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WAGE DIFFERENTIALS IN BELGIUM: THE ROLE OF WORKER AND EMPLOYER CHARACTERISTICS

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ABSTRACT:

This paper examines the role of worker and employer characteristics in the determination of wages in the Belgian private sector. Empirical findings, based on detailed matched employer-employee data covering the period 1995-2002, reveal the existence *ceteris paribus* of: i) a substantial but decreasing return on education, ii) a large and stable gender wage gap, iii) an increasing wage penalty for those employed on a fixed term contract, iv) a positive and persistent employer-size wage effect, v) small and slightly declining regional wage differentials, and vi) a positive but moderate effect of company collective agreements on workers' wages. Further results show persistent but decreasing wage differentials between workers with the same observed characteristics and working conditions, employed in different sectors.

JEL CLASSIFICATION: D31, J31, J41.

KEYWORDS: Wage structure, matched employer-employee data, Belgium.

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INTRODUCTION

The empirical debate about the role of worker and employer characteristics in the determination of earnings inequalities was reopened at the end of the 1980s by an article by Krueger and Summers (1988). These authors highlighted the fact that the structure of wages in the U.S. was not compatible with the competitive framework, according to which wage differentials at equilibrium are explained either through differences in the quality of the labour force – measured in terms of productive capacity – or by so-called compensating differences. In other words, they showed that wage disparities persisted between agents with identical observed individual characteristics and working conditions, employed in different sectors. Since then, similar results have been obtained for many industrialised countries (Araï *et al.*, 1996; Hartog *et al.*, 1997, 2000; Lucifora, 1993; Vaïniomaki and Laaksonen, 1995). Accordingly, the existence of inter-industry wage differentials has become a stylised fact in the economic literature.

Yet, the reason for their existence remains a complex and unresolved puzzle. Indeed, the role of unmeasured abilities in explaining inter-industry wage differentials is still unsettled. To put it differently, there is no consensus on whether workers with better unmeasured abilities are over-represented in high-wage sectors (Abowd *et al.*, 1999; Björklund *et al.*, 2007; Carruth *et al.*, 2004; Gibbons and Katz, 1992; Goux and Maurin, 1999; Martins, 2004a). Moreover, while studies on industry wage premia offer some evidence against the perfectly competitive model, they hardly allow to discriminate among alternative models that support the existence of an effect of employer characteristics on wages (Benito, 2000; Krueger and Summers, 1988; Lindbeck and Snower, 1990; Thaler, 1989; Walsh, 1999).

The present paper adds to this literature by examining the magnitude, stability and sources of inter-industry wage differentials in the Belgian private sector over the period 1995-2002. The existence of inter-industry wage differentials in Belgium, for both male and female workers, has been recently highlighted by Rycx (2002) and Rycx and Tojerow (2002). Using cross-sectional data for 1995, the latter show that their structure is comparable with that observed in the other industrialised countries but that their dispersion is relatively small. Moreover, findings are in line with the hypothesis of a negative relation between the dispersion of inter-industry wage differentials and the degree of corporatism of the industrialised countries. The role of unions in bringing about these inter-industry wage differentials has been investigated by Rycx (2003). His findings, based on micro-data for 1995, suggest that: i) sectors offering high/low wages are similar for workers covered by different bargaining regimes, and ii) the dispersion of inter-industry wage differentials is higher when wages are collectively renegotiated at the firm level.

Nevertheless, great uncertainty remains as to the size, evolution and determinants of inter-industry wage differentials in Belgium. In this paper, we attempt to fill this gap at least partially by addressing the following questions: i) What are the effects of worker and employer characteristics on wages?, ii) How big and significant are inter-industry wage differentials?, and iii) Are sectoral differences in pay a temporary phenomenon or do

they persist over time? Overall, we aim to contribute to the literature on the Belgian wage structure by providing new evidence on the effects of worker and employer characteristics on inter-industry wage differentials.

To do so, we rely on detailed matched employer-employee data, i.e. the *Structure of Earnings Survey*, covering the years 1995, 1999 and 2002. These data contain a wealth of information, reported by the management of establishments, both on employer characteristics (e.g. sector of activity, region where the establishment is located, level of wage bargaining, size of the establishment) and individual workers (e.g. gross hourly wages, bonuses, age, education, tenure, sex, occupation, type of employment contract, working hours).

The remainder of this paper is organised as follows. In the next section a review of the literature on the magnitude and sources of inter-industry wage differentials is presented. Section 2 describes the data used in the paper and displays summary statistics. Section 2 provides new evidence on the effects of worker and employer characteristics on wages. It also examines in depth the size, dispersion and stability of inter-industry wage differentials in the Belgian private sector over the period 1995-2002. The last section concludes.

1. Theoretical and Empirical Background

According to the standard Walrasian (competitive) model of the labour market, in which the equilibrium wage is determined by marginal productivity, two agents with identical productive characteristics necessarily receive identical wages. However, so-called compensating differences may occur between similar individuals with different working conditions. Indeed, the disutility undergone by one individual following the performance of a task in an unfavourable situation may lead to wage compensation. This simple description of the wage determination process has been challenged by the pioneering observations of Slichter (1950) and more recently by Dickens and Katz (1987), Krueger and Summers (1988) and Katz and Summers (1989). These authors have demonstrated that pay differentials existed in the U.S. between workers with the same observable individual characteristics and working conditions but employed in different sectors. In recent years, comparable results have been obtained for a large number of countries (Araï *et al.*, 1996; Hartog *et al.*, 1997, 2000; Lucifora, 1993; Vainiomäki and Laaksonen, 1995). Moreover, it has been shown that the structure of inter-industry wage differentials is quite persistent and strongly correlated between countries but that its scale varies considerably between industrialised countries (Helwege, 1992; Zanchi, 1992). A number of studies, except that of Björklund et al. (2007), suggest in addition that sectoral effects are significantly weaker in strongly corporatist countries, regardless of the period studied (Barth and Zweimüller, 1992; Edin and Zetterberg, 1992; Gannon *et al.*, 2007; Kahn, 1998; Teulings and Hartog, 1998). Teulings and Hartog (1998), for example, report that from the most to the least corporatist country the dispersion in industry wage premia increases roughly at a ratio of 1:4. The concept of corporatism, borrowed from political science, resembles

the level of centralisation of collective bargaining as well as the degree of co-ordination between the social partners. However, as this concept has not been defined in one single way, there are differences in opinion as to the relative position of the industrialised countries on the scale of corporatism (OECD, 1997, 2004). The Scandinavian countries and Austria are nevertheless always in the category of strongly corporatist countries, whereas the U.S. and Canada are invariably at the bottom of the ranking. Depending on the authors, Belgium is ranked intermediate or high on the scale of corporatism.

Overall, the existence of sectoral wage premia increasingly casts doubt on the assumption of a perfectly competitive labour market. Indeed, it suggests that individual wages are not solely determined by personal productive characteristics and task descriptions but also by employer features in each sector. Nevertheless, great uncertainty remains.

The Role of Unobserved Ability

Uncertainty derives from the fact that the unobserved quality of the labour force might not be randomly distributed across industries. In other words, high-paying industries might simply be those where unmeasured labour quality is highest. Almost all studies examining the unobserved quality explanation rely on panel data. They compute industry wage premia on the basis of a wage equation estimated in first-differences so as to control for time-invariant unobserved individual ability. Results put forth by these studies are mixed. Krueger and Summers (1988), for example, show for the U.S. that the magnitude of inter-industry wage differentials decreases only marginally when wage equations are estimated in first-differences rather than in levels. A similar result has been reported by Gibbons and Katz (1992) on the basis of U.S. data from plant closings. In contrast, Abowd *et al.* (1999), Goux and Maurin (1999) and Murphy and Topel (1990), show that individual fixed effects explain a large fraction of estimated inter-industry wage differentials in the U.S. and France. Using longitudinal data from the *British Household Panel Survey*, Benito (2000) and Carruth *et al.* (2004) also provide strong evidence in favour of the unobserved quality explanation.

Longitudinal data allow to control for fixed unobserved individual characteristics and thus present a major advantage compared with cross-sectional data. Yet, the use of panel data generates specific problems that are not encountered with cross-sectional data. Indeed, first-difference estimates may be biased if: i) the number of workers changing industries is small, ii) workers who switch industries have non random characteristics, and iii) unobserved labour quality is not equally valued across industries. Fixed effects estimations are also more affected by measurement errors (i.e. errors in reporting changes in worker sectoral affiliation) since they exclusively focus on individuals switching industries. A final issue concerns the return-to-tenure component of the wage equation (Björklund *et al.*, 2007). Indeed, it is argued that fixed effects estimates are biased since the tenure effect is likely to be underestimated for individuals who have just switched industries.

To avoid the problems encountered with first-difference estimates, Björklund *et al.* (2007) examined the role of unobserved ability in explaining inter-industry wage differentials using

data on siblings. Their results show that unobserved ability accounts for approximately 50 percent of inter-industry wage dispersion in the U.S. and for between 11 and 24 percent in the Scandinavian countries. The unobserved quality explanation has further been tested with cross-sectional data by Martins (2004a). Applying quantile regressions to a Portuguese matched employer-employee data set for 1995, the author rejects the hypothesis that high-wage industries draw disproportionately more on high-ability workers. Consequently, he suggests that non-competitive forces play an important role in the wage determination process.

The Role of Employer Characteristics

All in all, there is no consensus regarding the exact scale of industry wage premia. Moreover, while studies on industry wage premia offer some evidence against the perfectly competitive model, they hardly allow to discriminate among alternative models supporting the existence of an effect of employer characteristics on wages (Benito, 2000; Krueger and Summers, 1988; Lindbeck and Snower, 1990; Thaler, 1989; Walsh, 1999). Prima facie, wage disparities observed between sectors support the efficiency wage theory. Indeed, the latter shows that if the incentive conditions for effort vary between sectors, then two workers with identical productive characteristics and working conditions are likely to earn different wages. For instance, according to the effort version of the efficiency wage theory, large companies would find it in their interest to offer relatively higher wages to their employees because they face higher costs to monitor effort.

However, this theory does not explain why the scale of inter-industry wage differentials varies between countries and appears to be more compressed in corporatist countries. The motives for companies to pay efficient wages, i.e. wages above the competitive level, actually seem to be similar among industrialised countries. Therefore, some authors (e.g. Teulings and Hartog, 1998) believe that the explanation put forward by Holmlund and Zetterberg (1991), based upon the rent-sharing theory[1], is more compelling. Holmlund and Zetterberg (1991) showed that the influence of sectoral conditions (variations in prices and productivity) on wages is strong in the U.S., moderate in Germany and low in the Scandinavian countries. The elasticity between sectoral environment and wages thus appears to be more pronounced in non-corporatist countries. To put it differently, determination of wages would depend more on the general macro-economic conditions in corporatist countries. This may be due to the fact that explicit or implicit co-ordination of wage bargaining in corporatist countries restricts workers' insider power, or in other words their ability to obtain part of the sectoral rents. It is also argued that the policy of 'wage solidarity' pursued by unions in most corporatist countries reinforces this phenomenon. For instance, Vainiomäki and Laaksonen (1995: 172) emphasise that 'the difference (in the dispersion of inter-industry wage differentials) between Sweden and Finland (may derive from) the less successful implementation of solidarity wage policy

[1] This theory refers "to a situation in which rents (profits above the level that results from paying all factors their market rates) are shared by the firm, at least in some part, with the employees of that firm" (Martins, 2007: 24).

and more flexibility in industry level agreements in Finland'. In sum, this strand of the literature suggests that rent-sharing is partly responsible for observed sectoral wage premia and for their apparently higher dispersion in non-corporatist countries.

However, this conclusion should be drawn with care for at least two reasons. Firstly, the hypothesis that the dispersion of inter-industry wage differentials is significantly lower in corporatist countries has been challenged by Björklund *et al.* (2007). Using data on siblings, the latter find that inter-industry wage differentials are not significantly larger in the U.S. than in Scandinavian countries, after controlling for unobserved factors shared by brothers. Secondly, more convincing evidence on the existence and magnitude of rent-sharing is provided by studies that directly estimate the elasticity between wages and profits (or value-added) with firm-level or matched worker-firm data (Araï, 2003; Blanchflower *et al.*, 1996; Christophides and Oswald, 1992; Fakhfakh and FitzRoy, 2004; Goos and Konings, 2001; Hildreth and Oswald, 1997; Margolis and Salvanes, 2001; Martins 2004b; Rycx and Tojerow, 2004; Van Reenen, 1996). Findings from this literature show that profitable firms pay higher wages even after detailed personal and firm characteristics are controlled for. Nevertheless, it is still unclear whether pay-profit elasticity is larger in countries with little centralisation or corporatism. Moreover, it remains to be shown how exactly rent-sharing contributes to the explanation of inter-industry wage differentials.

2. Description of the Data

The present study is based upon the *Structure of Earnings Survey* (SES) carried out by Statistics Belgium. The SES, currently available for the years 1995, 1999 and 2002, is a large matched worker-firm data set. It covers the Belgian establishments employing at least ten workers whose economic activities fall within sections C to K of the NACE Rev. 1 nomenclature. It thus encompasses the following sectors: mining and quarrying (C), manufacturing (D), electricity and water supply (E), construction (F), wholesale and retail trade; repair of motor vehicles, motorcycles and personal and household goods (G), hotels and restaurants (H), transport, storage and communication (I), financial intermediation (J), real estate, renting and business activities (K).[2] The survey contains a wealth of information, provided by the management of the establishments, both on establishment-level characteristics (e.g. sector of activity, region, size of the establishment, and level of wage bargaining) and individual workers (e.g. education, potential experience, tenure, number of working hours paid, gender, occupation, and gross hourly wages including and excluding annual bonuses[3]). Gross hourly wages – *excluding* bonuses[4] – are calculated by dividing total gross earnings

[2] It is representative of the whole private sector except agriculture, hunting, forestry and fishing.

[3] Information on annual bonuses is only available for 1995 and 2002.

[4] Annual bonuses include irregular payments which do not occur during each pay period, such as pay for holiday, 13th month or profit-sharing.

(including earnings for overtime hours and premiums for shift work, night work and/or weekend work) in the reference period (October) by the corresponding number of total paid hours (including paid overtime hours). In contrast, gross hourly wages – including bonuses – are obtained by adding to the gross hourly wages (exluding bonuses) the annual bonuses divided by: i) the number of month to which the bonuses correspond and ii) the number of total paid hours in the reference period, respectively. Potential experience is not directly reported in the SES. It is computed as follows: age – 6 – years of education – seniority. It measures the number of years of experience potentially accumulated on the labour market before the last job.[5]

The 1995 wave of the SES was conducted using a representative sample of 145,107 individuals working for 6,015 establishments. Yet, the simultaneous use of data relating to wages and levels of education yield a representative sub-sample of 81,562 individuals working for 4,092 establishments.[6] Exclusion of individuals for whom some information was either missing or incorrect,[7] reduces the sample by approximately 2.1% to 79,835 units. Finally, limiting the sample to establishments that are for at least 50 percent owned by the private sector drops it further to 67,023 individuals. Such a selection is justified by the fact that wages are determined in very different ways in the public and private sector. Therefore, including publicly controlled establishments would likely have skewed our results. A similar filtering process has been applied to the 1999 and 2002 waves of the SES. The initial surveys included respectively 124,272 and 108,677 observations. However, exclusion of incorrect or missing values and the selection of establishments that are for at least 50 percent owned by the private sector resulted in final samples of respectively 111,297 and 102,594 individuals.

[5] This variable should be considered with caution since it overestimates the labour market experience of individuals that have been employed part-time or had carrier breaks.

[6] The representative character of this sub-sample is illustrated in Demunter (2000) and Rycx (2002).

[7] Observations in which tenure was greater than worker's age were deleted. This reduces the sample size by 1.4%. Records with missing values for the level of wage bargaining or the variable showing whether the individual supervises the work of his co-workers were suppressed. However, it can be shown that results presented in this article would not have been significantly different if these observations had been taken into account.

Table 1. means (standard deviations) of selected variables

Variables / Data set:	SES[a] 1995	SES 1999	SES 2002
Gross hourly wage, excluding bonuses (in EUR)[b]	12.32	13.12	13.74
	(5.7)	(6.6)	(6.5)
Education:			
Primary or no degree	9.7	8.5	8.1
Lower secondary	24.3	29.6	28.0
General upper secondary	18.4	21.0	19.2
Technical/Artistic/Prof. upper secondary	24.9	17.4	19.7
Higher non-university short type, higher artistic training	13.9	14.8	15.3
University and non-university higher education, long type	8.4	8.3	8.9
Post-graduate	0.5	0.5	0.6
Prior potential experience (years)[c]	9.5	10.9	11.5
	(8.5)	(8.8)	(9.7)
Seniority in the current company (years)	9.9	8.9	8.5
	(9.0)	(9.3)	(9.1)
Hours[d]	160.5	147.7	153.8
	(26.5)	(40.6)	(41.4)
Female (yes)	31.4	30.3	32.0
Type of contract:			
Unlimited-term employment contract	97.0	95.0	95.7
Limited-term employment contract	2.4	3.7	3.4
Apprentice/Trainee contact	0.1	0.2	0.2
Other	0.4	1.2	0.7
Size of the establishment (number of workers)	501.8	705.3	651.6
	(1,133.8)	(1,857.0)	(1,661.5)
Region where the establishment is located:			
Brussels	17.6	22.7	16.4
Wallonia	19.4	17.9	21.5
Flanders	63.0	59.4	62.1
Level of wage bargaining:			
CA[e] only at the national and/or sectoral level	51.7	73.5	79.2
CA at the company level	39.4	26.5	19.9
Other	9.0	0.0	1.2
Number of observations	67,023	108,677	102,594

Notes: The descriptive statistics refer to the weighted sample. [a] SES stands for *Structure of Earnings Survey*. [b] Includes overtime paid and premia for shift work, night work and/or weekend work. Pay for holiday, 13th month, arrears, advances, travelling expenses etc. are excluded. [c] Experience potentially accumulated on the labour market before the last job. [d] Number of hours paid in the reference period (October), including overtime paid. [e] CA stands for collective agreement.

Table 1 depicts the means and standard deviations of selected variables in the 1995, 1999 and 2002 waves of the SES.[8] Note that, on average, gross hourly wage (excluding bonuses) amounts to 13 EUR, three-quarters of the workers have at most a degree from the upper secondary school, workers have 10 years of potential experience and 9 years of seniority, the proportion of women is slightly below one-third, and more than 95 percent of the workers have a permanent employment contract. Also noteworthy is that the number of hours paid per month (including overtime) has been decreasing from 161 in 1995 to 154 in 2002. Moreover, we find that the average establishment size has been increasing over time (652 in 2002 vs. 502 in 1995) and that the majority of the workforce is employed in Flanders (62 percent in 2002). Finally, let us notice that the proportion of workers whose wages are collectively renegotiated at the company level has been decreasing from approximately 39 to 20 percent between 1995 and 2002. The majority of workers have their wages thus solely determined through national and/or sectoral collective agreements.

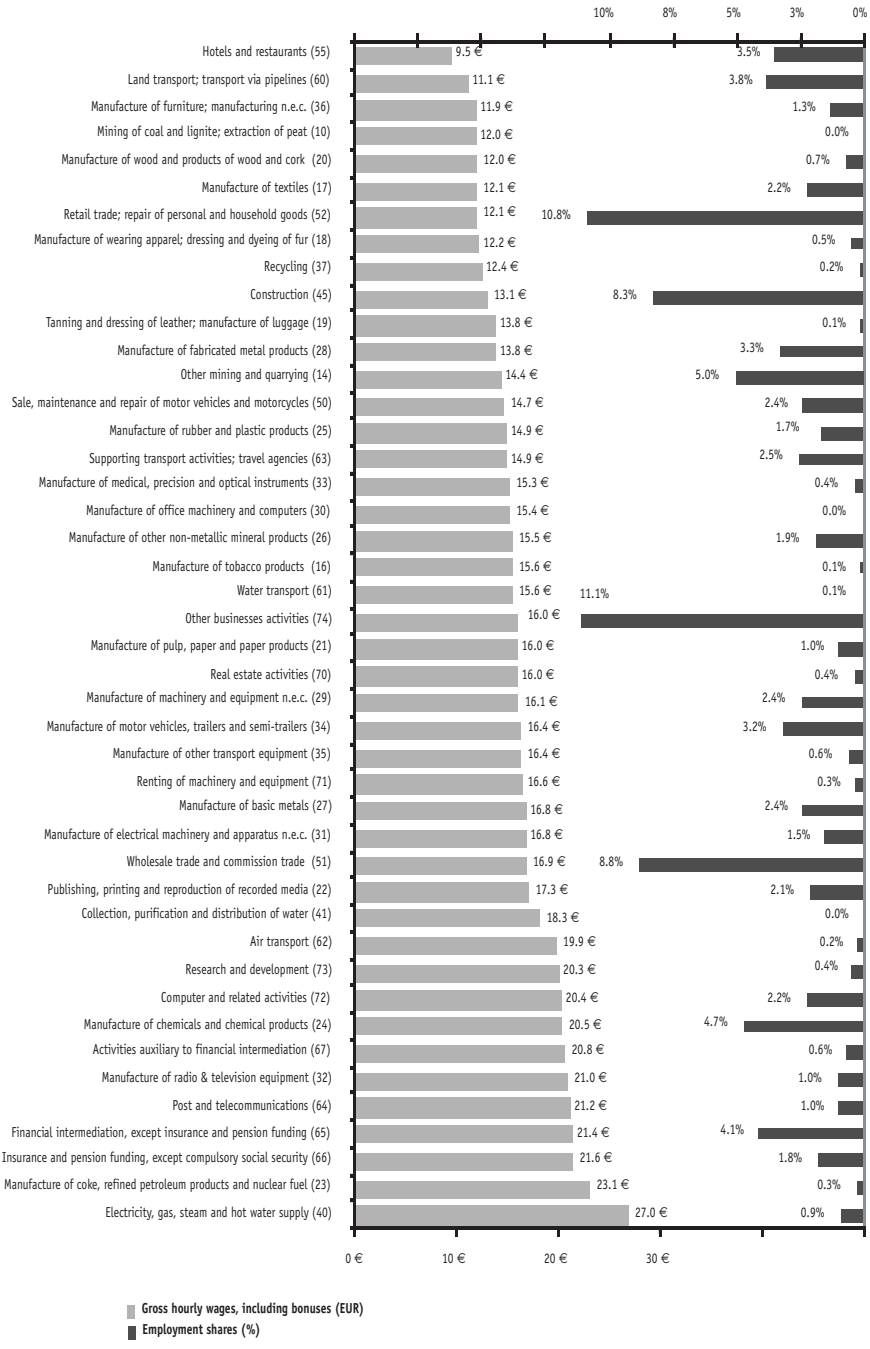
Figure 1 shows the distribution of employment across sectors as well as the mean gross hourly wage (including bonuses) in each industry for the year 2002.[9] Findings indicate that more than 30 percent of the workers are concentrated in the three following sectors: i) other business activities[10] (11.1 percent), ii) retail trade; repair of personal and household goods (10.8 percent), and iii) wholesale trade and commission trade (8.8 percent). A large fraction of the workforce is also employed in the other mining and quarrying sector (5 percent), the manufacture of chemicals and chemical products sector (4.7 percent), and the financial intermediation sector (4.1 percent).

[8] For a more detailed description see Appendix 1.

[9] The same figure for the year 1995 is reported in Plasman *et al.* (2006).

[10] It includes the following sub-sectors: i) Legal, accounting, book-keeping and auditing activities (NACE code 74.1); tax consultancy; market research and public opinion polling; business and management consultancy; holdings; ii) Architectural and engineering activities and related technical consultancy (NACE code 74.2); iii) Technical testing and analysis (NACE code 74.3); iv) Advertising (NACE code 74.4); v) Labour recruitment and provision of personnel (NACE code 74.5); vi) Investigation and security activities (NACE code 74.6); vii) Industrial cleaning (NACE code 74.7); and viii) Miscellaneous business activities n.e.c. (NACE code 74.8).

FIGURE 1. GROSS HOURLY WAGES (INCLUDING BONUSES) AND EMPLOYMENT SHARES FOR NACE TWO-DIGIT INDUSTRIES, 2002



Source: *Structure of Earnings Survey, 2002.*

Figure 1 reveals in addition that mean gross hourly wages (including bonuses) fluctuate considerable across sectors. The best paying industry is the electricity, gas, steam and hot water supply sector. The average worker there earns 27 EUR per hour. This sector is followed by the manufacture of coke, refined petroleum and nuclear fuel industries (23.1 EUR), the insurance and pension funding sector (21.6 EUR), the financial intermediation sector (21.4 EUR), and the post and telecommunications sector (21.2 EUR). The hotels and restaurant sector is at the very bottom of the wage scale. The average worker's hourly wage here is 9.5 EUR, almost 300 percent less than that of the average worker in the best paying industry. At the bottom of the scale, we likewise find land transport and transport via pipelines (11.1 EUR), manufacture of furniture (11.9 EUR), manufacture of wood and products of wood and cork (12 EUR), manufacture of textiles (12.1 EUR), and retail trade, repair of personal and household goods (12.1 EUR).

3. Magnitude, Dispersion and Stability of Inter-Industry Wage Differentials

The methodology that has been adopted to estimate inter-industry wage differentials (stripped of the sectoral diversity in observed working conditions, individual and firm characteristics) and their dispersion in the Belgian private sector over the period 1995-2002 is consistent with that of Krueger and Summers (1988). However, the standard errors of the industry wage differentials have been corrected according to Zanchi (1998). This strategy rests upon the estimation, for each period, of the following Mincer-type (1974) wage equation:

$$\ln w_i = \alpha + \sum_{j=1}^{J} \beta_j X_{j,i} + \sum_{k=1}^{K} \psi_k Y_{k,i} + \sum_{l=1}^{L} \delta_l Z_{l,i} + \varepsilon_i \qquad (1)$$

where w_i represents the gross hourly wage of the individual i (for $i = 1, ..., N$); X is a vector of individual characteristics and working conditions (6 dummy variables showing the highest completed level of education; prior potential experience, its square and its cube[11]; seniority within the current company and its square; sex; 22 occupational dummies; number of hours paid; an indicator showing whether the individual is paid a bonus for shift work, night-time and/or weekend work; a dummy for extra paid hours; 3 dummies for the type of contract; and a dichotomic variable indicating whether the individual supervises other workers[12]); Y comprises dummy variables relating to the sectoral affiliation of the individuals (nomenclature available both at the NACE two- and three-digit level); Z contains employer's characteristics (2 regional dummies indicating where the establishment is located; the size of the establishment; and 2 dummies for the level of wage bargaining); α is the intercept; β, Ψ and δ are the parameters to be estimated and ε_i is an error term (see Appendix 1 for a detailed description of the variables).

[11] The introduction of potential experience in the form of an order three polynomial rests upon the results of Murphy and Welch (1990).

[12] This variable is only available in the 1995 wave of the SES.

Technically, the computation of inter-industry wage differentials first of all involves calculating the employment-weighted average wage differential of all the sectors compared to the reference:

$$\pi = \sum_{k=1}^{K} \overline{p}_k \hat{\psi}_k \qquad \text{(for } k\text{=1 ,..., } K\text{)} \tag{2}$$

where $\hat{\psi}_k$ is the estimated sector coefficient and $\overline{p}_k = \frac{1}{N}\sum_{i=1}^{N} p_{k,i}$ (for k = 1,…, K+1) is the sectoral employment share; and then applying the formulae below:

$$\begin{cases} d_k = \hat{\psi}_k - \pi & \text{(for } k\text{=1 ,..., } K\text{)} \\ d_{K+1} = -\pi \end{cases} \tag{3}$$

In order to test accurately hypotheses about the inter-industry wage differentials, the standard errors of the original industry coefficients have been adjusted according to Zanchi (1998). To put it differently, we first transformed the variance-covariance matrix found when estimating equation (1) by ordinary least squares (OLS) as follows:

$$\text{var}-\text{cov}\left(\hat{\psi}^*\right) = \left(H - es'\right)\ \text{var}-\text{cov}\left(\hat{\psi}\right)\ \left(H - es'\right)' \tag{4}$$

where H is a ((K+1)xK) matrix constructed as the stack of a (KxK) identity matrix and a (1xK) row of zeros, e is a ((K+1)x1) vector of ones, s represents the employment shares of the K first industries, and var-cov($\hat{\psi}$) is the original variance-covariance matrix of the industry dummy coefficients. Next, the correct estimates of the standard errors of the industry wage differentials were obtained by taking the square roots of the diagonal elements of this transformed variance-covariance matrix.

According to Zanchi (1998), the variability in industry wage differentials has been measured by the standard deviation of the industry wage premia, adjusted for least squares sampling error and weighted by sectoral employment shares. This summary statistic, further referred in the text as WASD (i.e. weighted adjusted standard deviation), corresponds to the following expression:

$$WASD(d_k) = \sqrt{\sum_{k=1}^{K+1} \overline{p}_k \left(d_k - \frac{\sum_{k=1}^{K+1} d_k}{K+1} \right)^2 - \frac{\sum_{k=1}^{K+1} \text{var}(\hat{\psi}_k^*)}{K+1} + \frac{\sum_{k=1}^{K+1}\sum_{l=1}^{K+1} \text{var}-\text{cov}\left(\hat{\psi}_k^*, \hat{\psi}_l^*\right)}{(K+1)^2}} \tag{5}$$

The dispersion in industry wage premia has also been assessed by the wage range in moving from the lowest- to the highest-paying industry.

3.1. Wage Regressions

Before embarking upon the analysis of the effects of workers' sectoral affiliation on wages, we briefly discuss the results from equation (1) that has been estimated for each period by OLS with White (1980) heteroscedasticity-consistent standard errors.

Table 2. Wage regressions

(Dependent variable: Ln of individual gross hourly wages *excluding* annual bonuses)

Explanatory variables / Period :	**1995**	**1999**	**2002**
Intercept	1.825**	2.043**	2.181**
	(0.025)	(0.017)	(0.018)
Education:			
Primary or no degree		Reference	
Lower secondary	0.053**	0.045**	0.034**
	(0.004)	(0.003)	(0.004)
General upper secondary	0.140**	0.105**	0.100**
	(0.005)	(0.004)	(0.004)
Technical/Artistic/Prof. upper secondary	0.128**	0.118**	0.111**
	(0.004)	(0.004)	(0.004)
Higher non-university short type, higher artistic training	0.221**	0.195**	0.192**
	(0.006)	(0.005)	(0.005)
University and non-univ. higher education, long type	0.383**	0.355**	0.332**
	(0.007)	(0.007)	(0.007)
Post-graduate	0.510**	0.525**	0.478**
	(0.019)	(0.021)	(0.021)
Prior potential experience:			
Simple	0.016**	0.020**	0.017**
	(0.001)	(0.001)	(0.001)
Squared/10^2	-0.036**	-0.066**	-0.044**
	(0.000)	(0.005)	(0.003)
Cubed/10^4	0.022*	0.075**	0.032**
	(0.010)	(0.008)	(0.006)
Seniority in the company:			
Simple	0.017**	0.016**	0.017**
	(0.000)	(0.000)	(0.000)
Squared/10^2	-0.017**	-0.017**	-0.020**
	(0.001)	(0.001)	(0.001)
Sex:			
Male		Reference	
Female	-0.116**	-0.128**	-0.121**
	(0.003)	(0.002)	(0.002)
Supervises the work of his or her co-workers:			
Yes	0.110**	/	/
	(0.004)		
Hours:			
Ln of the number of hours paid, including overtime paid	-0.000	-0.008*	-0.023**
	(0.005)	(0.003)	(0.003)

TABLE 2. CONTINUED

Explanatory variables / Period :	1995	1999	2002
Bonus for shift work, night work and/or weekend work:			
Yes	0.057**	0.031**	0.046**
	(0.004)	(0.003)	(0.003)
Overtime paid:			
Yes	0.024**	0.030**	0.035**
	(0.005)	(0.004)	(0.005)
Contract:			
Unlimited-term employment contract		Reference	
Limited-term employment contract	-0.026**	-0.086**	-0.064**
	(0.007)	(0.005)	(0.007)
Apprentice/Trainee contract	-0.636**	-0.831**	-0.296**
	(0.093)	(0.072)	(0.026)
Other employment contract	-0.024	-0.039**	-0.032**
	(0.024)	(0.008)	(0.008)
Occupation (22 dummies)	Yes	Yes	Yes
Sector of activity (respectively 174, 171 and 179 dummies)	Yes	Yes	Yes
Region where the establishment is located:			
Brussels		Reference	
Wallonia	-0.036**	-0.043**	-0.022**
	(0.004)	(0.003)	(0.003)
Flanders	-0.037**	-0.010**	0.003
	(0.003)	(0.003)	(0.003)
Size of the establishment:			
Ln of the number of workers	0.029**	0.028**	0.028**
	(0.001)	(0.001)	(0.001)
Level of collective wage agreement:			
Only at the national and/or sectoral level		Reference	
Company level	0.022**	0.016**	0.030**
	(0.003)	(0.002)	(0.003)
Other type of agreement	-0.016**	/	-0.011
	(0.004)		(0.007)
Adjusted R^2	0.713	0.659	0.623
F-test	535.5**	479.5**	405.0**
Number of observations	67,023	108,677	102,594

Notes: White (1980) heteroscedasticity-consistent standard errors are reported between brackets. Results are based on equation (1), estimated on the basis of the 1995, 1999 and 2002 *Structure of Earnings Surveys*. **/*/°: coefficient significant at the 1, 5 and 10 percent level, respectively.

Results in Table 2 show, in line with human capital theory, that the level of education exercises a substantial positive influence upon wages.[13] However, the return on education appears to have significantly decreased between 1995 and 2002. Indeed, compared to someone with a primary education qualification (or no degree), the wage differential has dropped from 15 to 10 percent[14] for someone with a general upper secondary education, from 25 to 21 percent for someone qualified on a short non-university higher education course, from 47 to 39 percent for someone with a long non-university or university higher education, and from 67 to 61 percent for an individual who has obtained a postgraduate degree.[15]

Not surprisingly, we also see a concave relation between the wages and the general potential experience of a worker on the labour market.[16] Initially, the return on an additional year of experience stands at between 1.6 and 1.9 percent, depending on the year under investigation. However, it decreases progressively and becomes negative after around 30 years of experience. All other things being equal, an individual with 29 years of experience obtains a wage differential of approximately 20 percent compared to the reference workers whose gross hourly wage has increased from 6.2 to 8.9 Euros between 1995 and 2002. The hypothesis of a bell-shaped relationship between wages and experience rests upon the idea that the investment in human capital (specific training and accumulation by work) diminishes over time and that the stock of human capital suffers from some degree of obsolescence. The growing share of the relationship between wages and experience is explained essentially by the evolution of individual productivity and partly by scale increases.

The relationship between wages and seniority in the company is also in the form of a bell. However, the return on seniority decreases markedly less quickly than that on experience. This difference can be explained through the almost automatic increase in wages as a function of years of seniority (essentially for white-collar workers) and through the progression in the earnings classification (i.e. promotion by seniority). It also illustrates the fact that companies offer more rewards for the human capital specific to their working environment. Finally, these results support the 'turnover' version of the efficiency wage theory (Stiglitz, 1974) according to which companies grant a bonus to workers who are faithful to them.

The dummy variable relating to gender suggests that all other things being equal, women are paid wages which are between 11 and 12 percent lower than those of men. This result is in line with the growing literature on the gender wage gap in Belgium. Jepsen (2001) shows, for instance, on the basis of the 1994 and 1995 Panel Study of Belgian Households (PSBH), that the sex wage gap between full-time workers stands at around 15 percent and

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[13] Findings discussed in this sub-section are based on a wage equation where the dependent variable is the individual gross hourly wage *excluding* annual bonuses. Results based on gross hourly wages including annual bonuses are reported in Plasman *et al.* (2006). They are quite similar to the former although the magnitude of some regression coefficients may differ to some extent.

[14] Technically, this figure is obtained by taking the antilog (to base e) of the estimated dummy coefficient from which 1 is subtracted (x 100). For more details see Gujarati (1995: 525).

[15] However, the decrease in the return on education for postgraduates is not statistically significant (t=1.13).

[16] See footnote 11.

that only a small part of it can be explained by gender differences in endowments. In contrast, using the 1995 Structure of Earnings Survey (SES), Plasman *et al.* (2001) suggest that the wage gap between (all) men and women working in the Belgian private sector reaches almost 22 percent and that half of it is attributable to gender differences in working conditions, individual and firm characteristics. Using the PSBH, Konings (2005) shows in addition that the gender wage gap in the Belgian economy has been stable over the period 1998-2002 and that a substantial part of it can be attributed to discrimination. Findings reported in Table 2 corroborate this conclusion. Indeed, they show the existence of a persistent gender wage gap even after controlling for individual and firm characteristics. To put it differently, they reject the hypothesis of a 'natural' trend towards pay equality.

We likewise observe a wage differential of 11.6 percent in favour of individuals supervising the work of their co-workers. This result stems from the fact that all other things being equal, these individuals have a higher degree of responsibility within the company. It also backs up the 'effort' version of the efficiency wage theory (Shapiro and Stiglitz, 1984). According to this theory, it is optimal for a company to offer a bonus to employees whose effort it cannot monitor constantly, and to carry out intermittent checks with respect to them, including dismissal in the event of insufficient effort. To sum up, these results suggest the existence of a positive relationship between the wage of an individual and his degree of autonomy at work. Notice that such a relationship has also been observed in other countries (Araï, 1994; Groshen and Krueger, 1990).

Table 2 reveals, in addition, that the number of hours has a negative but rather limited influence on the gross hourly wage.[17] This result is in line with earlier work of Jepsen (2001) and Jepsen *et al.* (2005). Both studies examine the wage penalty associated with part-time employment in Belgium. Using respectively the PSBH and the SES, the authors find no sign of a "within industry and occupational group" wage penalty against part-timers. However, they report a substantial "market-wide" wage gap. These findings suggest that, although discrimination legislation seems to be working, part-timers are segregated both at the occupational and sectoral level.[18]

The fact of putting in extra paid hours or being paid a bonus for non-typical working hours (shift work, night work and/or weekend work) leads to an increase in hourly wages of around 3 and 5 percent respectively compared to the reference category. Also

[17] The regression coefficients relative to the number of hours and over-time hours should be interpreted with caution. This is due to a potential endogeneity bias. Indeed, even if employees can not always freely choose their working hours, the assumption of exogenous hours is too restrictive. To put it differently, the labour supply decision might depend upon the potential market wage rate. An easy way to account for this potential bias is to use instrumental variables representing the expected working hours of each employee. Following Wolf (2002), it is extremely difficult to find appropriate instruments. Nonetheless, it has been conventional to use variables describing the household context, such as the number of small children, the marital status and the other household income. Unfortunately, these instruments are not reported in the SES. This is why controlling for the endogeneity of working hours appears to be a very difficult task.

[18] For evidence on the wage effects of part-time employment for men in European countries (including Belgium) see e.g. O'Dorchai *et al.* (2007).

noteworthy is that the wage penalty of those employed on a limited-term employment contract has increased from 2.6 percent in 1995 to 6.2 percent in 2002 with respect to their opposite numbers with an unlimited-term contract. The existence of a wage penalty against workers with a finite-term contract is compatible with the proposal put forward by Harris and Holmström (1982). According to this proposal, employers levy an amount on the wages of newcomers because their productive ability is uncertain. Be that as it may, the reason why the wage penalty against workers on a fixed-term contract has increased over time remains unclear.

As regards establishment characteristics, we find that all other things being equal wages are significantly lower in Wallonia and Flanders (except in 2002) than in Brussels. Yet, the magnitude of the differential is small and decreasing over time. Results also show the existence of a significant and positive effect of the employer size on workers' wages. Indeed, they suggest that, on average, a doubling of the establishment-size increases earnings by 3 percent. Yet, according to Lallemand *et al.* (2005a), a significant part this establishment-size wage premium could be explained by the fact that the productivity and stability of the Belgian workforce is higher in large establishments.[19] Finally, it is found that workers covered by a company collective agreement (CA) earn between 2 and 3 percent more than their opposite numbers whose wages are solely covered by national and/or sectoral CAs. These results fit in with findings reported earlier by Rycx (2003) and Plasman *et al.* (2007).

Overall, results from our wage regressions are quite satisfactory. Indeed, a substantial part of the total variation in individual hourly wages is explained by the regression model (i.e. between 62 and 71 percent, depending on the period considered). Moreover, most regression coefficients are significant and they have the expected sign. Be that as it may, our estimates might be slightly biased because of the fact that our sample is censored. In fact it does not contain any information on the number of unemployed people or on their characteristics. Docquier *et al.* (1999), Laurent (2000) and Jepsen (2001) have studied this problem in the case of Belgium. Their results obtained using the PSBH suggest that the expected level of earning is not significantly tied to the fact of having a job. The assessment of a censored sample therefore would not lead to a significant selection bias in Belgium. Although this result might derive from the low percentage of unemployed people included in their samples, it does tend to back up our estimates.

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[19] The impact of employer size on the level and dispersion of wages in selected European countries (including Belgium) is investigated in e.g. Lallemand *et al.* (2005b, 2006).

[20] An identical analysis was carried out at the NACE three-digit level. The results arising from this, reported in Plasman *et al.* (2006), support and refine our conclusions.

[21] Inter-industry wage differentials estimated, both at the NACE two- and three-digit level, on the basis of a wage equation where the dependent variable includes annual bonuses are reported in Plasman *et al.* (2006). Taking into account annual bonuses increases the magnitude and dispersion of the industry wage differentials. However, the overall conclusion remains the same.

3.2. Inter-industry wage differentials

Table 3 reports inter-industry wage differentials for NACE two-digit industries in 1995, 1999 and 2002.[20] These differentials are estimated on the basis of equation (1) using as dependent variable the log (to base e) of individual gross hourly wages excluding annual bonuses.[21]

Table 3. Inter-industry wage differentials, 1995-2002

Industry (NACE two-digit) / Period:	1995	1999	2002
Mining of coal and lignite; extraction of peat (10)	/	/	-0.157**
			(0.022)
Other mining and quarrying (14)	0.018	0.023	-0.007*
	(0.013)	(0.015)	(0.003)
Manufacture of food products and beverages (15)	-0.012*	0.004	/
	(0.001)	(0.003)	
Manufacture of tobacco products (16)	0.019	0.054**	0.040**
	(0.019)	(0.015)	(0.013)
Manufacture of textiles (17)	-0.069**	-0.038**	-0.040**
	(0.006)	(0.005)	(0.005)
Manufacture of wearing apparel; dressing and dyeing of fur (18)	-0.109**	-0.124**	-0.107**
	(0.010)	(0.009)	(0.010)
Tanning and dressing of leather; manufacture of luggage, handbags,	-0.026	-0.045*	-0.088**
saddlery, harness and footwear (19)	(0.023)	(0.018)	(0.014)
Manufacture of wood and products of wood and cork, except	-0.031**	-0.050**	-0.055**
furniture; manufacture of articles of straw and plaiting materials (20)	(0.006)	(0.006)	(0.006)
Manufacture of pulp, paper and paper products (21)	0.067**	0.053**	0.058**
	(0.009)	(0.007)	(0.006)
Publishing, printing and reproduction of recorded media (22)	0.095**	0.051**	0.027*
	(0.007)	(0.006)	(0.012)
Manufacture of coke, refined petroleum products and nuclear fuel (23)	0.193**	0.271**	0.176**
	(0.015)	(0.016)	(0.015)
Manufacture of chemicals and chemical products (24)	0.104**	0.109**	0.102**
	(0.004)	(0.004)	(0.004)
Manufacture of rubber and plastic products (25)	0.001	0.014*	-0.027**
	(0.006)	(0.006)	(0.005)
Manufacture of other non-metallic mineral products (26)	0.028**	0.013**	0.026**
	(0.006)	(0.005)	(0.005)
Manufacture of basic metals (27)	0.023**	0.066**	-0.017**
	(0.006)	(0.007)	(0.006)
Manufacture of fabricated metal products, except machinery	-0.004**	-0.027**	-0.016**
and equipment (28)	(0.005)	(0.004)	(0.004)
Manufacture of machinery and equipment n.e.c. (29)	-0.042**	-0.018**	0.011*
	(0.004)	(0.004)	(0.005)

[20] An identical analysis was carried out at the NACE three-digit level. The results arising from this, reported in Plasman *et al.* (2006), support and refine our conclusions.

[21] Inter-industry wage differentials estimated, both at the NACE two- and three-digit level, on the basis of a wage equation where the dependent variable *includes* annual bonuses are reported in Plasman *et al.* (2006). Taking into account annual bonuses increases the magnitude and dispersion of the industry wage differentials. However, the overall conclusion remains the same.

TABLE 3. CONTINUED

Industry (NACE two-digit) / Period:	1995	1999	2002
Manufacture of office machinery and computers (30)	0.021	0.031	-0.061**
	(0.024)	(0.026)	(0.017)
Manufacture of electrical machinery and apparatus n.e.c. (31)	-0.002	0.003	-0.012°
	(0.007)	(0.006)	(0.007)
Manufacture of radio, television and communications equipment and apparatus (32)	0.018*	0.016°	0.072**
	(0.007)	(0.009)	(0.009)
Manufacture of medical, precision and optical instruments, watches and clocks (33)	0.020	-0.008	-0.005
	(0.013)	(0.008)	(0.008)
Manufacture of motor vehicles, trailers and semi-trailers (34)	-0.036**	-0.024**	-0.036**
	(0.005)	(0.005)	(0.005)
Manufacture of other transport equipment (35)	0.016*	-0.003	-0.020**
	(0.008)	(0.008)	(0.007)
Manufacture of furniture; manufacturing n.e.c. (36)	-0.076**	-0.095**	-0.097**
	(0.006)	(0.005)	(0.005)
Recycling (37)	-0.059**	-0.079**	-0.025*
	(0.014)	(0.010)	(0.010)
Electricity, gas, steam and hot water supply (40)	0.229**	0.254**	0.225**
	(0.005)	(0.008)	(0.009)
Collection, purification and distribution of water (41)	/	/	0.122*
			(0.056)
Construction (45)	0.000	0.008*	0.016**
	(0.005)	(0.004)	(0.003)
Sale, maintenance and repair of motor vehicles and motorcycles; retail sale of automotive fuel (50)	-0.031**	0.011*	0.021**
	(0.006)	(0.005)	(0.005)
Wholesale trade and commission trade, except of motor vehicles and motorcycles (51)	-0.003	0.008*	0.016**
	(0.003)	(0.004)	(0.003)
Retail trade, except of motor vehicles and motorcycles; repair of personal and household goods (52)	-0.110**	-0.088**	-0.062**
	(0.006)	(0.004)	(0.004)
Hotels and restaurants (55)	-0.097**	-0.125**	-0.143**
	(0.009)	(0.006)	(0.005)
Land transport; transport via pipelines (60)	-0.059**	-0.088**	-0.075**
	(0.008)	(0.005)	(0.006)
Water transport (61)	0.180**	0.109**	0.019
	(0.024)	(0.005)	(0.018)
Air transport (62)	0.159**	0.105**	0.134**
	(0.029)	(0.018)	(0.027)
Supporting and auxiliary transport activities; activities of travel agencies (63)	0.031**	-0.004	0.010*
	(0.007)	(0.007)	(0.005)
Post and telecommunications (64)	0.254**	-0.016	0.059**
	(0.030)	(0.012)	(0.010)
Financial intermediation, except insurance and pension funding (65)	0.113**	0.063**	0.061**
	(0.004)	(0.005)	(0.005)
Insurance and pension funding, except compulsory social security (66)	0.054**	0.031**	0.073**
	(0.006)	(0.007)	(0.007)
Activities auxiliary to financial intermediation (67)	0.009	0.032*	0.035**
	(0.013)	(0.014)	(0.011)
Real estate activities (70)	0.004	-0.009	0.040**
	(0.022)	(0.011)	(0.015)
Renting of machinery and equipment without operator and of personal and household goods (71)	-0.035*	0.028*	0.013
	(0.016)	(0.012)	(0.013)
Computer and related activities (72)	0.006	-0.018*	0.022**
	(0.008)	(0.007)	(0.006)

Table 3. Continued

Industry (NACE two-digit) / Period:	1995	1999	2002
Research and development (73)	0.056**	0.074**	0.047**
	(0.015)	(0.010)	(0.011)
Other businesses activities (74)	0.009*	0.021**	0.015**
	(0.004)	(0.004)	(0.004)
Adjusted R^2 of the wage regression	0.701	0.648	0.613
F-test relative to the wage regression	1,191.9**	1,090.2**	884.4**
F-test relative to the sectoral dummies	137.6**	141.4**	116.3**
Percent significant industry wage differentials at the 5 percent level	72.1%	76.7%	90.9%
	(31/43)	(33/43)	(40/44)
Number of industries	43	43	44
Number of observations	67,023	108,677	102,594

Notes: Inter-industry wage differentials are estimated on the basis of equation (1) where the dependent variable is the ln of individual gross hourly wages excluding annual bonuses. Standard errors of the industry wage differentials, computed according to Zanchi (1998), are reported between brackets. **/*/°: industry wage differential significant at the 1, 5 and 10 percent level, respectively.

Results show, for all periods, the existence of substantial wage differentials between workers employed in different sectors, even after controlling for a large number of individual and establishment characteristics. These differentials are statistically significant at the 5 percent level, both in individual terms (with a few exceptions) and globally. We further note that the hierarchy of the sectors in terms of wages is quite stable over time. Indeed, results reported in Table 4 show that Pearson and Spearman correlation coefficients between the wage differentials estimated in 1995, 1999 and 2002 are highly significant and reach at least 75 percent[22]. These correlations suggest that the estimated wage differentials between industrial sectors do not derive from transitory differences in demand across industries.

[22] Similar results are obtained when the inter-industry wage differentials are computed at the NACE three-digit level and/or on the basis of a wage equation where the dependent variable is the gross hourly wage including annual bonuses (see Plasman *et al.,* 2006).

Table 4. Pearson / Spearman correlation coefficients between inter-industry wage differnetials

Period:	1995	2002
1999	0.805** / 0.816** (n = 43)	0.876** / 0.758** (n = 42)
2002	0.805** / 0.780** (n = 42)	

Notes: Computation based on the inter-industry wage differentials reported in Table 3. n stands for the number of sectors. **/*/°: coefficient significant at the 1, 5 and 10 percent, respectively.

The best paying industry over the period 1995-2002 is the electricity, gas, steam and hot water supply sector. Depending on the period considered, the average worker in this sector earns *ceteris paribus* between 27 and 31 percent[23] more than the average worker in the whole economy. At the top of the conditional wage distribution, we also find the manufacture of coke, refined petroleum products and nuclear fuel industry (between +20 and 34 percent), the air transport sector (between +12 and 19 percent), the manufacture of chemicals and chemical products industry (between +11 and 12 percent), and financial intermediaries, except insurance and pension funding (between +6 and 13 percent).

The hotel and restaurant sector is at the very bottom of the wage scale: the average worker's wage there is *ceteris paribus* between 11 and 14 percent lower than that of the average worker in the economy. At the bottom of the scale, we also find the manufacture of wearing apparel, dressing and dyeing of fur (between -11 and -13 percent), retail trade (between -7 and -12 percent), the manufacture of furniture (between -8 and -10 percent), and the manufacture of textiles (between -4 and -8 percent).

If we compare these results with those obtained by Gannon *et al.* (2007) for six member states of the European Union on the basis of the 1995 *European Structure of Earnings Survey* (ESES), we find that the sectoral wage structure reported for Belgium is quite similar to that observed in other industrialised countries. To put it differently, it appears that high- and low-paying industries do not vary substantially across countries.

[23] In order to get the difference in percentage between the wage (in EUR) of the average worker in sector k and the employment-share weighted mean wage (in EUR) in the economy, the following expressions have been computed :

$V_k = [(\exp(\hat{\Psi}_k) - 1) - G]$ for $k = 1,\ldots,$ K and $V_{K+1} = -G$; where $G = \sum_{k=1}^{K} \overline{p}_k [\exp(\hat{\psi}_k) - 1]$.

This transformation is necessary because the estimated wage equation has a semi-logarithmic form (for a discussion see Reilly and Zanchi, 2003).

Table 5. Dispersion of inter-industry wage differentials, 1995-2002

	1995	1999	2002
Range:			
NACE two-digit industries	0.363	0.396	0.381
NACE three-digit industries	0.599	0.552	0.570
WASD:			
NACE two-digit industries	0.071	0.064	0.057
NACE three-digit industries	0.084	0.080	0.072

Notes: Results are based on a wage equation where the dependent variable is the ln of individual gross hourly wages excluding annual bonuses. WASD stands for weighted adjusted standard deviation of inter-industry wage differentials. At the NACE two-digit level, the number of sectors varies between 42 and 43 depending on the year considered. At the three-digit level, it fluctuates between 172 and 180.

What about the dispersion of inter-industry wage differentials? Table 5 shows the range and weighted adjusted standard deviation (WASD) of the industry wage differentials estimated in 1995, 1999 and 2002 at the NACE two- and three-digit level. Not surprisingly, it is found that the dispersion in inter-industry wage differentials increases significantly when the number of sectors being considered increases. We also note that the WASD has steadily and quite substantially decreased between 1995 and 2002, both at the NACE two- and three-digit level.[24] The explanation for this evolution is still unsettled. However, it could be related to the European integration process and the deregulation of certain industries. If we compare our results with those obtained for other industrialised countries (see, for example, Teulings and Hartog, 1998), we find that Belgium occupies a middle position among the industrialised countries with regard to the dispersion of the inter-industry wage differentials. The scale of the latter is indeed lower than in the Anglo-Saxon countries (U.K., U.S. and Canada) and higher than those in the Scandinavian countries.

[24] A similar result, reported in Plasman *et al.* (2006), is found when inter-industry wage differentials are estimated on the basis of a wage equation where the dependent variable is the ln of individual gross hourly wages including annual bonuses.

Conclusion

In this paper, we wanted to shed some light on the role of worker and employer characteristics in the determination of wages in the Belgian private sector, taking advantage of access to detailed matched employer-employee data covering the period 1995-2002. We also aimed to contribute to the literature on the Belgian wage structure by providing new evidence on the magnitude, stability and causes of inter-industry wage differentials. To do so, three central questions have been addressed: i) What are the effects of worker and employer characteristics on wages? ii) How big and significant are inter-industry wage differentials?, and iii) Are sectoral differences in pay a temporary phenomenon or do they persist over time?

Empirical findings, based on individual wage regressions, show principally that: i) the level of education exercises a substantial but decreasing influence upon wages; ii) the gender wage gap is highly significant and has not declined between 1995 and 2002; iii) working hours have a negative but rather limited influence on hourly wages; iv) the wage penalty for those employed on a fixed-term contract has increased between 1995 and 2002; v) regional wage differentials are small and slightly declining; vi) the employer size has a positive and stable effect on workers' wages; and vii) workers covered by company collective agreements (CA) earn significantly more than their opposite numbers whose wages are solely covered by national and/or sectoral CAs.

Further results show the existence of substantial and persistent wage differentials between workers with the same observed characteristics and working conditions, employed in different sectors. The best paying industry over the period 1995-2002 is the electricity, gas, steam and hot water supply sector. Depending on the period considered, the average worker in this sector earns *ceteris paribus* between 27 and 31 percent more than the average worker in the whole economy. At the top of the conditional wage distribution, we also find the manufacture of coke, refined petroleum products and nuclear fuel industry (between +20 and 34 percent), the air transport sector (between +12 and 19 percent), the manufacture of chemicals and chemical products industry (between +11 and 12 percent), and financial intermediaries, except insurance and pension funding (between +6 and 13 percent). The hotel and restaurant sector is at the very bottom of the wage scale: the average worker's wage there is *ceteris paribus* between 11 and 14 percent lower than that of the average worker in the economy. At the bottom of the scale, we also find the manufacture of wearing apparel, dressing and dyeing of fur (between -11 and -13 percent), retail trade (between -7 and -12 percent), the manufacture of furniture (between -8 and -10 percent), and the manufacture of textiles (between -4 and -8 percent).

Regarding the dispersion of inter-industry wage differentials, we find that Belgium occupies a middle position among the industrialised countries. The scale of the latter is indeed lower than in the Anglo-Saxon countries and higher than those in the Scandinavian countries. Yet, it appears that the dispersion of wages across sectors in Belgium has steadily and quite substantially decreased between 1995 and 2002.

Future research on inter-industry wage differentials in Belgium should examine whether high-paying industries employ a larger fraction of workers with better non-observed abilities. More work is also needed on the role of non competitive forces (such as rent-sharing) in shaping industry wage differentials. Finally, it would be interesting to analyse why the dispersion of sectoral wage premia/penalties has decreased between 1995 and 2002. This could be done for instance by studying their relation with product market regulations, international trade or the degree of collective bargaining centralisation.

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APPENDIX

APPENDIX 1. DESCRIPTION AND MEANS (S.D.) OF SELECTED VARIABLES (SES 1995, 1999, 2002)

	SES 1995	SES 1999	SES 2002
Gross hourly wage, including bonuses: (in EUR) includes overtime paid, premiums for shift work, night work and/or weekend work and bonuses (i.e. irregular payments which do not occur during each pay period, such as pay for holiday, 13th month, profit sharing, etc.).	14.04 (7.3)	/	15.5 (8.6)
Gross hourly wage, excluding bonuses: (in EUR) includes overtime paid, premiums for shift work, night work and/or weekend work.	12.32 (5.7)	13.12 (6.6)	13.74 (6.5)
Education:			
Primary or no degree	9.7	8.5	8.1
Lower secondary	24.3	29.6	28.0
General upper secondary	18.4	21.0	19.2
Technical/Artistic/Prof. upper secondary	24.9	17.4	19.7
Higher non-university short type, higher artistic training	13.9	14.8	15.3
University and non-university higher education, long type	8.4	8.3	8.9
Post-graduate	0.5	0.5	0.6
Prior potential experience: (years), experience (potentially) accumulated on the labour market before the last job. It has been computed as follows: age – 6 – years of education – seniority.	9.5 (8.5)	10.9 (8.8)	11.5 (9.7)
Seniority in the current company: (years).	9.9 (9.0)	8.9 (9.3)	8.5 (9.1)
Hours: number of hours paid in the reference period, including overtime paid.	160.5 (26.5)	147.7 (40.6)	153.8 (41.4)
Female (yes)	31.4	30.3	32.0
Overtime paid (yes)	7.3	3.8	2.1
Bonuses for shift work, night work and/or weekend work (yes)	15.1	14.9	14.1
Supervises the work of other workers (yes)	16.3	/	/
Type of contract:			
Unlimited-term employment contract	97.0	95.0	95.7
Limited-term employment contract	2.4	3.7	3.4
Apprentice/Trainee contract	0.1	0.2	0.2
Other	0.4	1.2	0.7
Occupation:			
Corporate managers (P12)	6.3	3.1	2.7
Managers of small enterprises (P13)	0.1	0.7	0.4
Physical, mathematic and engineer science professionals (P21)	3.7	4.4	4.7
Life science and health professionals (P22)	0.3	0.4	0.3
Teaching professionals (P23)	0.0	0.0	0.0
Other professionals (P24)	1.8	4.7	6.0
Physical and engineer science associate professionals (P31)	10.0	4.5	4.3
Life science and health associate professionals (P32)	0.2	0.3	0.4
Teaching associate professionals (P33)	0.0	/	0.0
Other associate professionals (P34)	4.8	2.7	3.5
Office clerks (P41)	18.8	17.9	17.1
Customer services clerks (P42)	1.3	2.4	3.0
Personal and protective services workers (P51)	3.2	4.4	4.9
Models, salespersons and demonstrators (P52)	7.4	5.8	6.1
Extraction and building trading workers (P71)	4.3	5.8	5.5
Metal, machinery and related trades workers (P72)	8.6	7.8	7.9
Precision, handicraft, printing workers (P73)	1.5	2.5	1.3
Other craft and related trades workers (P74)	4.5	5.9	5.9

APPENDIX 1. CONTINUED

	SES 1995	SES 1999	SES 2002
Stationary plant and related operators (P81)	2.4	3.4	3.4
Machine operators and assemblers (P82)	5.0	8.9	7.5
Drivers and mobile plant operators (P83)	4.6	4.5	4.7
Sales and services elementary occupations (P91)	3.8	4.1	4.0
Labourers in mining, construction, manufacturing and transport (P93)	7.3	5.6	6.2
Size of the establishment: number of workers.	501.8 (1,133.8)	705.3 (1,857.0)	651.6 (1,661.5)
Region: geographic location of the establishment.			
Brussels	17.6	22.7	16.4
Wallonia	19.4	17.9	21.5
Flanders	63.0	59.4	62.1
Level of wage bargaining:			
Collective agreement only at the national and/or sectoral level	51.7	73.5	79.2
Collective agreement at the company level	39.4	26.5	19.9
Other	9.0	/	1.2
Number of observations	67,023	108,677	102,594

Notes: The descriptive statistics refer to the weighted sample. Descriptive statistics relative to the sectoral affiliation of the workers are available on request.