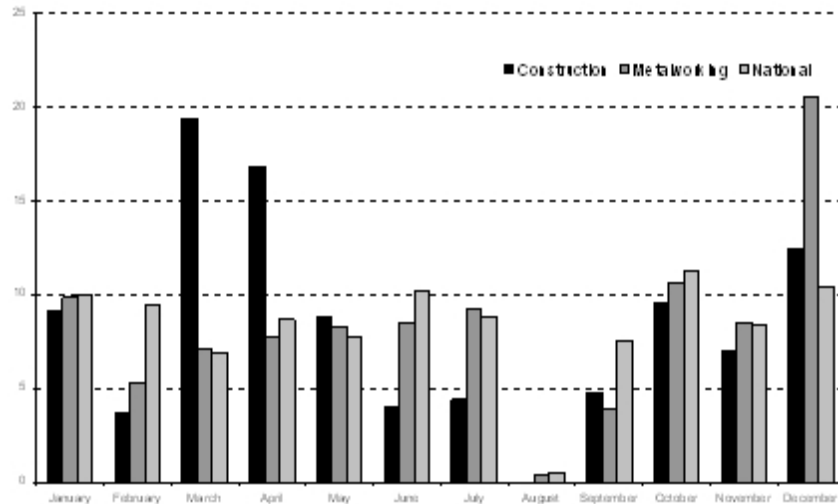


Figure 2: Monthly proportion of collective agreements (at the industry level)

national, regional and *département* levels respectively.

Collective agreements in construction are mainly signed in March and April, those in metalworking industry in December while no clear seasonal pattern appears for national agreements (see Figure 2).

The annual average proportions of employees covered by collective wage-setting agreements after an extension procedure (calculated as the ratio of the number of employees covered by an agreement and the total number of employees) are 61.2%, 72.0% and 78.2% at the national, regional (construction) and *département* (metalworking industry) levels, respectively. They are lower than the coverage of all collective agreements, equal to 90.4% (see Combault, 2006). Durations between successive agreements longer than one year explain this difference.

Figure 3 reports the distribution of durations between two successive wage-setting agreements. A peak is observed at 12 months for all industries, 30% of durations are between 11 and 13 months for the national agreements and 40% for the metalworking and construction industries. These peaks are explained by the obligation for employers and unions to open negotiations on wages at least once a year.

Figure 4 displays the distribution of the duration between the agreement date and the date of effectiveness of the agreement. There is no duration greater than one year (in absolute value), which means that the agreement is implemented within a year after or before its signature. Let us remark that most agreements in the metalworking industry are retroactive since their effective date is very often in January. However, at the national level, 48.6% of these durations are shorter than two months, this proportion being 63.1% in construction, and

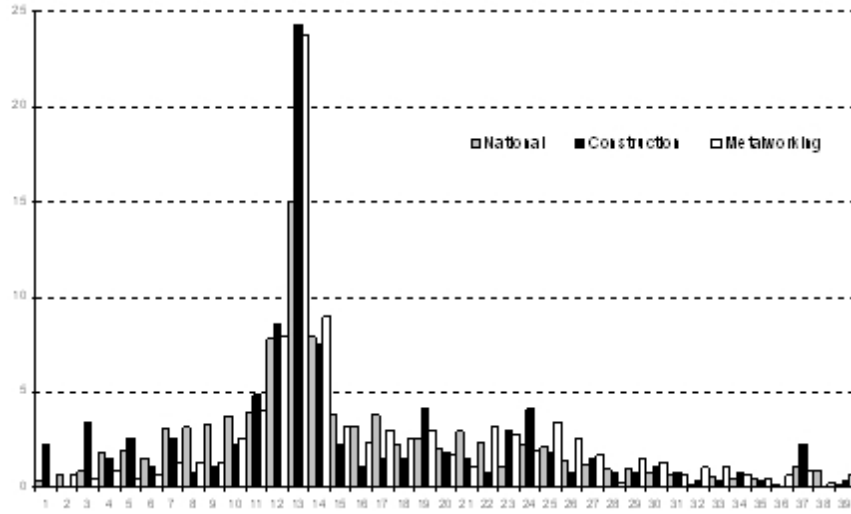


Figure 3: Duration between successive wage-setting agreements (in months, industry-level)

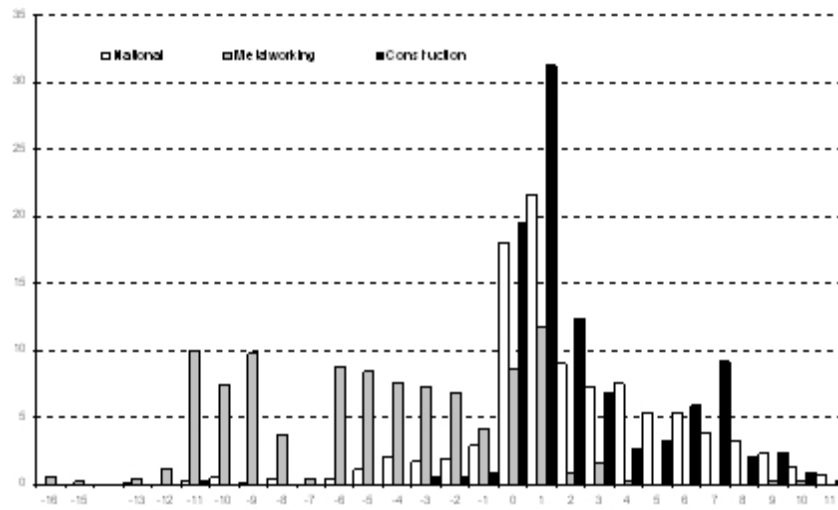


Figure 4: Duration between the dates of agreement and of effectiveness (in months, industry level)

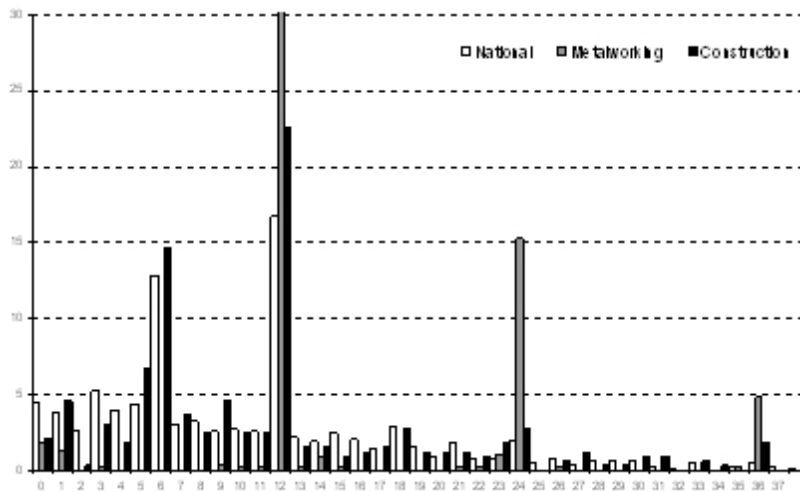


Figure 5: Duration between successive dates of effectiveness of agreements (in months, industry level)

21.1% in metalworking industry. The distribution between successive effective dates (see Figure 5) is highly concentrated around two peaks: at 12 months (68.6% in the metalworking industry,<sup>5</sup> 22.6% in construction and 16.7% at then national level) and at 6 months (14.7% in construction and 12.9% at national level). Implementation of agreements is more regular than their negotiation.

### 3.2.2 Firm-level agreements

370,000 agreements were signed at the firm level from 1994 to 2005. The number of agreements increased sharply after 1999 (14,327 agreements in 1998 versus 37,446 in 1999). This result is linked to the emergence of new themes of negotiations: from 1998 to 2002 (see Figure 6), firms were constrained by law to negotiate on reducing the workweek length, and from 2002 to 2005 firms received incentives to bargain on profit sharing. Consequently, the share of wage-setting agreements decreased within the period from 45% in the nineties to 15% in 2005. However, around 66,000 wage-setting agreements were contracted from 1994 to 2005 and each year, around 5,000 wage-setting agreements were signed. The peak in 1999 (12,500 agreements) is the result of the negotiation both on wages and on the reduction of the workweek hours. Since 2003, the number of agreements increases slightly because of the May 2004 Act and of a resurgence of wage-setting negotiations.

The coverage rate of firm level agreements is lower than at the industry level: each year, on average 25% of employees are covered by a wage-setting agreement

<sup>5</sup>On Figure 5, the mode for metalworking industry has been truncated at 30%.

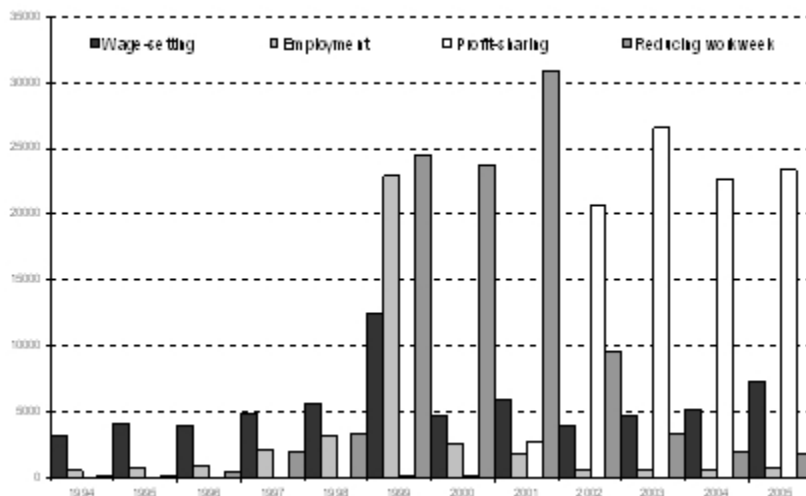


Figure 6: Main topics of agreements (at the firm level)

at the firm level (versus more than 60% at the industry level). At the sectorial level, there is a higher degree of heterogeneity of coverage. Three groups can be distinguished: in car industry and energy sectors, the coverage is higher than 60%, in intermediary goods, financial services, consumption goods, and capital goods sectors, this rate ranks between 30 and 40% and in construction, transport and personal services sectors the coverage rate is less than 20%. This may reflect the differences between the firms' sizes among sectors (see Figure 7).

We observe a strong seasonality in the distribution of wage-setting agreements within a year. Two out three wage-setting agreements are signed during the first semester versus 50% for all types of agreements (see Figure 8). Furthermore, the peaks in June and December are both partly explained by huge numbers of reducing workweek agreements. Excluding the reducing workweek agreements, 15% of wage-setting agreements are signed in March and 50% during the first four months of the year. Firms may enter into negotiation on wages just after balancing the books at the end of the previous year.

Due to the obligation for firms to open negotiations on wages each year, 40% of durations between successive agreements ranks from 11 to 13 months. 57% of durations between two agreements are less than 13 months (see Figure 9). The wage-setting agreements signed during the first quarter are more likely to last exactly one year: they represent 25% versus 10% for agreements contracted in the third quarter, which reinforces the seasonality of negotiation period for firms (see Figure 10).

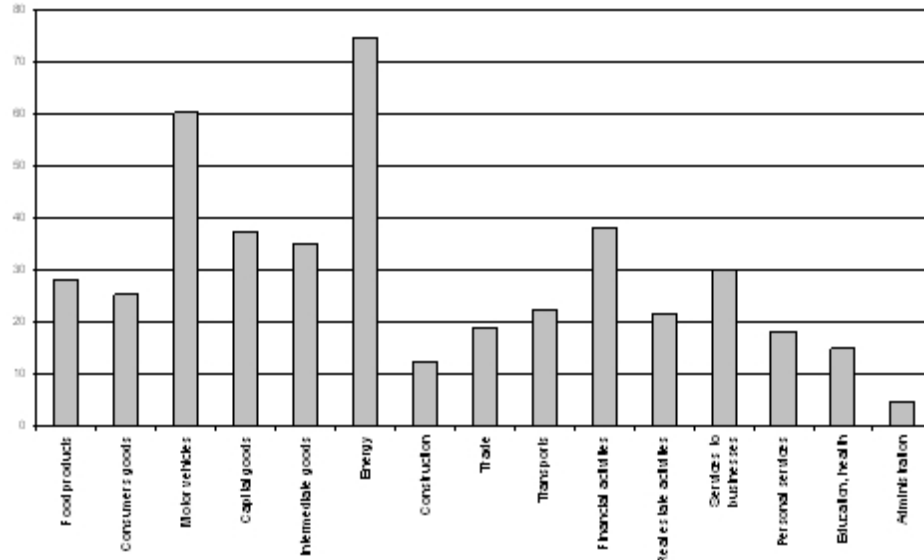


Figure 7: Coverage rate of wage-setting agreements (firm level, by industry)

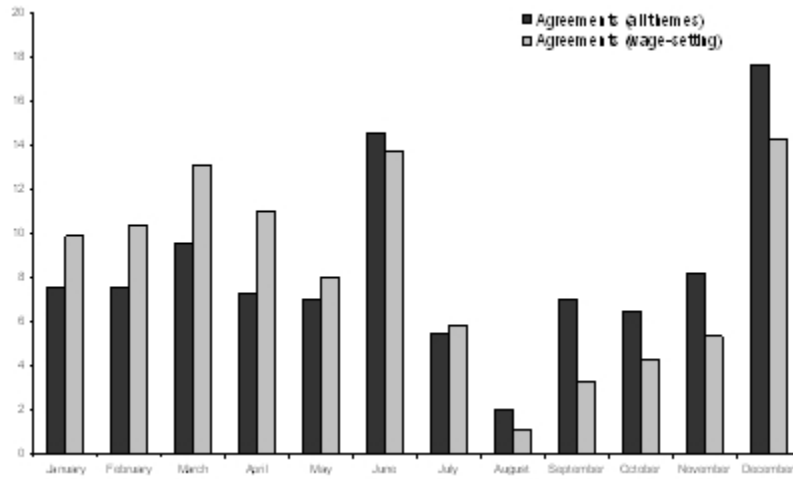


Figure 8: Monthly proportions of firm-level agreements

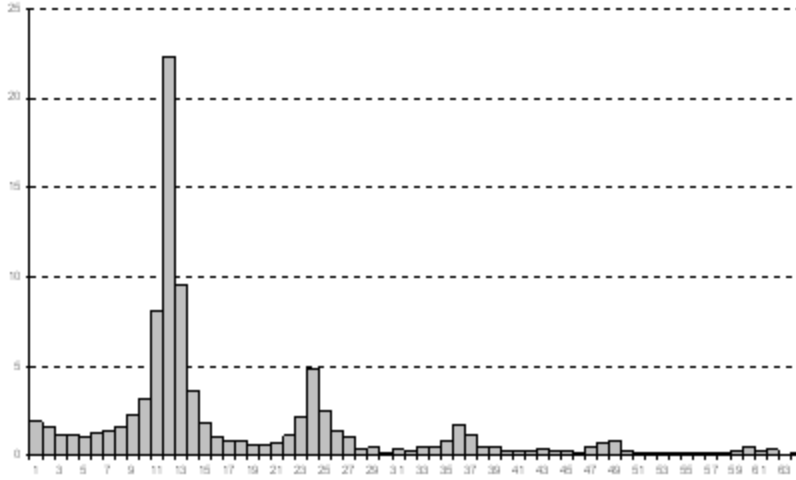


Figure 9: Durations between successive wage-setting agreements (firm level)

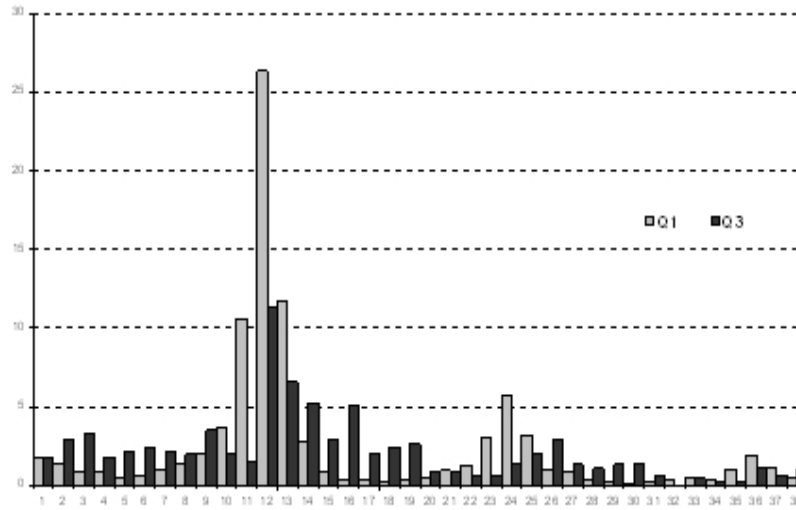


Figure 10: Durations between successive wage-setting agreements (at the firm level, by quarter of signature)



## 4 Determinants of firm-level agreements

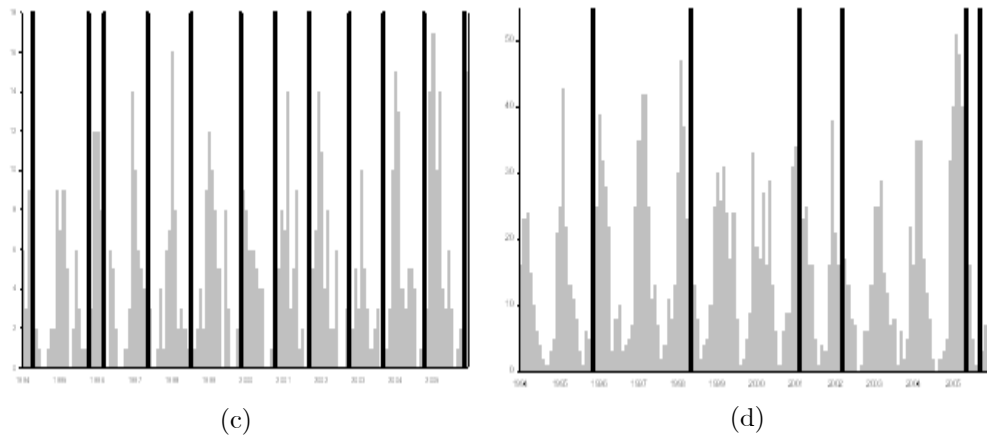
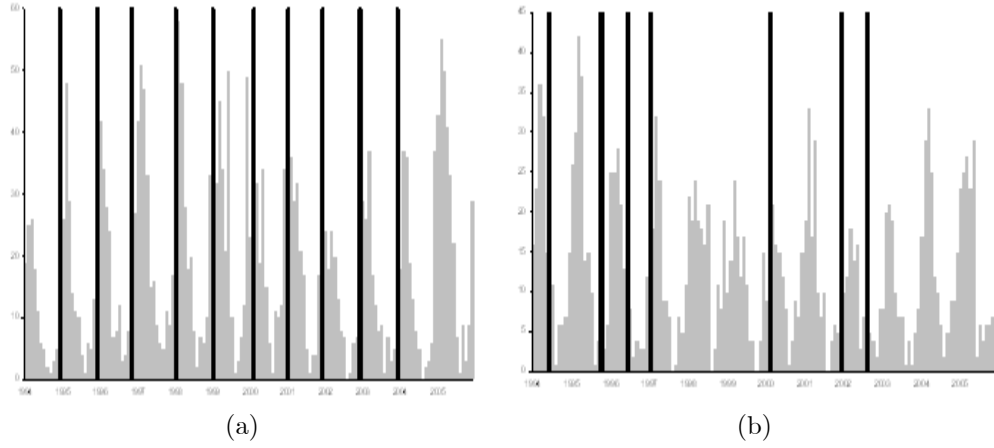
From here, our analysis is based on firm data coming from the ACEMO survey that are matched with the data on industry- and firm-level agreements. First, given the hierarchy among the different bargaining levels, one could expect that an industry-wage agreement should have an impact on the occurrence of a firm-level wage agreement. To document this issue, we conduct a descriptive analysis of the empirical relationship between industry- and firm-level agreements. Table 3 reports the proportions of firm-level wage agreements as a function of the frequency of industry-level agreements. As previously shown, the proportion of firms covered by a wage agreement is quite low (around 12%), but this proportion is lower in services than in manufacturing (9.2% versus 16.2%). More interestingly, this proportion decreases when the last industry-level agreement has been signed last year, two years ago and more. For instance, the proportion of firm-level agreements is around 14% if the industry-level agreement occurs in the current year, whereas it is close to 11% when this agreement was signed more than two years ago. Moreover, in firms that are not covered by an industry-level wage agreement, the probability to negotiate wages at the firm-level is not higher: there are only 3.6% of wage agreements in firms not covered by an industry-wage agreement. Finally, the proportion of firm-level agreements is relatively high in statutory jobs.

**Table 3: Proportions of firm-level agreements covered or not by an industry-level wage agreement (in percent)**

	Total	Manufacturing	Services
<b>Covered by an industry-level agreement</b>	12.6	16.7	8.9
Industry-level agreement this year	13.6	17.0	9.9
Industry-level agreement one year ago	12.7	17.1	8.7
Industry-level agreement two years ago	11.0	16.1	8.3
Industry-level agreement more than 2 years ago	10.7	15.0	7.2
<b>Not covered by an industry agreement</b>	3.6	3.5	3.9
Statutory jobs	24.2	25.2	9.6
<b>Total</b>	12.4	16.2	9.2

Figure 10-b illustrates the relationship between the number of firm-level wage agreements and the date of the industry-level wage agreements in four different industries. In the chemical (a) and milk industries (c), industry-level wage agreements are regular. They are signed each year in the first quarter. In addition, the number of firm-level agreements of these industries increases highly after the date of signature of the industry-level agreement, and then it decreases until the next industry-level agreement.

Figure 10-b: Firm-level and industry-level agreements over time (in months)



Number of firm agreements in grey; dummy variable for industry level agreements in black;  
 (a) Chemical industry (b) Wholesale food trade (c) Milk industry (d) Private hospitals

As regards the wholesale food trade industry (b) and private hospitals (d), industry-level wage agreements are irregular: only six and seven wage agreements respectively were signed at the industry level from 1994 to 2005. The number of firm-level agreements displays the same irregularity. So, there seems to be no significant time correlation between industry- and firm-levels wage agreements.

**Table 4: Wage-setting bargaining and firm size (%)**

Firm size	Distribution of the labour force	Coverage rate of negotiations	Coverage rate of agreements	Success rate (Col 4 / Col 3)
less than 20	14.5	0.4	0.4	93.9
20-50	15.1	1.5	1.4	96.7
50-100	8.5	5.8	5.2	88.6
100-200	12.3	17.0	14.8	87.0
200-500	12.7	27.2	24.3	89.3
more than 500	36.8	43.0	39.3	91.3

Source: Authors' calculations from the Acemo survey and the data set on firms' agreements

Another relevant determinant for the occurrence of a firm-level wage agreement is the size of the firm. We observe that the coverage rates of negotiations and agreements are positively correlated with the size of the firm (see Table 4). For instance, almost 40% of employees in firms with more than 500 employees are covered by wage negotiations, versus only 0.4% of employees in firms with less than 20 employees. The coverage rate of agreements displays a similar pattern. It is worth noting that the rate of success of the firm-level bargaining process is high (around 90%, see Table 4), irrespective of the firm size.

**Table 5: Proportions of part-time workers and short-term contracts in the firm, according to its bargaining regime (%)**

		(1) Part-time workers		(2) Short term contracts		Max ((1), (2))	
		No firm agr.	Firm agr.	No firm agr.	Firm agr.	No firm agr.	Firm agr.
Manufacturing	Mean	4.4	3.9	4.9	3.9	7.4	6.0
	Q3	5.6	4.9	6.6	5.1	9.5	8.0
	Med	2.3	2.4	2.7	2.2	5.1	4.3
	Q1	0.5	1.0	0.6	0.7	2.3	2.2
Services	Mean	18.5	12.4	8.7	6.3	21.3	14.3
	Q3	24.7	14.1	10.8	8.1	28.6	16.6
	Med	8.3	7.5	4.6	4.2	11.4	9.5
	Q1	2.3	3.0	1.1	1.8	5.0	5.2
Total	Mean	12.3	7.3	7.1	4.9	15.2	9.4
	Q3	12.9	8.6	8.9	6.5	17.6	11.0
	Med	4.6	3.6	3.7	3.0	7.7	6.0
	Q1	1.1	1.4	0.9	1.0	3.3	2.9

Finally, the presence of part-time workers and short-term contracts should have a negative effect on the bargaining process at the firm level. In particular, a high proportion of short-term contracts (i.e. a lower fraction of insiders) in the firm could lead to less frequent negotiations. Indeed, Table 5 shows that the proportion of short-term contracts and part-time workers is negatively correlated with the occurrence of a wage-setting agreement in the firm. These proportions are generally much higher in services.

## 5 Wage changes in the firm

In this section, we provide some descriptive statistics on wage changes at the firm level<sup>6</sup> and the impact of wage bargaining.

The average variation of wages in firm  $j$  between March of year  $t$  and March of year  $t + 1$  is denoted  $\Delta W_{jt}$ . It is calculated as the average of the wage changes in all skill groups  $i$  ( $i = 1, \dots, 12$ ) employed in all plants  $l$  ( $l = 1, 2, \dots$ ) of firm  $j$  between year  $t$  and  $t + 1$ . Thus:

$$\Delta W_{jt} = \sum_{l=1,2,\dots} \left\{ \left( \frac{N_{ljt}}{N_{jt}} \right) \sum_{i=1}^{12} \left( \frac{N_{iljt}}{N_{ljt}} \right) \times \left( \frac{w_{iljt+1} - w_{iljt}}{w_{iljt}} \right) \right\} \quad (1)$$

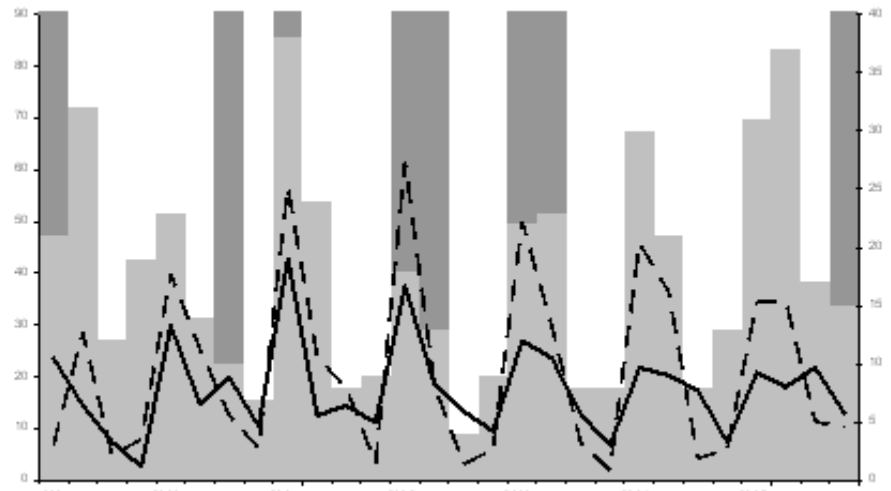
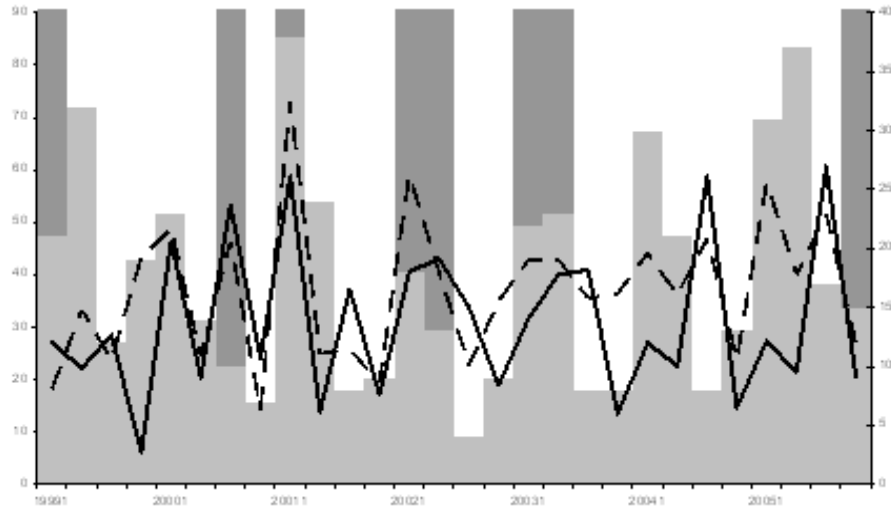
where  $N_{jt}$  is the number of workers employed in firm  $j$  in year  $t$ ,  $N_{ljt}$  is the number of workers employed in plant  $l$  of firm  $j$  in year  $t$ ,  $N_{iljt}$  is the number of workers of skill-type  $l$  employed in plant  $l$  of firm  $j$  in year  $t$ , and  $w_{iljt}$  is the representative wage of a worker of skill-type  $i$  in plant  $l$  of firm  $j$  in year  $t$ .

Figure 10-c reports the frequency over time of wage changes both for employees covered and not covered by a firm agreement in the wholesale food trade industry. We compare this frequency with the number of agreements at the firm-level over time and the dates of industry-level agreements. We make this comparison for two different groups of workers, blue-collar and executives. First, in both groups, as expected, the frequency of wage changes for employees covered by a wage agreement is higher than the frequency of wage changes for employees not covered by a wage agreement. The difference between these two frequencies is particularly significant for executives. For blue-collar, the gap is reduced by the impact of the national minimum wage changes. For instance, at the end of the observation period, peaks of wage changes for employees not covered by wage agreements correspond to large national minimum wage changes. Besides, there seems to be a positive link between the number of firm-level wage agreements in this *branche* and the frequency of wage changes. On the contrary, the impact of industry-level agreements on wage changes appears to be quite small.

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<sup>6</sup>See Heckel et al. (2007) for details on wage dynamics in France.

Figure 10-c: Firm- and industry-level agreements and frequency of wage changes (in quarters) [Wholesale food trade industry]



Number of firm agreements in light grey; dummy variable for industry level agreements in dark grey;

dashed line: frequency of wage change for employees covered by a firm agreement on wages;  
 continuous line: frequency of wage change for employees not covered by a firm agreement on wages

(a) Blue collars (b) Executives

Then we investigate the impact of the different levels of wage bargaining on wage changes inside the firm. Figure 11 indicates the value of the average wage changes according to the level of the industry agreement, year by year. Two different periods can be distinguished: between 1999 and 2001, the law on the

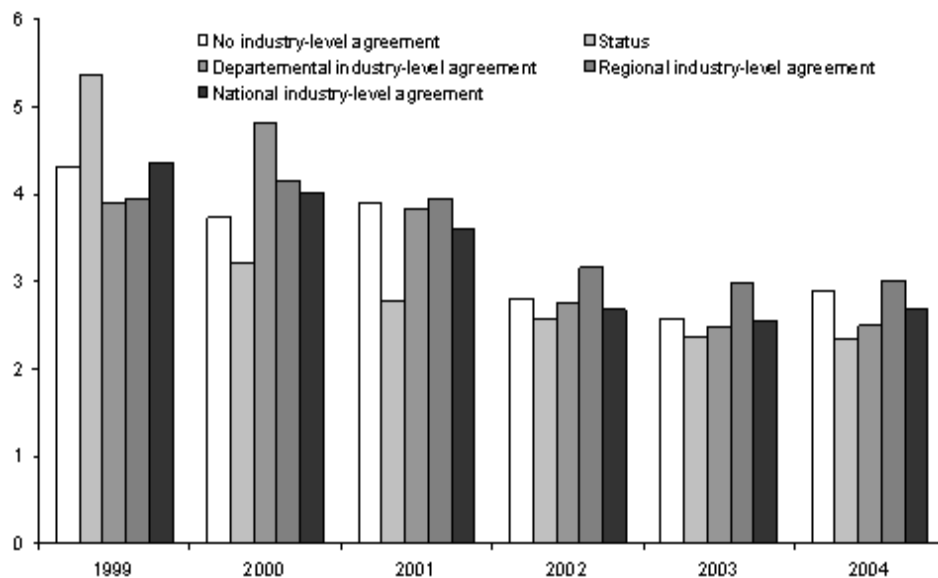


Figure 11: Average wage changes, by type of agreement and by year.

reduction of the working time was implemented and average wage changes were close to 4 and 5% and, between 2002 and 2004, wage changes were stabilising around 3%.

The differences in average wage changes among the different levels of bargaining seem to be small and show no significant variability. When there is no industry-level agreement, wage changes are not lower than wage changes observed at the national level. The highest average wage changes are observed for local and regional industry-level agreements but these levels correspond also to some specific economic sectors (metalworking and construction). Finally, the lowest average wage change is observed in statutory jobs.

Figure 12 and Table 6 illustrate the impact of the different types of wage bargaining on the wage change distribution. Figure 12 plots the distributions of firm-level average wage changes according to the level of the wage agreement. Descriptive statistics on wage changes are gathered in Table 6. First we remark that there is a significant difference between wage changes occurring in the presence and in the absence of a firm-level agreement. The distribution of wage changes associated with a firm-level agreement dominates the distribution of wage changes in the absence of a firm-level agreement, in particular for wage changes between 1.5 and 3.5%. The average wage change for employees covered by a firm-level wage agreement is 3.5% versus 3.1% for employees not covered by a firm-level agreement. Secondly, the occurrence of an industry-level wage agreement slightly modifies the distribution of wages changes. The main differ-

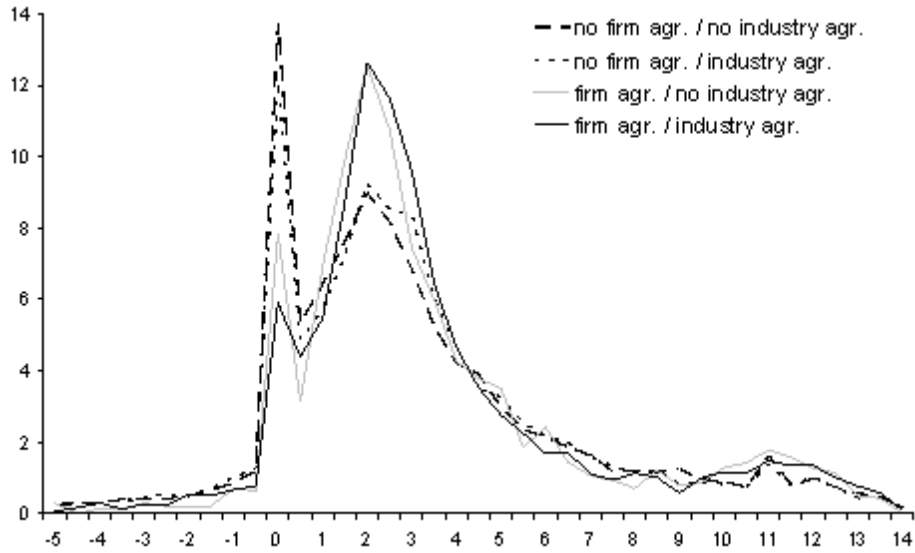


Figure 12: Distribution of wage changes, according to the type of agreement

ences can be observed for wage changes around 2.5 and 4%; the distributions corresponding to an industry-level agreement dominate slightly the distribution without industry-level agreements. However, no significant difference in the values of average wage changes can be observed (Table 6).

**Table 6: Average wage changes in the firms, according to the type of agreement**

		No firm-level agreement		Firm-level agreement	
		No industry agreement	Industry agreement	No industry agreement	Industry agreement
Industry	Mean	3.0	3.2	3.4	3.6
	Q3	4.1	4.5	4.3	4.3
	Med	2.3	2.5	2.5	2.6
	Q1	1.0	1.1	1.5	1.7
Services	Mean	3.2	3.1	3.6	3.4
	Q3	5.1	4.6	5.3	4.7
	Med	2.4	2.5	2.7	2.6
	Q1	0.5	0.7	1.2	1.4
Total	Mean	3.1	3.1	3.5	3.5
	Q3	4.6	4.5	4.6	4.4
	Med	2.4	2.5	2.5	2.6
	Q1	0.8	0.9	1.5	1.6

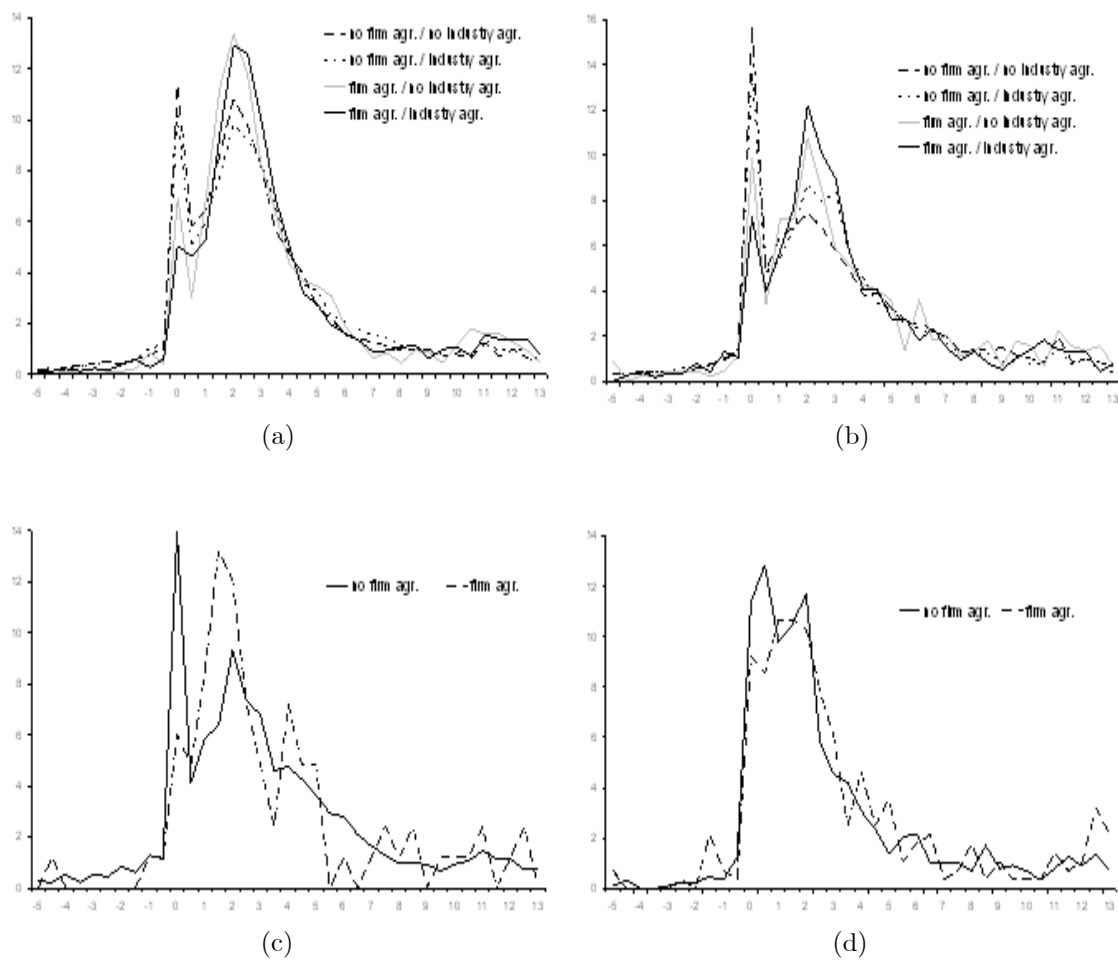


Figure 13: Distribution of wage changes, by type of agreement and by economic sector

(a): manufacturing sector, (b) services, (c) no industry-level agreement, (d) statutory employment

If we now compare the distributions of wage changes in different sectors (Figure 13), similar conclusions can be drawn: both in manufacturing and in services, the discriminant factor is the existence or the absence of a firm-level agreement. The industry-level agreements have a small effect. However, the difference between the distribution of wage changes corresponding to firm-level agreements and the distribution without firm-level agreements is smaller in the manufacturing sector than in services. The influence of a firm-level wage agreement is even smaller in statutory jobs.



## 6 The effects of bargaining on wage dynamics

### 6.1 The econometric model

Now let us assume that the average wage change  $\Delta W_{jt}$  in firm  $j$  during year  $t$ , defined by equation (1), is assumed to be generated by the following linear model:

$$\Delta W_{jt} = X_{jt}\beta_w + \gamma_1 Y_{jt} + \gamma_2 C_t + u_{jt} \quad (2)$$

In this expression,  $X_{jt}$  is a vector of control variables, including the size and the industry of the firm, and time dummies. The variable  $Y_{jt}$  takes value 1 if we observe a wage agreement in firm  $j$  during year  $t$ , 0 otherwise. The variable  $C_t$  takes the value 1 if firm  $j$  is covered by a collective agreement negotiated during year  $t$ . When a wage agreement occurs in firm  $j$  during year  $t$ , the outcome variable becomes:

$$\Delta W_{jt}^1 = X_{jt}\beta_w + \gamma_1 + \gamma_2 C_t + u_{jt} \quad (3)$$

In the absence of a firm-level agreement, it is:

$$\Delta W_{jt}^0 = X_{jt}\beta_w + \gamma_2 C_t + u_{jt} \quad (4)$$

With these notations, the observed wage change may be written:

$$\Delta W_{jt} = \Delta W_{jt}^1 \times Y_{jt} + \Delta W_{jt}^0 \times (1 - Y_{jt}) \quad (5)$$

Using the terminology of the econometric literature on evaluation methods, we can remark that our model is a model with a constant effect of the treatment since, for a firm in which a firm-level agreement has been signed and whose characteristics are  $X_{jt}$  and  $Z_{jt}$ , the average effect of a firm-level agreement on the wage change is:

$$E(\Delta W_{jt}^1 - \Delta W_{jt}^0 \mid Y_{jt} = 1, X_{jt}, Z_{jt}, C_t) = \gamma_1$$

This effect is also equal to  $\gamma_1$  for a firm in which a firm-level agreement is not observed:

$$E(\Delta W_{jt}^1 - \Delta W_{jt}^0 \mid Y_{jt} = 0, X_{jt}, Z_{jt}, C_t) = \gamma_1$$

Consequently,  $\gamma_1$  is the average treatment effect, namely the effect of a firm-level agreement, in the whole sample.

At the level of the firm, the variable  $C_t$  can be considered as exogenous. However, if we want to interpret the parameter  $\gamma_1$  as the causal effect of a firm-level agreement, we have to control for the potential endogeneity of the regressor  $Y_{jt}$ . This endogeneity may result from omitted or unobserved factors that affect  $Y_{jt}$  and that are simultaneously correlated with the residual  $u_{jt}$ . To capture this correlation, we introduce an auxiliary probit equation to explain the occurrence of a bargaining agreement in firm  $j$  and year  $t$ . This equation has the following form:

$$Y_{jt} = \mathbf{1}(Y_{jt}^* > 0)$$

where  $Y_{jt}^*$  is the propensity for firm  $j$  to obtain a contractual agreement with its workers during year  $t$ . This propensity is supposed to depend linearly on some firm characteristics, on the occurrence of an industry-level agreement during year  $t$  or during the previous years, and on some unobserved firm-specific heterogeneity that is potentially correlated with the residual  $u_{jt}$  of the wage equation. More precisely, we set:

$$Y_{jt}^* = X_{jt}\beta_x + Z_{jt}\beta_z + \delta_y C_t + v_{jt} \quad (6)$$

where  $X_{jt}$  is the vector of covariates affecting also the wage change in firm  $j$ , the dummy variable  $C_t$  indicates the occurrence of an industry-level agreement in year  $t$ , and  $v_{jt}$  is a firm-specific random term which is potentially correlated with  $u_{jt}$ . The identification of the two-equations model (2)+(6) is based on the presence of the instrumental variable  $Z_{jt}$  in the auxiliary probit equation. As usual, such a variable should affect the occurrence of a firm-level agreement but not the wage change in the firm. Here, our instrumental variable is the proportion of workers employed under short-term labour contracts within the firm, which may increase the bargaining power of employers and make the negotiation at the firm-level less likely. Residuals are assumed to be normally distributed:

$$\begin{pmatrix} u_{jt} \\ v_{jt} \end{pmatrix} \sim N \left[ \begin{pmatrix} 0 \\ 0 \end{pmatrix}, \begin{pmatrix} \sigma_u^2 & \rho\sigma_u \\ \rho\sigma_u & 1 \end{pmatrix} \right]$$

where  $\sigma_u^2$  is the variance of the wage changes and  $\rho$  is the correlation coefficient between the residuals  $u_{jt}$  and  $v_{jt}$ . The likelihood function of this model is the one of the usual selection (type-2 Tobit) model. Since negotiations over the years corresponding to the implementation of the law on the reduction of the working time (see Figure 11 and the corresponding comments in Section 5) were very specific, we restrict our analysis to the second subperiod of our data set, namely to the years going from 2002Q1 to 2005Q1. To build an i.i.d. subsample, we have drawn randomly only two observations (corresponding to two successive years, in order to calculate the wage change  $\Delta W_{jt} = W_{j,t+1} - W_{j,t}$ ) for each firm. An extension would consist in incorporating all the observations for a given firm and in estimating a selection model with repeated observations and with firm-specific (random) effects.

## 6.2 Results

The results of the estimation are presented in Table 7 for manufacturing and in Table 8 for services. First, the probability of a firm-level wage agreement increases with the firm size. This result is valid both in manufacturing and services. The estimates of coefficients associated with industry dummies are also in line with the descriptive statistics (see section 4): compared to other industries in manufacturing (respectively in services), wages are negotiated more often at the firm level in motor vehicles, capital goods and intermediate goods industries (respectively, transports, finance and real estate industries). Wage negotiation is more unfrequent in firms of the construction industry. Moreover,

the frequency of firm-level agreements has significantly increased since 2003, both in manufacturing and services.

The proportion of short-term contracts is estimated to have a significant negative impact on the probability of a firm-level wage agreement. This result may be explained by the lower bargaining power of temporary workers.

**Table 7: Parameter estimates (Manufacturing)**

	Firm agreement			Wage change		
	Est.	Std. E.	P-val.	Est.	Std. E.	P-val.
Constant	-2.41	0.19	0.00	2.89	0.26	0.00
Prop. of short-term contracts	-0.01	0.00	0.02	-	-	-
Industry-level agreement	0.04	0.04	0.32	-0.03	0.08	0.75
Firm-level agreement	-	-	-	4.23	0.13	0.00
<i>Year:</i>						
2002-2003	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
2003-2004	0.14	0.06	0.02	-0.32	0.11	0.00
2004-2005	0.17	0.06	0.00	-0.31	0.10	0.00
<i>Industry:</i>						
Food	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Consumption goods	0.12	0.09	0.15	-0.29	0.16	0.07
Motor vehicles	0.40	0.12	0.00	-0.77	0.27	0.00
Capital goods	0.20	0.08	0.02	-0.29	0.15	0.06
Intermediary goods	0.20	0.07	0.01	-0.43	0.13	0.00
Energy	0.35	0.23	0.12	-0.47	0.49	0.34
Construction	-0.17	0.10	0.08	0.68	0.16	0.00
<i>Size of the firm:</i>						
less than 20 employees	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
20-50 employees	0.41	0.17	0.02	-0.32	0.15	0.04
50-100 employees	1.17	0.14	0.00	-0.65	0.15	0.00
100-200 employees	1.49	0.14	0.00	-0.84	0.13	0.00
200-500 employees	1.93	0.14	0.00	-1.33	0.15	0.00
more than 500 employees	2.03	0.15	0.00	-1.54	0.20	0.00
$\rho$	-0.80	0.01	0.00			
$\sigma_u^2$	2.95	0.04	0.00			
Log-likelihood	-13,317.859					
Number of observations	4,937					

In the manufacturing sector, the occurrence of a wage-agreement at the industry-level has no statistically significant effect on the probability of a firm-level agreement during the same year, while it is estimated to have a significantly positive but small effect in the services sector. Two opposite arguments may explain the existence of a relationship between industry- and firm-level agreements. First, we could expect that there is an inverse relationship: when the industry-level wage negotiations are frequent, the employer has less incentives to negotiate wages with the workers in the firm. On the contrary, frequent wage negotiations at the industry-level may reflect a well-settled relationship between

the trade unions and the employers, probably resulting from a high bargaining power of the trade unions. We could then expect more regular firm-level wage agreements in industries where the unions and workers have a high bargaining power. In our results, this second effect seems to overcome the first one.

**Table 8: Parameter estimates (Services)**

	Firm agreement			Wage change		
	Est.	Std. E.	P-val.	Est.	Std. E.	P-val.
Constant	-2.87	0.19	0.00	2.83	0.24	0.00
Prop. of short-term contracts	-0.01	0.00	0.07	-	-	-
Industry-level agreement	0.11	0.05	0.04	-0.21	0.10	0.03
Firm-level agreement	-	-	-	4.77	0.21	0.00
<i>Year:</i>						
2002-2003	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
2003-2004	0.22	0.08	0.00	-0.21	0.12	0.08
2004-2005	0.24	0.07	0.00	-0.1	0.11	0.93
<i>Industry:</i>						
Trade	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Transports	0.34	0.08	0.00	-0.17	0.15	0.26
Finance	0.23	0.11	0.03	-0.11	0.23	0.65
Real estate	0.61	0.15	0.00	-0.44	0.31	0.15
Services to firms	-0.06	0.07	0.44	0.07	0.12	0.57
Services to households	0.03	0.12	0.80	0.01	0.16	0.95
Education, health	0.17	0.23	0.46	-0.71	0.31	0.02
Administration	0.11	0.19	0.57	0.04	0.28	0.88
<i>Size of the firm:</i>						
less than 20 employees	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
20-50 employees	0.62	0.14	0.00	-0.31	0.14	0.02
50-100 employees	1.03	0.14	0.00	-0.56	0.15	0.00
100-200 employees	1.35	0.13	0.00	-0.80	0.14	0.00
200-500 employees	1.53	0.13	0.00	-1.08	0.16	0.00
more than 500 employees	1.80	0.14	0.00	-1.60	0.21	0.00
$\rho$	-0.75	0.02	0.00			
$\sigma_u^2$	3.23	0.04	0.00			
Log-likelihood	-13,747.535					
Number of observations	5,045					

The impact of the covariates on wage changes are also consistent with the descriptive statistics given in Section 5. For instance, the size of the firm has a strong significant effect on the wage dynamics. In both manufacturing and services sectors, smaller wage changes are more likely to be observed in larger firms. Besides, in manufacturing, wage changes are smaller in motor vehicles, capital goods and intermediate goods industries, whereas they are larger in construction. Wage increases were lower after 2003, both in manufacturing and services.

Firm-level wage agreements have strong positive effects on annual average wage changes in both sectors, manufacturing and services. On the contrary, industry-level agreements have a significant negative effect on wage changes in services, whereas their is not statistically different from zero (while negative) in manufacturing. However, let us remark that the magnitude of the effect of the industry-level agreement on wage changes is much lower than that of the firm-level agreement. The estimate of the causal effect of a firm-level agreement on the wage variation ( $\hat{\gamma}_1 = 4.23$  in manufacturing,  $\hat{\gamma}_1 = 4.77$  in services) is higher than the difference between the modal wage change observed in firms which negotiate a firm-level agreement and the modal wage change in firms which do not negotiate this type of agreement (this difference is slightly greater than 2.5; see Figure 12, section 5). This discrepancy results both from the sample composition and selection effects.

To clarify this point, we can compute, from our maximum likelihood estimates, the predicted average wage change in each firm having negotiated a wage-setting agreement during year  $t$ . This predicted wage change is:

$$E(\Delta W_{jt}^1 | Y_{jt} = 1, X_{jt}, Z_{jt}, C_t) = X_{jt}\beta_w + \gamma_1 + \gamma_2 C_t + \rho\sigma_u \frac{\varphi(X_{jt}\beta_y + Z_{jt}\beta_y + \delta_y C_t)}{\Phi(X_{jt}\beta_y + Z_{jt}\beta_y + \delta_y C_t)}$$

where  $\varphi$  and  $\Phi$  are the density and the cumulative density functions of the standard normal distribution  $\mathcal{N}(0, 1)$ , respectively. Then by averaging these quantities over the subsamples in which  $Y_{jt} = 1$  and  $C_t = 0$  (respectively,  $Y_{jt} = 1$  and  $C_t = 1$ ), we obtain the average wage changes in firms having negotiated a wage agreement and belonging to an industry in which no collective agreement (respectively, one collective agreement) has been signed during the same year. The results of these exercises are provided in Table 9.

Table 9 shows that the predicted average value of the wage change in firms that negotiate is 2.71 in manufacturing and 2.79 in services. It is lower than the estimated causal effect of the firm-level agreement on the wage variation in the firm. This means that, in the absence of a successful wage negotiation inside the firm, the firm would have been incited to reduce its wages. Table 9 shows also that, in general, the predicted wage change in firms that negotiate is slightly higher than in services, and when the firm-level agreement is not associated with an industry-level agreement. It is also much higher in large firms (i.e. firms with more than 100 employees) than in small ones (i.e. firms with less than 100 employees).

**Table 9: Predicted average wage changes in firms having negotiated a firm-level wage agreement**

	Manufacturing		Services	
	Estimate	Std. err.	Estimate	Std. err.
<b>All firms</b>				
Industry-level agreement	2.76	0.01	2.83	0.04
No industry-level agreement	2.63	0.02	2.75	0.04
Total	2.71	0.01	2.79	0.03
<b>Less than 100 employees</b>				
Industry-level agreement	1.99	0.09	2.07	0.11
No industry-level agreement	1.93	0.09	2.26	0.10
Total	1.96	0.06	2.17	0.08
<b>More than 100 employees</b>				
Industry-level agreement	2.84	0.01	3.02	0.03
No industry-level agreement	2.75	0.01	2.89	0.03
Total	2.81	0.01	2.95	0.02

## 7 Conclusion

The impact of the level of wage bargaining on economic performances is a crucial issue. In this paper, using original micro-data on wage negotiations in French firms between 1999 and 2005, we have investigated how wages are negotiated and what are the effects of the different levels of bargaining on wage changes.

First, using descriptive statistics, we have described a complex system of wage bargaining and exhibit some patterns of collective wage bargaining in France. Industry-level wage bargaining can take place at the national, regional or local level; on average, around 75% of employees are covered by an industry wage agreement. Most of these agreements are signed at the beginning of the year; the average duration between two agreements is one year and the agreement has an impact within the year. At the firm-level, around 5,000 wage agreements are signed each year; they cover around 25% of employees; most of agreements are signed within the first quarter of the year; and the typical duration between two wage agreements is one year. We find that the main determinants of the firm-level wage agreement are the size of the firm and to a lesser extent the proportion of short-term contracts. There is no clear link between the different levels of wage-bargaining.

Finally, we have estimated the impact of the different levels of wage bargaining on the wage dynamics inside the firm. For that purpose, we have regressed the year-to-year change in the average firm-level wage on the two types of agreements, but to correct for potential endogeneity of the occurrence of a firm-level agreement, we have simultaneously estimated an auxiliary probit equation. We show that a firm-level wage agreement has a strong positive impact on the annual wage change in the firm, whereas an industry-level agreement has a null or

even a negative effect on the wage variation. This effect is larger in firms with more than 100 employees.

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