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# CANADIAN JOBS AND FIRM SIZE:
## Do Smaller Firms Pay Less?

by

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## Abstract

Recent years have witnessed a growing interest in small firms. Many studies have shown that small firms are responsible for a substantial portion of the jobs newly created over the last decade in Canada. This naturally raises the following question : how do jobs in small firms compare with those held in larger firms. Are they less likely to be unionized ? Are they less likely to be covered by a pension plan ? Are they more likely to be terminated by a permanent layoff ? Do they pay lower wages ?

Using data from the 1986 Labour Market Activity Survey, we find that the last four questions yield a unique answer : yes. In other words, jobs in larger firms : 1) are more likely to be unionized, 2) are better covered by pension plans, 3) are less subject to permanent layoffs and 4) are paid higher wages, on average. Most importantly, the observed wage differences hold even after controlling for differences in workers' education level, age and abilities.

The fact that larger firms pay higher wages has quite interesting implications for labour economics. First, it suggests that wage differences across Canadian workers may result, not only from differences in education, work experience and abilities, but also from factors unrelated to workers' attributes or - stated differently - from luck. Secondly, as long as women have lower probabilities than men of working in large firms, it may help explain part of the well-known male-female earnings differential. We estimate these probabilities and find that, even after controlling for occupation, male workers are more likely than their female counterparts to work in large firms. This in turn raises the following questions. Do women prefer working in smaller firms ? Did they face discrimination in large firms in the past ?

The fact that larger firms pay higher wages also raises the question of whether or not industrial policy should pay special attention to promoting job creation in existing medium-sized and large firms. The implications of our results for industrial policy are not clear. In the short run, this may be desirable ; it may help shift part of the labour force towards high value-added activities. However, such a conclusion does not necessarily hold in the long run. First, one has yet to show that a dollar spent today on medium-sized or large firms will induce in the long run a bigger expected increase in the number of high value-added jobs than a dollar spent on small firms. Secondly, as long as they stimulate competition among firms in a given industry, small firms may contribute to an efficient use of resources in the economy.



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## 1 Introduction

Recent years have witnessed a growing interest in small firms. Following the work of Birch (1981) in the United States, it has often been argued that small firms are responsible for a substantial portion of the jobs newly created over the last decade in Canada [Department of Regional Industrial Expansion (1985); Small Business Secretariat (1983); Canadian Federation of Independent Business (1983)]. This naturally raises the following question : how do jobs in small firms compare with those held in larger firms ? Are they less likely to be unionized ? Do they differ in terms of pension plan coverage ? Are they more likely to be terminated by a layoff ? One purpose of this paper is to provide answers to these questions.

The second purpose of this paper is to investigate the relationship between wages and firm size. Neoclassical theory asserts that wages are determined solely by workers' human capital and by non pecuniary aspects of the jobs themselves. Once one controls for these factors, wage differentials should disappear. Recent work by Krueger and Summers (1988) on interindustry wage differentials shows that this is not the case ; differences in wages across industries persist even after controlling for these factors. As well as industry structure, firm size seems to affect wages. Most recent U.S. studies [Brown and Medoff (1989), Idson and Feaster (1990)] suggest that larger firms tend to pay higher wages. Does this wage-size relationship also hold for Canada ? If so, this would imply that wage disparities across Canadian workers result, not only from differences in education and work experience, but also from factors unrelated to workers' attributes. This is another question this paper addresses.

Using cross-sectional data from the 1986 Labour Market Activity Survey (LMAS) and controlling for measurable workers' characteristics as well for occupation and industry-specific effects, we find that in Canada, as is the case in the United States, larger firms tend to pay higher wages. As is commonplace in studies of the impact of unionization [Freeman (1984)], industry [Krueger and Summers (1988)] or firm size [Brown and Medoff (1989), Evans and Leighton (1989)] on wages, one may argue that this wage gap is due to differences in workers' unobserved abilities. Using longitudinal data from the LMAS survey to control for differences in unobserved constant-over-time workers' abilities, we still get a substantial wage gap between large and small firms. This highlights the need for alternative explanations of the wage determination process. Efficiency wage models provide some of these explanations, which are examined briefly in this study.

The paper is organized as follows. First, we look at the distribution of employment across firm sizes (section 2). Then we show that jobs (as measured by total hours worked) in larger firms have the following characteristics : 1) they are more likely to be unionized, 2) they are more likely to be covered by a pension plan, 3) they are less likely to be terminated by a permanent layoff and 4) they are paid a higher wage, on average (section 3). The higher hourly wage received by workers in larger firms may simply reflect the fact that larger firms employ more highly educated and more experienced workers (section 4). If this conjecture is right, then the wage-size relationship will disappear once one controls simultaneously for multiple dimensions of labor quality. In section 5, using multivariate regression techniques, we suggest that this conjecture is wrong : even after controlling for observable workers' characteristics, small firms still pay approximately 20 % less than large firms. Using longitudinal data to control for differences in unobserved constant-over-time abilities, we find that a wage gap still exists. Section 6 considers other potential explanations for the wage-size relationship. Section 7 concludes the paper by discussing implications of the results and directions for future research.

## 2 How is employment distributed across firm sizes ?

In this paper we define small firms as having less than 20 employees, large firms as having more than 500 employees and medium-sized firms as having between 20 and 499 employees. We define employment in a given firm size as the number of hours worked in 1986 in this firm size. We also restrict our sample to full-time jobs held in 1986 by paid workers of all industries except agriculture, fishing and public services (see Appendix 1 and 2 for data sources)[1] [2]. Restricting the sample to full-time jobs may be justified by the idea that these involve elements (e.g. long-term investment in training, seniority provisions in wage contracts, pension plan coverage) not likely to be found in part-time jobs. As a result, differences in characteristics of full-time jobs across employers are likely to be governed by factors somewhat different from those related to part-time jobs.

Small firms are far from being a negligible part of employment ; they account for roughly 25 % of workhours in full-time jobs (Chart 1), for a far bigger share of workhours in part-time jobs (44 %) and for almost 27 % of all workhours (Table 1)[3].

The importance of small firms varies tremendously by industrial sector[4] (Table 2). Small firms account for the bulk of employment in construction (53 %) and in consumer services (43 %) but are much less important in forestry and mining, manufacturing and distributive services. For these last three industrial groups as well as for business services, at least 45 % of employment is provided by large firms. Hence, the view that small firms are predominant in all service producing sectors is inadequate[5].

The distribution of workhours across firm sizes also varies substantially by province (Table 3). With the exception of New-Brunswick, small firms play a more important role in providing employment in the Maritimes than in most other provinces. At the other end of the spectrum, they account for only 21 % of workhours in Ontario.

To sum up, small firms : 1) as well as larger firms, represent a substantial portion of aggregate employment, 2) are predominant in consumer services and construction, 3) account for a relatively small share of employment in forestry and mining, manufacturing, and distributive services and 4) tend to be more important in the smaller scale economies of the Maritimes.

## 3 Comparing jobs across firm sizes

To fully compare jobs across firm sizes, one has to look at various aspects of the jobs themselves such as : 1) working conditions, 2) fringe benefits, 3) wages, 4) the extent to which these jobs are unionized, 5) the extent to which they are covered by a pension plan and 6) the probability of being laid-off from a given job. Since the Labour Market Activity Survey, from which our data are taken, does not contain information on working conditions or fringe benefits, we focus our attention on the latter four aspects. We also ask whether, given some of these characteristics, workers employed in large firms have a longer tenure than those working in small firms.

### 3.1 Wages

In the aggregate, large firms pay an average hourly wage in full-time jobs ($13.55) which exceeds by more than 50 % the wage paid by small firms ($8.85) (Table 4). This positive wage-size relationship holds whether we control **separately** for education, age, sex, marital status, major industrial groups (Chart 2) or major occupational groups although, as will be seen later, part of this wage gap disappears when we control **simultaneously** for these variables. Interestingly, the relationship appears to be weaker for unionized jobs ; the percentage gap between large firms' and small firms' average wage reduces to about 11 % (column 6). While this suggests that unions are successful in equalizing wages across firms in a given occupation and/or industry, we shall see later that, once one controls simultaneously for workers' characteristics, industry and occupation, the discrepancy between the wage gap in non unionized jobs and that in unionized jobs becomes much smaller.

Relative wages by firm size do not differ much across educational groups ; depending on their education level, workers in large firms earn between 46 % and 53 % more than their counterparts in small firms (not controlling for other factors). However, relative wages by firm size differ across age groups. Until the age of 54 years, being older while working in a large firm allows one to receive (from 27 % to 66 % : column 6) higher relative wages. Table 5 suggests that part of this age-wage gap profile may be due to higher seniority in larger firms ; employees in larger firms exhibit steeper age/tenure profiles.

Relative wages by firm size also differ across industrial groups : in business services and in construction, hourly wages in large firms exceed those in small firms by only 28 % and 33 % respectively, as compared to 52 % and 57 % in manufacturing and in distributive services. If, as suggested above, unionization acts towards reducing relative wage disparities across firm sizes, then these diverging gaps cannot be explained solely in terms of differing unionization rates across industrial groups. Indeed, manufacturing and distributive services, which are the most unionized sectors, show far bigger wage disparities than business services, which is the least unionized sector (Table 6, column 5). Clearly, other factors such as education, age and occupation have to be taken into account to explain these various figures.

Finally, relative wage disparities appear to be smaller for blue collar workers (41 %) than for white collar workers (51 %) or professionals and managers (56 %). As will be seen later, this may be related to the fact that the discrepancy in the average education level is smaller for blue collar workers than for the two other occupational groups.

### 3.2 Union coverage

The larger the firm, the more likely the job is to be unionized (Table 6). An hour worked in a large firm is almost 5 times more likely to be "unionized" than an hour worked in a small firm. The unionization rate [6] increases monotonically with firm size for almost all sectors.

Whether we compare unionization rates between large and small firms by looking at **ratios** (column 6) or **differences** (column 7) between the relevant percentages, there are tremendous differences in relative unionization rates across industries. Large firms' jobs are 7 times more likely to be unionized than small firms' jobs in distributive services and 8 times more likely in consumer services while they are only 2 times more likely to be unionized in construction and in business services. For these last two industries, the reasons underlying this minimal (though substantial) discrepancy in unionization rates probably differ.

In construction, unions do succeed in small firms in linking a substantial portion (29 %) of workhours to unionized jobs. The fact that they are not as successful in doing so in other industries (they reach a maximum percentage of approximately 15 % in manufacturing) seems to account for the relatively equal unionization rates observed in construction. The same argument does not apply to business services. In that case, the predominance of white-collar workers (clerks, engineers, architects, accountants, lawyers) probably accounts for the uniform (and very low) unionization rates in large and small firms [7]. Consumer services have very unequal unionization rates in terms of ratios but less unequal rates in terms of differences. Finally, for both measures, forestry and mining and manufacturing are characterized by a substantial degree of inequality in unionization rates across firm sizes.

Table 7 shows the proportion of workhours in unionized jobs for a set of two-digit industries that account for approximately 85 % of aggregate employment[8]. For all industries except mining services and finance, large firms have a higher unionization rate than small firms.

One might expect the discrepancy in unionization rates between large and small firms to diminish the more highly unionized the industry is. If so, the weighted Pearson correlation coefficient between industry's unionization rates (column 5) and : 1) the ratio of large firms' unionization rates to small firms' unionization rates (column 7) or 2) the difference between large firms' unionization rates and small firms' unionization rates (column 8) should both be negative. While the former is positive (0.02) but not significant at the 5 % level, the latter is positive, rather high (0.82) and strongly significant. This suggests that having a higher degree of unionization in a given industry does not lead to an equalization of unionization rates across firm sizes.

### 3.3 Pension plan coverage

Table 8 shows that, as well as the type of industry and union status, firm size is a key determinant of pension plan coverage. The larger the firm, the more likely a workhour is to be related to a job covered by a pension plan. An hour worked in a large firm is, on average, more than 5 times more likely to be covered by a pension plan than in a small firm [9]. This ratio is much higher (7.3) in non unionized jobs than in unionized jobs (1.5). In fact, for all major industrial groups, disparities in pension plan coverage, whether measured in relative or in absolute terms, are much smaller in unionized than in non unionized jobs. Hence, unionization does not only increase the likelihood of being covered by a pension plan : it also reduces the gap in pension plan coverage between large and small firms.

### 3.4 Job security

Are workers in larger firms less likely to be laid-off ? To answer this question, we rely on previous work by Picot and Baldwin (1990). Using cross-tabulations from the longitudinal version of the 1986-87 Labour Market Activity Survey, they first show that the probability of being permanently laid-off [10] from a firm : 1) decreases with age, wage and firm size [11] and 2) is higher in industries for which product demand is volatile. Then they regress (with a logit model) the probability of being permanently laid-off on industry (7 groups), age (5 groups), firm size (4 categories), along with the natural log of the hourly wage rate. Table 9 presents their results. Even after controlling for industry, age and wage level, the probability of being permanently laid-off still decreases with firm size. For instance, a worker in the 25-34 age group, earning $10 per hour in a small manufacturing firm has a 9.2 % probability of being

permanently laid-off whereas the related figure for an identical worker employed in a large firm is only 4.3 %. Hence, workers in larger firms are less likely to be permanently laid-off[12] .

### 3.5 Tenure

With higher wage rates, higher unionization rates, higher pension plan coverage and a lower probability of being permanently laid-off, tenure in large firms could be expected to be much greater than in small firms. This is clearly the case, as shown in Table 10. At the aggregate level and for most industrial and occupational groups, the difference between the average duration of employment in a large firm and that in a small firm is quite substantial[13] .

One may argue that this higher tenure is only due to the fact that larger firms : a) pay higher wages, b) have a higher proportion of workhours unionized or c) covered by a pension plan. To test this proposition, we regress tenure on hourly wages, on dummies for union status and pension plan coverage and on a detailed set of explanatory variables (Table 11). We run this regression both for completed spells of employment and for all (i.e. completed as well as truncated ) spells of employment. Even after controlling for these factors, workers in large firms still stay at least 11 months longer with the same employer than workers in small firms. Thus higher tenure is not only due to higher wages, higher unionization rate and higher pension plan coverage. As long as jobs in larger firms involve : 1) better working conditions, 2) more substantial fringe benefits, 3) a lower probability of layoff and/or 4) more firm-specific training, workers may find it advantageous to stay longer with these firms. While the idea that larger firms offer better working conditions can be questioned [14] and, as well as the arguments related to fringe benefits or firm-specific training, cannot be evaluated with the LMAS file, we have shown earlier that the probability of being permanently laid-off is lower in larger firms. The fact that there is greater opportunity in a large firm to change jobs without quitting may also explain this higher tenure ; it is consistent with the lower quit rates observed among large firms [15].

Hence, jobs in larger firms : 1) are more likely to be unionized, 2) are more likely to be covered by a pension plan, 3) are less likely to be terminated by a layoff, and 4) receive a higher hourly wage. This last point raises the following question : do larger firms pay higher wages simply because they use more educated and more experienced workers ? To answer this question, we first verify whether larger firms do actually employ a more educated and experienced workforce.

## 4 Comparing workers across firm sizes

### 4.1 Are workhours in larger firms filled to a greater extent by highly educated workers ?

Table 12 confirms that larger firms tend to use more highly educated units of labour : the proportion of workhours filled by workers having completed college or university is, in large firms, about eight percentage points greater than the related proportion in small firms (24.2 % vs 16.3 %). This tendency for larger firms to employ more highly educated labour is generally observed for both men and women and for all age groups. It is stronger for professionals/managers than for white collar workers or blue collar workers ; this may partly explain why the relative wage disparities documented above were larger for the first group.

Table 13 suggests that part of the discrepancy may result from differing occupational mix between large and small firms ; for all industrial groups, large firms have a greater proportion of professionals and managers. If, within each industry, small firms had the same occupational structure (defined by three broad categories) as large firms, their share of highly educated workers would increase to 18.9 % [16]. One may argue that the whole discrepancy merely reflects differences in industrial and occupational structure. For instance, large firms would have more highly educated workers because : 1) in manufacturing, they use a higher proportion of professionals and managers and 2) their employment is much more concentrated in manufacturing than that of small firms (Table 2). However, this is not the case. If small firms had the same occupational and industrial structure [17] as large firms, their share of highly educated workers would not exceed 20.7 %. Thus, a substantial part of the discrepancy still appears to result from differences in education levels per se [18] .

4.2 Are workhours in larger firms filled to a greater extent by more experienced workers ?

Whether we use the proportion of workhours filled by workers belonging to the 25-64 or the 35-64 age group as a measure of workforce experience, we get the same result : larger firms rely more heavily on experienced workers to produce their output (Table 14). The difference is particularly striking for blue collar workers, who account for more than 40 % of total employment. However, it is non existent for female workers belonging to the 35-64 age group. Thus, the idea of larger firms relying more on experienced workers does not apply equally to male and female workers.

Hence, the results of sections 4.1 and 4.2 can be summarized as follows. Large firms have : a) more highly educated workers, particularly in professional and administrative occupations and b) have more experienced male workers.

4.3 What is the probability of being in a large firm ?

Whether larger firms rely more intensively on more educated and more experienced workers can be checked by estimating, for a worker with given characteristics, the probability of ending up in a given firm size (see Appendix 3 for details of the estimation method).

Table 15 presents the results of four logistic regressions (see Appendix 4 for detailed results). The first model includes dummy variables for education, age, sex, marital status as well as four age/sex interactions and one marital status/sex interaction. The first (second) interaction term is included so as to allow the relative probabilities of male and female workers (of married workers) being in a given firm size to vary across age groups (across sexes)[19]. In the second model, which contains all previous variables plus controls for occupations, it appears that sex, marital status and one age/sex interaction are not significant. Deleting these two variables leads to the third model[20]. Then adding controls for industry leads to the fourth model. The analysis below focuses on the results yielded by the first, the third and the fourth model.

Since higher coefficients imply higher probabilities of being in a large firm, the results of all three regressions imply that the probability of working in a large firm : 1) generally increases with education [21], 2) does not always increase with age for women, 3) increases with age for men and 4) is, for male workers who are at least 35 years old or married, generally higher than for female workers. While the second point can be inferred by looking at the age coefficients (age2534, ..., age5564) of Table 15 [22],

the last two points can be seen clearly by computing the sum of coefficients related to age, sex, marital status, age/sex interaction and marital status/sex interaction (Table 16)[23]. When coefficients are not significant at the 5 % level (chi-square with one degree of freedom), their value is assumed to equal zero. Table 16 shows that male workers who are at least 35 years old or married are more likely to be in a large firm than female workers. As suggested in section 4.2, the probability of being in a large firm increases monotonically with age for male workers. A quite different pattern is observed for female workers. The probability of being in a large firm first increases for female workers as they move from the 16-24 to the 25-34 age group but then levels off. As a result, the gap between male and female workers tends to widen with age.

Table 17 illustrates this last point. For married male workers having completed secondary school and employed in processing occupations (PRIM/PROC), the likelihood of being in a large firm increases from 32.7 % to 60.4 % as we go from the youngest to the oldest age group. Female workers belonging to the 25-34 age group have more chances of being in a large firm than those belonging to the 16-24 age group but older female workers do not exhibit higher probabilities. These figures result from the third model. Since this model controls for education and broad occupations, differences in these variables cannot be invoked to explain this pattern[24]. Then why do male and female workers have differing probabilities of being in large firms ?

One may think that women are in general less career-oriented than men and thus less likely to be found in large organizations. Data from the Survey of Barriers to Advancement in Public Services suggest that this is not the case[25]. A more subtle form of this argument would be that only cohorts of older women are less career-oriented. This would explain why the probability differential increases with age. It would also imply that as new cohorts of women enter the labor force, the differential should disappear. Once more, the aforementioned survey does not support this view ; as compared to their male counterparts, older women do not seem to be less career-oriented than young women[26]. Alternatively, one may argue that either older women have preferred smaller firms per se or they have faced discrimination in larger firms in the past. Whatever reason underlies it, the fact that female workers have lower probabilities of ending up in large firms raises an interesting question : how much of the well-known male-female earnings differential can be attributed to these differing probabilities of being in a large firm ?

Clearly, the results of these regressions refine the conclusions reached earlier. First, they confirm that highly educated workers and older male workers are more likely to end up in a large firm. Secondly, they imply that the probability of female workers being in a large firm does not increase monotonically with age. Thus, the age effect does not apply equally for male and female workers. As controls for occupations and industry have been included, one can hardly argue that this pattern is due to the fact that older women prefer to work in occupations and/or industries in which smaller firms are predominant. Thirdly, they show that male workers who are at least 35 years old are more likely to be employed in large firms than their female counterparts [27].

Hence, after controlling simultaneously for several workers' characteristics, the data suggest that, as compared to small firms, large firms rely to a greater extent on highly educated, older male workers. This is consistent with the idea that larger firms may have a higher-quality workforce. It is then possible that the wage-size effect observed in section 3 merely reflects this worker quality effect : smaller firms would pay lower wages simply because they use lower-quality workers. If this is so, then the wage-size effect would vanish once one controls simulataneously for multiple dimensions of worker quality. We now turn to an examination of this question.

## 5 Do larger firms pay more simply because they use higher-quality workers ?

### 5.1 Controlling for observable aspects of labor quality

To control for observable aspects of labor quality, we first regress the logarithm of hourly wage on the following set of explanatory variables :

1) five education dummies,
2) age, age squared,
3) tenure, tenure squared
4) sex
5) marital status
6) union status
7) four region dummies,
8) one census metropolitan area dummy
9) one marital status/sex interaction, one age/sex interaction, one age squared/sex interaction, five education/sex interactions[28].

We also include dummy variables for : a) firm size (Regression 1-A), b) establishment size (Regression 1-B) and c) all possible establishment/firm size combinations (Regression 1-C) [29].

The first column of Table 18 shows the size coefficients resulting from the three previous regressions [30] [31] (see Appendix 5 for detailed results of columns 1 and 2) . Regression 1-A implies that large **firms** pay 27 % (i.e. exp[0.2348] - 1.0) more than small **firms** for workers with identical observable characteristics. Regression 1-B implies that the wage gap between large and small **establishments** amounts to 27 % (= exp[0.2396] - 1.0). Regression 1-C suggests that, given the establishment (firm) size, increasing firm (establishment) size either leads to higher wages or to relatively unchanged wages [32] . In sum, controlling for observable aspects of labor quality reduces the wage gap from 53 % (Table 4) to 27-34 % [33]. Hence, labor quality does matter but it is certainly not the sole determinant of wage disparities across firm sizes [34].

Neoclassical theory suggests that employers have to offer higher wages to attract workers of a given quality in occupations which involve bad working conditions. Working conditions can vary not only across occupations but also across industries and firms. Also, efficiency wage models are compatible with the idea that industries in which effort evaluation is difficult (Shapiro and Stiglitz (1984)) or which have high training costs (Salop (1979)) may find it advantageous to pay higher wages so as to increase productivity or reduce turnover. To take these arguments into account, we now add controls for occupation and industry to regression 1. The wage gap resulting from the estimated size coefficients (Table 18 : column 2) remains substantial : it now ranges between 21 % (exp[0.1919] - 1.0) and 28 % (exp[0.2429] - 1.0). Thus, occupation-specific or industry-specific effects, whether they come from variations in working conditions (across broadly defined occupations), in measurement of effort or in training costs, seem to account for a fairly limited portion of the wage-size effect[35].

We have shown in Table 4 that the wage gap between large and small firms was only about 11 % for unionized workers while it amounted to 53 % for the whole sample. We just noted that controlling for occupation and industry, as well as for observable characteristics of workers, reduces this last figure to 21 - 28 %. We might expect that running regression # 2 on the subsample of unionized workers leads to a similar drop in wage disparities for this group of workers. The third column of Table 19 shows that this is not the case : controlling for all the above explanatory variables either slightly increases the wage

discrepancy (from 11 % to 17 % in regression 2-A) or leaves it unaltered (in regression 2-B). Nevertheless, the size effect remains generally smaller for unionized workers than for non unionized workers. This confirms the notion - introduced earlier - that unions may be partly successful in equalizing wages across firms in given industries.

As long as they represent more attractive targets for unions, larger firms whose jobs are not unionized may find it profitable to pay higher wages in order to avoid unionization. As suggested by Brown and Medoff (1989), if union avoidance efforts matter, then the wage-size effect should be smaller for workers employed in occupations or industries for which the threat of unionization is minimal than for non unionized workers as a whole. Following Brown and Medoff (1989), we estimate our wage equation (regression # 2) on non unionized workers (Table 19 : column 1) as well as on five other subsamples : 1) professionals and managers, 2) white collar workers, 3) blue collar workers, 4) non unionized workers employed in 2-digit occupations in which the unionization rate is less than 10 % and 5) non unionized workers employed in 2-digit industries in which the unionization rate is less than 10 %. Clearly, professionals and managers and the last two groups are the ones for which the threat of unionization is the lowest. Despite this, the size effect is, as compared to that of non unionized workers, clearly larger for professionals and managers, is at least as big for non unionized workers in slightly unionized occupations and is sometimes smaller, sometimes higher for non unionized workers in slightly unionized industries. Hence, as was the case in Brown and Medoff (1989), the union avoidance hypothesis does not seem to explain a sizeable fraction of the wage gap.

5.2 Controlling for unobservable constant-over-time labor quality

As is commonplace in studies looking at the effect of unionization (Freeman (1984)), industry (Krueger and Summers (1988)) or firm size (Evans and Leighton (1989), Brown and Medoff (1989) on wages, one may argue that part of the variation in wages is due to the fact that workers have differing unobserved abilities. More precisely, if workers in larger firms have more of these unobserved abilities, then it is possible that the wage gap found so far merely reflects an "unobservable worker quality gap". Going from a wage equation in level to a first-difference wage equation allows us to take into account the portion of these unobserved abilities that is constant over time. To see this, consider the following wage equation :

$$Wit = B * Xit + ai + uit$$

where Wit, the wage of worker i at time t, depends on a vector Xit of observable variables, on unobserved contant-over-time abilities ai and on a random term uit. First-differencing the above equation leads to the following equation:

$$Wit - Wit\text{-}1 = B * (Xit - Xit\text{-}1) + (uit - uit\text{-}1)$$

in which unobserved constant-over-time abilities no longer appear and are thus implicitly taken into account. This first-difference equation has been estimated in the United States over the 1973-1977 time interval (Brown and Medoff (1989) using the Quality of Employment Survey) and the 1976-1981 time interval (Evans and Leighton (1979) using the National Longitudinal Survey of Young Men). While Brown and Medoff (1989) find that the size effect remains substantial even after controlling for differences in unobserved abilities, Evans and Leighton (1979) conclude that "about 60 percent of the wage-size effect is due to unobserved heterogeneity when all firms are considered and about 100 percent when firms with 25 or more employees are considered" (p. 299).

In this paper, we rely on the 1986 version of the LMAS file. This file groups information on up to five jobs held by a given individual in 1986. We concentrate on the first and second job held that year by all job changers. This leads to a total of 2638 observations on wage differences.

The fourth column of Table 20 presents first-difference estimates of the wage-size effect using firm size dummies. The fourth column of Table 21 shows similar estimates using establishment size dummies. In both cases, the first-difference equation contains, along with the size coefficients, the following explanatory variables :

1) tenure,
2) tenure squared,
3) union status,
4) 37 industry dummies,
5) 38 occupation dummies.

As well as the size coefficients, all these variables are expressed in first-difference[36]. The dependent variable is the difference between the (natural logarithm of the) hourly wage rate in the second job held in 1986 and that in the first job held in 1986. We also add a dummy variable to distinguish job changers who stay in the same 2-digit occupation (stay = 1) from those who change occupations when going from their first to their second job (stay = 0). Because they are more likely to carry to their second job a substantial portion of the knowledge acquired in the previous job, the former are expected to experience higher wage increases than the latter.

The first three columns of Table 20 (and Table 21) reproduce estimates of regression # 2 run on : 1) the whole sample, 2) on all first jobs held by job changers and 3) on all second jobs held by job changers[37].

Comparing columns 1 and 2 of Table 20 and Table 21, it is clear that job changers are not representative of all workers. The coefficients for education, age, tenure, union status, firm size and establishment size differ markedly between the two samples. This may be related to the fact that job changers are overrepresented in younger age groups and in consumer services [38]. Restricting our attention to the sample of job changers (columns 2-4), we find that first-differencing the wage equation does not alter substantially the size coefficients. Comparing columns 2 and 4 of Table 20, the wage gap between large and small firms varies, **for job changers**, between 7 % (exp[0.0703] - 1.0) and 9 % (exp[0.0833] - 1.0). The related wage gap between large and small establishments (Table 21) varies between 13 % (exp[0.1196] - 1.0) and 15 % (exp[0.1375] - 1.0). Thus, for job changers, unobserved abilities do not seem to differ much across firm sizes.

Hence, whether we control or not for workers' unobserved abilities, a sizable wage differential between large and small firms remains. This obviously raises the following question : why would larger firms pay higher wages ?

## 6 Why would larger firms pay higher wages ?

Economics offers many explanations as to why larger firms would pay higher wages. Previous sections have dealt with some of these explanations. Following Brown and Medoff (1989), one can argue that larger firms would pay higher wages because :

1) they have a higher quality workforce ;

2) they must compensate workers for bad working conditions ;

3) they want to avoid unionization ;

4) they have more market power (i.e. more inelastic demand curves) and share part of their excess profits with workers ;

5) they face a decreasing number of applicants per job and have to raise wages to attract a given quality of applicants (Weiss and Landau (1984)).

We have shown in section 5 that even though observable labor quality matters, the size effect remains substantial after controlling for it. Going from a wage equation in level to a first-difference wage equation does not alter the size coefficients of job changers. This suggests that, for job changers, unobserved labor quality is not important. Controlling for industry and occupation leaves the size effect in the 21 - 28 % interval. This implies that if working conditions are different across firm sizes, they must differ within a given occupation in a given industry. Furthermore, the fact that tenure is longer in larger firms, although not sufficient in itself to infer that working conditions are better in larger firms [39], is at least compatible with such an idea. As was done in Brown and Medoff (1989), we have looked at the size effect for groups of workers for which the threat of unionization is very low : our results suggest that the union avoidance story is not an important determinant of wage disparities across firm sizes. We have not investigated the fourth and fifth argument.

While the labor-quality argument assumes that firms of different sizes pay workers with identical characteristics an identical wage, the four other hypotheses imply that identical workers can be paid differing wages. Efficiency wage models (see Yellen (1984)) can also be used to explain why firms would pay identical workers differing wages. As applied to the wage-size relationship, they could be used to argue that larger firms would pay higher wages because :

6) they have more difficulty than small firms detecting shirking and use higher wages as a worker discipline device (Shapiro and Stiglitz (1984));

7) they have higher training costs and use higher wages as a way to reduce turnover (Salop (1979));

8) they rely more on teamwork than small firms and want to raise the work norms of their workers above the minimum required by paying them wages in excess of the minimum required (Akerlof (1982))[40].

As pointed by Fisher (1989), not much empirical work has been done so far to try to assess the relative merits of these theories. Brown and Medoff (1989) show that the size effect remains as strong for piece-rate workers - for whom effort evaluation is the easiest - as for other groups of workers. This goes against the shirking argument as an explanation of the size effect. If differing training costs underlie the wage differential between large and smaller firms, then one would expect this gap to be the lowest in

industries for which training costs are fairly similar across firm sizes. To take this idea into account, we run regression # 2 on the subsample of workers employed in consumer services. Table 22 shows that the resulting size coefficients are as strong for this subsample as they are for the whole sample. This is slight evidence against the training costs hypothesis.

The three previous versions of efficiency wage models are based on the notion that firms differ on certain characteristics such as : 1) ease of monitoring workers, 2) type of technology and training used, and 3) degree to which they rely on teamwork. This paper, along with all previous studies of the size effect, has focused attention solely on workers' characteristics. To shed more light on the size effect, information on firms' characteristics, such as training costs and labor productivity, is clearly needed. Adding such information to the above regressions could highlight some links between the eight previous arguments. For instance, maybe larger firms, being more capital-intensive or more frequent users of new manufacturing technologies (McFetridge (1988)[41]), have lower unit costs - hence, more profits - but higher training costs and thus find it profitable to pay wages in excess of the market-clearing wage to reduce turnover. Larger firms would then have higher profits even though they would pay higher wages.

## 7 Summary and conclusions

This paper began by asking how jobs in small firms compare with those in larger firms. Then it went onto asking how workers in small firms compare with those in larger firms. Finally, it attempted to answer the following question : do smaller firms pay less for workers with identical characteristics ?

The answers to these questions can be summarized as follows :

1) jobs (as measured by hours worked) in larger firms are more likely to be unionized, ...

2) ... are more likely to be covered by a pension plan, ...

3) ... are less likely to be terminated by a permanent layoff and ...

4) ... seem to be paid a higher wage ;

5) the probability of being in a large firm increases with education for both sexes, ...

6) ... increases with age for men but not for women (except for the very young) ;

7) the probability of being in a large firm is generally higher for male than for female workers. As a result of 6), the gap (in the probability of being in a large firm) between male and female workers increases with age ;

8) using cross-sectional data and controlling for observable workers' characteristics as well as for industry and occupation, large firms pay approximately 20 % more than small firms ;

9) using longitudinal data and thus controlling for differences in unobserved constant-over-time abilities, as well as for observable workers' characteristics, industry and occupation, and restricting the sample to job changers only (which are **not** representative of all workers), large firms pay approximately 10 % more than small firms.

These results raise many interesting questions. First, how much of the well-known male-female earnings differential can be accounted for by these differing probabilities of ending up in a large firm ? Secondly, how much of the polarization (i.e. increases in the number of jobs at the bottom and top of the distribution) in the Canadian employment earnings distribution, documented by Myles, Picot and Wannell (1988), can be attributed to the growing importance of smaller firms ?

The implications of these results for industrial policy are not clear. On one hand, it can be argued that since small firms pay lower wages, industrial policy should pay particular attention to promoting job creation in existing medium-sized and large firms. For instance, Bulow and Summers (1986) develop a dual labor market model in which it is desirable, in a small open economy, to subsidize high-wage paying firms having a comparative advantage. This induces higher levels of exports and shifts the composition of employment towards high wage jobs. Alternatively, one may argue that :

1) in a dynamic framework, a portion of today's small or medium-sized firms will inevitably expand and eventually become large firms while a portion of today's large firms will inevitably decline,

2) to claim that industrial policy should concentrate on existing large firms, one has to show that a dollar spent today on large firms would induce in the long run a bigger expected increase in the number of high value-added jobs than a dollar spent in smaller firms,

3) no such information to prove 2) is available yet and ...

4) ... unless one has clear evidence about point 2), the fact that jobs in smaller firms pay lower wages, have lower pension plan coverage and are less unionized cannot be used to derive implications for industrial policy.

Also, the presence of smaller firms in a given industry is likely to stimulate competition and thus to contribute to an efficient use of resources [OECD (1985)].

Despite this, two conclusions emerge clearly from this study. First, as pointed out by Thurow (1976) and Bulow and Summers (1986), the existence of a substantial wage differential - be it across industries or across firm sizes - has surprising implications for wage inequalities ; it suggests that luck, as well as education and work experience, may play a role in wage determination. Second, as suggested by Krueger and Summers (1988) and Fisher (1989), the relative merits of each of the efficiency wage models in explaining the wage-size relationship have to be assessed. Is the wage gap due to firms' differences in supervision costs or to differences in training costs ? In the latter case, as long as productivity and training costs are strongly correlated, adding productivity measures to the list of explanatory variables of the wage equation could prove fruitful. Further work on the size effect should take this into account.

NOTES

1. Since it is restricted to **paid workers**, the resulting sample excludes : 1) unpaid family workers and 2) self-employed workers.

2. This statement applies to all tables except Table 1, which contains part-time jobs as well as full-time jobs.

3. Note that workhours in full-time jobs account for more than 90 % of all workhours (Table 1).

4. The major industrial groups used in this paper include the following two-digit industries (defined by the 1980 Standard Industrial Classification) :

   Forestry and Mining : 1) Forestry, 2) Metal Mines, 3) Mineral Fuels, 4) Non-Metal Mines, 5) Quarries and 6) Mining Services.

   Construction : 1) General Contractors, 2) Special Trades Contractors and 3) Services to Construction.

   Manufacturing : 1) Food and Beverage, 2) Tobacco Products, 3) Rubber and Plastic, 4) Leather, 5) Textile, 6) Knitting, 7) Clothing, 8) Wood, 9) Furniture and Fixtures, 10) Paper and Allied Industries, 11) Printing and Publishing, 12) Primary Metal, 13) Metal Fabricating, 14) Machinery, 15) Transportation equipment, 16) Electrical Products, 17) Non-Metallic Mineral Products, 18) Petroleum and Coal, 19) Chemical Products and 20) Miscellaneous.

   Distributive services : 1) Transportation, 2) Storage, 3) Communication, 4) Electric Power, Gas and Water Utilities and 5) Wholesale Trade.

   Business Services : 1) Finance, 2) Insurance Carriers, 3) Insurance Agencies and Real Estate and 4) Services to Business Management.

   Consumer Services : 1) Retail Trade, 2) Amusement and Recreation, 3) Personal Services, 4) Accommodation and Food Services and 5) Miscellaneous Services.

5. Except for wholesale trade, where they account for 30.2 % of total workhours, small firms have a fairly small share of total workhours in other distribution related industries : 1) 16.4 % in transportation, 2) 9.4 % in storage, 3) 4.4 % in communication and 4) 3.1 % in utilities.

6. Throughout the paper, the reader should keep in mind that "unionization rate" refers to the percentage of **workhours** related to a unionized job.

7. In business services, the proportion of workhours related to white-collar occupations such as MANAGERS, NATURAL AND SOCIAL SCIENCES and CLERICAL is twice as large as the one for the whole economy (76.63 % vs 37.34 %).

8. The set of industries includes all industries for which we had, for **each firm size**, a sample of at least 25 jobs.

9. We also investigated the relationship between firm size and pension plan coverage for the set of two-digit industries included in Table 7. For all these industries, large firms did exhibit a higher pension plan coverage than small firms.

10. Picot and Baldwin (1990) define a permanent layoff as a layoff in which the person does not return to the same employer or firm in the same or following year.

11. One may argue that : 1) older workers are less likely to be permanently laid-off because of seniority provisions included in wage contracts, 2) workers receiving high wages are less likely to be laid-off because firms have usually invested a substantial amount of money for their training.

12. These differing probabilities of being permanently laid-off may be related to the higher death rates among small rather than large firms (see Baldwin and Gorecki (1990), chapter 8).

13. The figures presented in Table 10 refer to completed spells of employment. We also investigated the relationship between tenure and firm size for all (i.e. truncated as well as completed) spells of employment : at the aggregate level, the difference between tenure in large firms and that in small firms was equal to 68.4 months, i.e. more than twice the difference resulting from Table 11 (28.8 months).

14. In fact, as we shall see later, one neoclassical explanation of why larger firms pay higher wages relies on the idea that they must compensate workers for **bad (and not good)** working conditions.

15. Of all the 2638 job changers who voluntarily quit their previous job in 1986, 33.2 % came from small firms and 26.2 % came from large firms. Since small firms accounted for 25.5 % of total workhours in 1986, as compared to 39.8 % for large firms, the ratio "share of quits / share of total workhours" equals 1.30 for small firms and 0.66 for large firms.

16. This percentage is obtained by weighting, within each industry and for each occupation, small firms' share of highly educated workers by the share of each occupation in large firms' employment.

17. The occupational (industrial) structure is defined by the three (six) categories used in Table 13.

18. Although using a finer level of disaggregation (for the occupational/industrial structure) would likely decrease the part of the discrepancy due to differences in education levels, we shall see later that, after controlling simultaneously for occupation, industry (using eight and six categories respectively) and age, higher education still increases the probability of being in a large firm. This confirms that large firms tend to rely to a greater extent on highly educated workers.

19. Education/age and education/sex interactions were also tried and were found to be not significant.

20. Using a likelihood ratio test (chi-square with 3 degrees of freedom), we cannot reject, at the 10 % level, the null hypothesis that the coefficients of these three variables equal zero (2 log likelihood(model 2) - 2 log likelihood(model 3) = 4.10 < 6.25 ). This supports the third model in favor of the second one. Similarly, we tried deleting these three variables from the first model. Contrary to the above results, the resulting likelihood ratio test did not support these zero restrictions. This is probably due to the fact that, in the first model, one of these three variables (sex) is significant. We then deleted the two remaining variables (marital status and one age/sex

interaction) from the first model. The resulting coefficients were similar to those of the first model.

21. Although the effect of higher education is reduced when additional controls for occupation and/or industry are added, it still remains sizable (see Table 17).

22. These coefficients determine how the probability of female workers being in large firms varies with age.

23. Recall that higher coefficients imply higher probabilities of being in a large firm.

24. This pattern also holds in the fourth model, which controls for major industrial groups (defined in Table 2), as well as for all previous variables (i.e. occupation, education, age, sex, age/sex interactions, marital status/sex interaction). For workers having completed secondary school and employed in processing occupations in manufacturing industries, the probability of being in large firms varies with age as follows :

| Age group | Married male workers | Female workers |
|---|---|---|
| 16-24 | 38.9 % | 35.6 % |
| 25-34 | 49.8 % | 46.3 % |
| 35-44 | 54.6 % | 43.1 % |
| 45-54 | 56.3 % | 35.6 % |
| 55-64 | 61.1 % | 42.3 % |

Thus, as is the case with the third model, the gap (in the probability of being in large firms) between male and female workers still tends to widen with age after controlling both for industry and occupation (as well as for other variables).

25. The proportion of female public servants who reported that : 1) they wanted or requested a promotion in the last three years, 2) they wanted or requested a developmental opportunity in the last three years, 3) they would seek promotion in the next three to five years, was at least as high as that for male public servants. See : The Report of the Task Force on Barriers to Women in the Public Services, Volume 2 (1990).

26. Comparing answers of male and female public servants to the three questions defined in the previous note, one would expect the difference between men and women to increase with age (i.e. as compared to their male counterparts, female workers would be less career-oriented in higher age groups). Special tabulations from the Survey of Barriers to Advancement in Public Services show that this is not the case. In fact, the proportion of female public servants answering yes to the first two questions is, for the 45-54 and the 55-64 age groups, at least as high as the related proportion for male public servants.

27. As mentioned earlier, married male workers also are more likely to be in a large firm than female workers (married or not). However, Table 17 indicates that the marital status/sex interaction increases the likelihood of being in a large firm by roughly 4 percentage points and thus is far less important than the education effect or the age/sex effect.

28. As is customary in labor economics, the education, age and tenure variables are intended to measure differences in workers' human capital. Sex and marital status are included to allow for the possibility of discrimination towards female and unmarried workers. The union status variable is included to capture the impact of unionization on wages. Four region dummy variables and one census metropolitan area dummy variable are included to allow for the possibility of having distinct "local" labor markets as a result of imperfect geographical workers' mobility. The male-female wage differential may vary with age, education and marital status ; three types of interactions (age/sex, education/sex, marital status/sex) are added to take this into account.

29. As explained in Appendix 1, the establishment refers to the location in which the respondent is employed. The firm refers to the set of all establishments owned by the respondent's employer in Canada.

30. The size categories that are used as reference groups are : 1) small firms in regression 1-A, 2) small establishments (i.e. with less than 20 employees) in regression 1-B and c) small establishments of small firms in regression 1-C.

31. The regressions of section 4 are based on a more recent version of the 1986 LMAS file : the sample resulting from this file contains 25,356 observations. Similar regressions run with the earlier version of the file (containing 24,297 observations) leads to qualitatively identical results.

32. For example, small establishments owned by firms with 20-99 employees (e119f2099) pay wages which are fairly close to those paid by small establishments belonging to large firms (e119f500p). On the other hand, there clearly seems to be a firm size effect for medium-sized establishments. At the end of the spectrum, large establishments (i.e. with 500 employees or more : e500pf500p) would pay 34 % (exp[0.2950] - 1.0) more than small establishments of small firms.

33. See previous endnote.

34. One may argue that under perfect geographical workers' mobility, wages should be the same (after controlling for workers' characteristics) for all regions and thus, dummy variables for regions and census metropolitan areas should be excluded. Excluding these variables does not alter the estimates of the size coefficients ; these increase in the second decimal place by, at most, one point.

35. We also controlled for occupation (as well as for all previous variables) using a more detailed occupational classification (3-digit level) involving 78 dummy variables. The resulting wage gap hovered between 21 % and 27 %. Thus, using a more detailed occupational classification than that used in regression # 2 does not alter these conclusions.

36. Variables that take constant values within a year (e.g. age, education, sex) disappear when we go from a wage equation in level to a first-difference wage equation.

37. Recall that regression # 2 is a wage equation in level.

38. The proportion of job changers being between 16 and 34 years old is 76.4 % while the proportion of full-time jobs held in 1986 by workers belonging to this age group is only 59.7 %. Similarly, the percentage of job changers leaving consumer services amounts to 42.4 % while the percentage of full-time jobs held in 1986 by workers employed in consumer services is only

29.9 %.

One may argue that the discrepancy between the size coefficients of column 2 and those of column 1 merely reflects the fact that the wage gap between large and small firms increases with tenure and that most job changers, being fairly young, have relatively low tenure in their first job held in 1986. This would explain why the size coefficients of job changers are smaller than those for the whole sample. To take this into account, we added a tenure/firm size interaction to the first difference equation. We also added dummy variables to classify job changers into three categories : 1) job changers laid-off from their previous job, 2) job changers who voluntarily quit their previous job, 3) job changers leaving their job for other reasons (e.g. going back to school, retirement, illness,...). Despite this, the resulting size coefficients did not change substantially ; the estimated coefficients of the firm size dummies were 0.0440, 0.0637 and 0.0963 while those of the establishment size dummies were 0.0462, 0.0866 and 0.0987.

39. As mentioned in section 3.5, higher tenure in larger firms could be the result of other factors such as greater job security, larger fringe benefits and more opportunities for career advandement within the firm.

40. Another version of efficiency wage models (adverse selection models : see Weiss (1980)) suggests that firms cannot infer workers' ability (which is assumed to be unobservable) and have to pay higher wages to attract a better pool of applicants. As applied to the wage-size relationship, these models would imply that larger firms pay higher wages because they want to have high-ability workers. Since a substantial wage gap remains even after controlling for unobservable constant-over-time abilities as well as for observable characteristics, these models cannot be used to explain the remaining wage gap.

41. Using a sample consisting only of medium-sized and large establishments (defined in terms of the value of annual shipments), McFetridge (1988) finds that "the effect of scale on the probability of adoption [of new manufacturing technologies] is positive for plant scales at and above the respective industry means but is usually exhausted at scales well below the maximum in each industry" (p.47).

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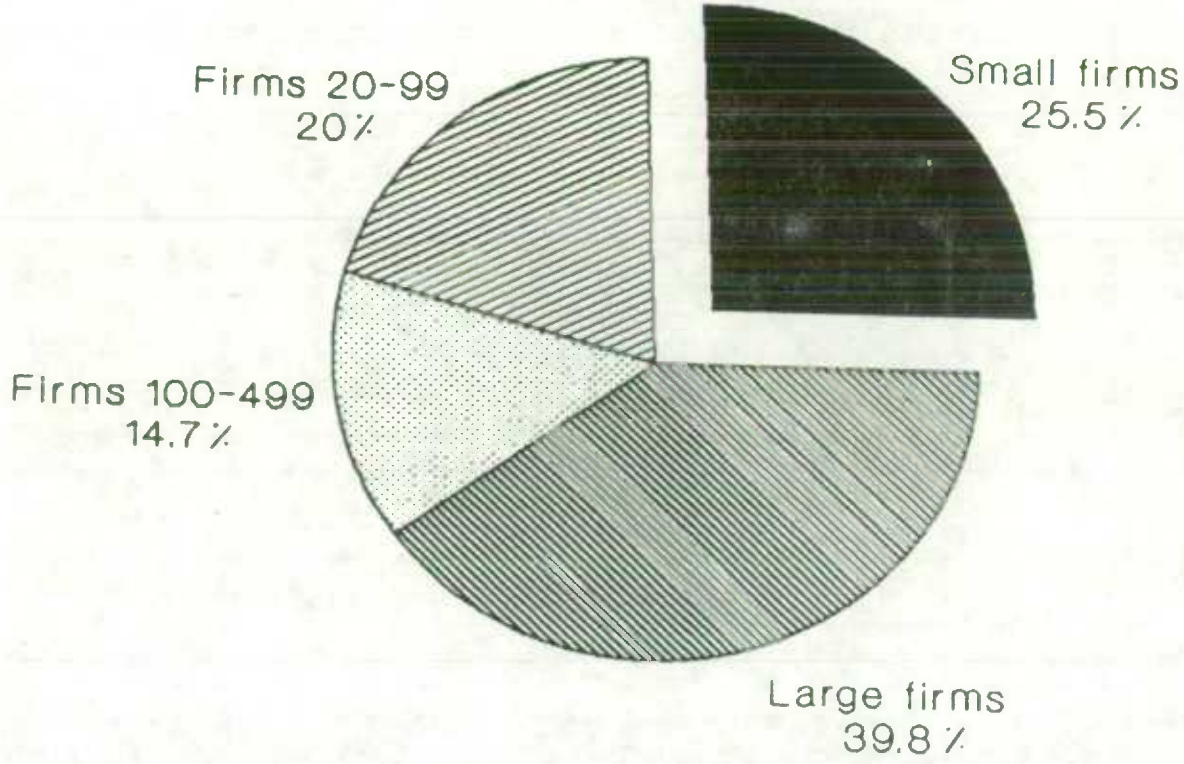
CHART 1 :

# Distribution of workhours
## by firm size




**Hours worked in full-time jobs**

TABLE 1

DISTRIBUTION OF HOURS WORKED IN 1986 BY FIRM SIZE

| | NUMBER OF EMPLOYEES WITH THE FIRM | | | | SHARE OF WORKHOURS | |
|---|---|---|---|---|---|---|
| | 1-19 | 20-99 | 100-499 | 500+ | TOTAL | RELATED TO FULL-TIME/PART-TIME JOBS IN TOTAL WORKHOURS |
| FULL-TIME JOBS | 25.5 | 20.0 | 14.7 | 39.8 | 100.0 | 92.3 |
| PART-TIME JOBS | 43.5 | 16.5 | 9.3 | 30.7 | 100.0 | 7.7 |
| FULL-TIME AND PART-TIME JOBS | 26.9 | 19.8 | 14.3 | 39.1 | 100.0 | 100.0 |

Source: Labour Market Activity Survey (1986) is the source of information in all tables except Table 9.

TABLE 2

DISTRIBUTION OF WORKHOURS ACROSS FIRM SIZES, FOR MAJOR INDUSTRIAL GROUPS, 1986

| | NUMBER OF EMPLOYEES WITH THE FIRM | | | | |
|---|---|---|---|---|---|
| | 1-19 | 20-99 | 100-499 | +500 | Total |
| FORESTRY AND MINING | 15.5 | 15.1 | 18.0 | 51.3 | 100.0 |
| CONSTRUCTION | 53.2 | 27.8 | 9.5 | 9.6 | 100.0 |
| MANUFACTURING | 11.2 | 21.8 | 20.6 | 46.4 | 100.0 |
| DISTRIBUTIVE SERVICES | 17.5 | 17.0 | 12.8 | 52.7 | 100.0 |
| BUSINESS SERVICES | 24.5 | 17.2 | 13.4 | 45.1 | 100.0 |
| CONSUMER SERVICES | 43.2 | 20.3 | 10.8 | 25.7 | 100.0 |
| TOTAL | **25.5** | **20.0** | **14.7** | **39.8** | **100.0** |

TABLE 3

DISTRIBUTION OF WORKHOURS ACROSS FIRM SIZES, FOR EACH PROVINCE, 1986.

| | NUMBER OF EMPLOYEES WITH THE FIRM | | | | SHARE OF EACH PROVINCE IN-TOTAL WORKHOURS |
|---|---|---|---|---|---|
| | 1-19 | 20-99 | 100-499 | 500+ | |
| Newfoundland | 38.0 | 17.9 | 10.9 | 33.2 | 1.3 |
| Prince-Edward-Island | 44.7 | 23.2 | 13.5 | 18.5 | 0.3 |
| Nova-Scotia | 32.0 | 18.0 | 12.6 | 37.4 | 2.8 |
| New-Brunswick | 28.7 | 20.6 | 14.1 | 36.6 | 2.1 |
| Quebec | 27.2 | 20.7 | 13.6 | 38.5 | 26.1 |
| Ontario | 21.0 | 20.4 | 16.1 | 42.5 | 42.4 |
| Manitoba | 25.9 | 18.7 | 14.1 | 41.3 | 3.6 |
| Saskatchewan | 37.3 | 18.1 | 9.7 | 34.9 | 2.5 |
| Alberta | 27.1 | 17.4 | 14.2 | 41.3 | 8.8 |
| British-Columbia | 30.7 | 20.7 | 15.1 | 33.5 | 10.2 |
| **Total** | **25.5** | **20.0** | **14.7** | **39.8** | **100.0** |

TABLE 4 AVERAGE HOURLY WAGE PAID IN FULL-TIME JOBS, BY FIRM SIZE, 1986

| | NUMBER OF EMPLOYEES WITH THE FIRM | | | | | |
|---|---|---|---|---|---|---|
| | (1) 1-19 | (2) 20-99 | (3) 100-499 | (4) 500+ | (5) ABSOLUTE DISCREPANCY (4) - (1) | (6) RELATIVE DISCREPANCY (4) ÷ (1) |
| Education | | | | | | |
| Elementary | 8.34 | 9.62 | 10.76 | 12.34 | $4.00 | 1.48 |
| Some secondary | 8.44 | 9.88 | 11.00 | 12.29 | 3.85 | 1.46 |
| Completed secondary | 8.44 | 9.86 | 11.13 | 12.75 | 4.31 | 1.51 |
| Some postsecondary | 8.86 | 10.26 | 12.18 | 13.56 | 4.70 | 1.53 |
| completed college | 9.79 | 12.20 | 12.22 | 14.26 | 4.47 | 1.46 |
| completed university | 12.35 | 16.34 | 17.23 | 18.47 | 6.12 | 1.50 |
| Age | | | | | | |
| 16-24 | 6.77 | 7.47 | 7.95 | 8.57 | $1.80 | 1.27 |
| 25-34 | 9.14 | 10.60 | 11.65 | 12.89 | 3.75 | 1.41 |
| 35-44 | 10.26 | 12.49 | 13.31 | 14.61 | 4.35 | 1.42 |
| 45-54 | 9.82 | 12.20 | 13.60 | 16.27 | 6.45 | 1.66 |
| 55-64 | 9.42 | 10.74 | 14.14 | 14.50 | 5.08 | 1.54 |
| Sex | | | | | | |
| Male | 10.06 | 11.88 | 13.30 | 14.87 | $4.81 | 1.48 |
| Female | 6.75 | 8.16 | 9.39 | 10.42 | 3.67 | 1.54 |
| Marital Status | | | | | | |
| Married/ common-law | 9.57 | 11.48 | 12.85 | 14.41 | $4.84 | 1.51 |
| Single | 7.52 | 8.74 | 9.40 | 10.72 | 3.20 | 1.43 |
| Widow(er) | 7.74 | 9.03 | 11.47 | 11.14 | 3.40 | 1.44 |
| Divorced, separated | 8.46 | 10.87 | 12.35 | 12.61 | 4.15 | 1.49 |
| Union Status | | | | | | |
| unionized | 12.45 | 12.05 | 12.11 | 13.81 | $1.36 | 1.11 |
| non unionized | 8.46 | 10.33 | 12.00 | 13.34 | 4.88 | 1.58 |

(to be continued)

TABLE 4 (continued) AVERAGE HOURLY WAGE PAID IN FULL-TIME JOBS, BY FIRM SIZE, 1986

| | NUMBER OF EMPLOYEES WITH THE FIRM | | | | | |
|---|---|---|---|---|---|---|
| | (1) 1-19 | (2) 20-99 | (3) 100-499 | (4) 500+ | (5) ABSOLUTE DISCREPANCY (4) - (1) | (6) RELATIVE DISCREPANCY (4) ÷ (1) |
| Major Industrial Groups | | | | | | |
| Forestry and Mining | 11.22 | 12.73 | 14.98 | 15.66 | $4.44 | 1.40 |
| Construction | 11.13 | 13.25 | 13.19 | 14.81 | 3.68 | 1.33 |
| Manufacturing | 9.24 | 10.37 | 11.74 | 14.07 | 4.83 | 1.52 |
| Distributive Services | 9.53 | 10.83 | 12.83 | 15.00 | 5.47 | 1.57 |
| Business Services | 10.12 | 13.53 | 13.75 | 12.99 | 2.87 | 1.28 |
| Consumer Services | 7.23 | 8.49 | 9.88 | 9.91 | 2.68 | 1.37 |
| Major Occupations | | | | | | |
| Managers[1] | 10.32 | 14.39 | 16.04 | 16.41 | $6.09 | 1.59 |
| Nat/Soc | 12.38 | 12.52 | 15.54 | 16.92 | 4.54 | 1.37 |
| Clerical | 7.29 | 8.62 | 9.51 | 10.94 | 3.65 | 1.50 |
| Sales | 8.54 | 11.57 | 12.43 | 11.19 | 2.64 | 1.31 |
| Services | 5.87 | 6.47 | 8.31 | 9.32 | 3.45 | 1.59 |
| Prim/Proc | 9.43 | 9.96 | 10.79 | 13.56 | 4.13 | 1.44 |
| Const | 11.30 | 13.20 | 13.62 | 15.58 | 4.28 | 1.38 |
| Other | 8.48 | 9.96 | 12.09 | 13.78 | 5.30 | 1.63 |
| Type of Occupation | | | | | | |
| Professionals and Managers | 10.55 | 13.76 | 15.83 | 16.50 | $5.95 | 1.56 |
| White Collar Workers | 7.14 | 8.94 | 10.06 | 10.79 | 3.65 | 1.51 |
| Blue Collar Workers | 9.78 | 10.47 | 11.28 | 13.81 | 4.03 | 1.41 |
| TOTAL | 8.85 | 10.68 | 12.03 | 13.55 | $4.70 | 1.53 |

1. The major occupations are the following: 1) Managerial, administrative and related occupations 2) occupations in natural sciences, engineering, mathematics and occupations in social sciences and related fields, 3) clerical and related occupations, 4) sales occupations, 5) service occupations, 6) occupations in mining and quarrying, processing, machining and related occupations, product fabricating, assembling and repairing occupations, 7) construction trades occupations, and 8) other occupations (transport equipment operating occupations, material handling and related occupations, other crafts and equipment operating occupations and artistic, literary, recreational and related occupations).

CHART 2 :

# Average hourly wage rate by firm size, 1986

## by major industrial group

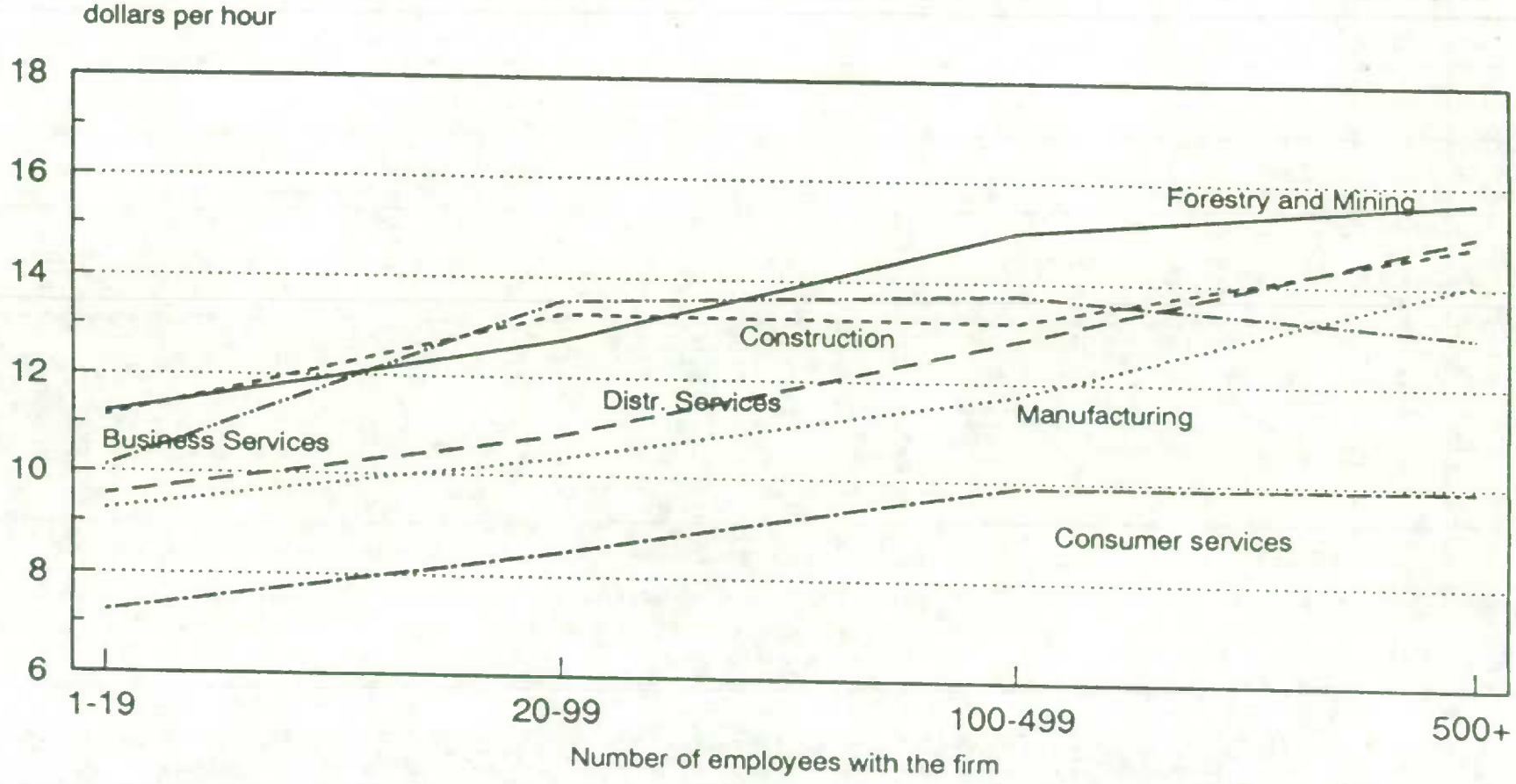


TABLE 5

NUMBER OF MONTHS SPENT WITH THE CURRENT EMPLOYER[1], BY FIRM SIZE, 1986

| | NUMBER OF EMPLOYEES WITH THE FIRM | | | | |
|---|---|---|---|---|---|
| | (1)<br>1-19 | (2)<br>20-99 | (3)<br>100-499 | (4)<br>500+ | (5)<br>ABSOLUTE DISCREPANCY<br>(4) - (1) |
| **Total** | **18.0** | **24.0** | **26.6** | **46.8** | **28.8** |
| 16-24 | 11.6 | 11.7 | 10.7 | 10.9 | -0.7 |
| 25-34 | 17.2 | 20.7 | 26.6 | 36.5 | 19.3 |
| 35-44 | 24.1 | 34.4 | 33.7 | 49.1 | 25.0 |
| 45-54 | 30.1 | 34.8 | 55.1 | 95.9 | 65.8 |
| 55-64 | 46.2 | 90.8 | 96.7 | 206.9 | 160.7 |

1. Completed spells of employment.

TABLE 6

PERCENTAGE OF WORKHOURS FILLED BY UNIONIZED WORKERS, BY FIRM SIZE, CONTROLLING FOR MAJOR INDUSTRIAL GROUPS, 1986

| | NUMBER OF EMPLOYEES WITH THE FIRM | | | | | | |
|---|---|---|---|---|---|---|---|
| | (1) 1-19 | (2) 20-99 | (3) 100-499 | (4) 500+ | (5) AVERAGE | (6) RELATIVE DISCRE-PANCY (4) ÷ (1) | (7) ABSOLUTE DISCRE-PANCY (4) - (1) |
| FORESTRY/MINING | 9.5 | 14.3 | 33.5 | 41.7 | 31.1 | 4.4 | 32.2% |
| CONSTRUCTION | 29.0 | 40.8 | 52.1 | 50.5 | 36.5 | 1.7 | 21.5% |
| MANUFACTURING | 14.7 | 26.5 | 44.2 | 55.2 | 42.1 | 3.8 | 40.5% |
| DISTRIBUTIVE SERV. | 9.5 | 17.4 | 34.0 | 64.5 | 43.0 | 6.8 | 55.0% |
| BUSINESS SERV. | 5.6 | 6.5 | 8.6 | 9.3 | 7.8 | 1.7 | 3.7% |
| CONSUMER SERV. | 2.8 | 13.1 | 17.9 | 22.6 | 11.6 | 8.1 | 19.8% |
| TOTAL | 9.7 | 20.2 | 33.0 | 44.4 | 29.0 | 4.6 | 34.8% |

TABLE 7 : Proportion of workhours in unionized jobs, by firm size : selected industries, 1986.

| INDUSTRIES | FIRM SIZE | | | | | Industry share of total hours |
|---|---|---|---|---|---|---|
| | 1-19 | 20-99 | 100-499 | 500+ | average | |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Forestry | 9.7 | 13.9 | 55.2 | 70.6 | 28.5 | 0.9 % |
| Mining services | 9.1 | 4.6 | 1.5 | 4.9 | 4.9 | 0.5 |
| Food and beverage | 15.6 | 24.0 | 58.5 | 66.0 | 52.0 | 3.5 |
| Clothing | 8.6 | 20.0 | 42.2 | 36.2 | 24.0 | 1.7 |
| Wood | 23.0 | 38.3 | 62.2 | 71.2 | 53.1 | 1.7 |
| Printing and publishing | 2.4 | 22.8 | 21.9 | 25.5 | 18.4 | 2.3 |
| Metal fabrication | 18.0 | 27.5 | 47.0 | 65.0 | 39.6 | 2.5 |
| Machinery | 9.6 | 13.2 | 43.4 | 44.2 | 29.5 | 1.2 |
| Transportation equipment | 15.3 | 30.6 | 50.2 | 71.6 | 61.3 | 3.8 |
| Electrical products | 8.3 | 19.8 | 22.9 | 35.7 | 29.2 | 2.6 |
| Non-metallic min. | 33.1 | 40.0 | 62.5 | 52.7 | 48.4 | 0.7 |
| General contractors | 27.6 | 31.8 | 44.7 | 54.3 | 34.4 | 2.9 |
| Special trades contractors | 30.2 | 48.5 | 65.5 | 48.7 | 39.0 | 4.0 |
| Transportation | 14.7 | 24.7 | 43.4 | 73.0 | 52.2 | 6.8 |
| Communication | 5.3 | 30.9 | 28.2 | 74.2 | 65.4 | 4.1 |
| Utilities | 57.0 | 76.2 | 80.8 | 73.3 | 73.8 | 1.7 |
| Wholesale trade | 6.1 | 7.5 | 18.4 | 25.0 | 13.5 | 6.9 |
| Retail trade | 2.6 | 10.2 | 8.8 | 24.2 | 11.7 | 13.9 |
| Finance | 14.0 | 2.2 | 8.7 | 5.3 | 5.8 | 4.3 |
| Insurance carriers | 2.2 | 5.7 | 17.1 | 14.9 | 12.5 | 1.6 |
| Insurances and real estate | 3.1 | 19.8 | 12.9 | 12.3 | 9.6 | 2.1 |
| Amusement and recreation | 4.1 | 11.6 | 34.7 | 28.5 | 14.0 | 1.4 |
| Services to business | 5.6 | 4.6 | 6.2 | 14.6 | 7.4 | 5.7 |
| Accommodation and food services | 2.5 | 12.2 | 25.3 | 17.3 | 10.8 | 6.1 |
| Miscellaneous services | 3.9 | 26.1 | 23.6 | 20.9 | 14.9 | 2.3 |
| SHARE OF TOTAL HOURS ACCOUNTED FOR BY ALL SELECTED INDUSTRIES | | | | | | 85.1 % |

(to be continued)

TABLE 7 (continued) : Proportion of workhours in unionized jobs, by firm size : selected industries, 1986.

| INDUSTRIES | Unionization rate: (average) (column 5) | Relative discrepancy (4) / (1) | Absolute discrepancy (4) - (1) |
|---|---|---|---|
| | (6) | (7) | (8) |
| Forestry | 28.5 | 7.3 | 61.0 |
| Mining services | 4.9 | 0.5 | -4.2 |
| Food and beverage | 52.0 | 4.2 | 50.4 |
| Clothing | 24.0 | 4.2 | 27.6 |
| Wood | 53.1 | 3.1 | 48.2 |
| Printing and publishing | 18.4 | 10.6 | 23.1 |
| Metal fabricating | 39.6 | 3.6 | 47.0 |
| Machinery | 29.5 | 4.6 | 34.6 |
| Transportation equipment | 61.3 | 4.7 | 56.4 |
| Electrical products | 29.2 | 4.3 | 27.4 |
| Non-metallic min. products | 48.4 | 1.6 | 19.6 |
| General contractors | 34.4 | 2.0 | 26.7 |
| Special trades contractors | 39.0 | 1.6 | 18.4 |
| Transportation | 52.2 | 5.0 | 58.3 |
| Communication | 65.4 | 14.1 | 69.0 |
| Utilities | 73.8 | 1.3 | 16.3 |
| Wholesale trade | 13.5 | 4.1 | 18.9 |
| Retail trade | 11.7 | 9.4 | 21.6 |
| Finance | 5.8 | 0.4 | -8.8 |
| Insurance carriers | 12.5 | 6.7 | 12.7 |
| Insurance and real estate | 9.6 | 4.0 | 9.2 |
| Amusement and recreation | 14.0 | 7.0 | 24.5 |
| Services to business | 7.4 | 2.6 | 9.0 |
| Accommodation and food services | 10.8 | 6.9 | 14.8 |
| Miscellaneous services | 14.9 | 5.4 | 17.0 |

Weighted Pearson correlation coefficient R between column (5) and :
column (1) : 0.60874 (0.0013) (*)
column (2) : 0.78369 (0.0001)
column (3) : 0.79833 (0.0001)
column (4) : 0.96133 (0.0001)
column (7) : 0.02533 (0.9043)
column (8) : 0.82065 (0.0001)

(*) : Figures in parentheses equal : Probability (RHO > |R|) under HO: RHO = 0.

## TABLE 8

## PERCENTAGE OF HOURS FILLED BY WORKERS COVERED BY A PENSION PLAN, BY FIRM SIZE: CONTROLLING FOR MAJOR INDUSTRIAL GROUPS, AND UNION STATUS.

| | NUMBER OF EMPLOYEES WITH THE FIRM | | | | | | |
|---|---|---|---|---|---|---|---|
| | (1) 1-19 | (2) 20-99 | (3) 100-499 | (4) 500+ | (5) AVERAGE | (6) RELATIVE DISCRE-PANCY (4) ÷ (1) | (7) ABSOLUTE DISCRE-PANCY (4) - (1) |
| **A) UNIONIZED JOBS** | | | | | | | |
| FORESTRY/MINING | 56.7 | 56.8 | 73.5 | 83.7 | 78.5 | 1.5 | 27.0% |
| CONSTRUCTION | 63.7 | 69.9 | 76.3 | 69.1 | 68.0 | 1.1 | 5.4% |
| MANUFACTURING | 52.6 | 50.5 | 64.7 | 82.1 | 72.9 | 1.6 | 29.5% |
| DISTRIBUTIVE SERV. | 56.2 | 70.4 | 78.3 | 91.2 | 87.1 | 1.6 | 35.0% |
| BUSINESS SERV. | 54.3 | 73.0 | 87.0 | 78.6 | 74.8 | 1.4 | 24.3% |
| CONSUMER SERV. | 40.6 | 44.3 | 60.9 | 72.5 | 60.8 | 1.8 | 31.9% |
| **TOTAL** | **56.7** | **57.2** | **68.6** | **84.5** | **75.7** | **1.5** | **27.8%** |
| **B) NON UNIONIZED JOBS** | | | | | | | |
| FORESTRY/MINING | 9.4 | 29.0 | 63.5 | 79.9 | 53.1 | 8.5 | 70.5% |
| CONSTRUCTION | 6.5 | 14.8 | 18.0 | 38.2 | 11.9 | 5.9 | 31.7% |
| MANUFACTURING | 11.5 | 25.2 | 45.3 | 72.8 | 44.0 | 6.3 | 61.3% |
| DISTRIBUTIVE SERV. | 9.8 | 27.9 | 46.6 | 74.9 | 41.0 | 7.6 | 65.1% |
| BUSINESS SERV. | 15.0 | 28.3 | 36.9 | 65.1 | 42.5 | 4.4 | 50.2% |
| CONSUMER SERV. | 6.5 | 14.6 | 24.2 | 43.2 | 18.2 | 6.6 | 36.7% |
| **TOTAL** | **8.8** | **22.5** | **39.2** | **64.3** | **33.4** | **7.3** | **55.4%** |
| C) TOTAL WHOLE ECONOMY | 13.5 | 29.5 | 48.9 | 73.2 | 45.7 | 5.4 | 59.8% |

TABLE 9 : Logistic Regression Results : Permanent Layoff Model,

| VARIABLES | COEFFICIENTS | STANDARD ERROR |
|---|---|---|
| Intercept | 0.219 | 0.12 |
| ln wage | -0.546 | 0.03 |
| Construction (1) | 0.087 | 0.09 |
| Manufacturing | -1.062 | 0.09 |
| Distributive Services | -1.246 | 0.10 |
| Business Services | -1.265 | 0.10 |
| Consumer Services | -1.346 | 0.09 |
| Public Services | -1.226 | 0.09 |
| Age 25-34 (1) | -0.193 | 0.04 |
| Age 35-44 | -0.305 | 0.06 |
| Age 45-54 | -0.425 | 0.07 |
| Age 55-64 | -0.095 | 0.07 |
| Firm size (1) | | |
| 20-99 | -0.352 | 0.05 |
| 100-499 | -0.482 | 0.06 |
| 500+ | -0.803 | 0.05 |
| Don't know | -0.176 | 0.06 |
| N is | 45600 | |
| Y = 0 is | 41900 | |
| Y = 1 is | 3800 | |
| -2 log likelihood with intercept only | 24275 | |
| -2 log likelihood for fitted model | 22684 | |

(1) Forestry and mining, age16-24 and firms with 1-19 employees are the reference groups, respectively.

Y = 1 if worker was permanently laid-off in 1986 - 1987
Y = 0 otherwise

Source: Picot and Baldwin (1990)

TABLE 10

NUMBER OF MONTHS SPENT WITH THE CURRENT EMPLOYER[1], BY FIRM SIZE, 1986

| | NUMBER OF EMPLOYEES WITH THE FIRM | | | |
|---|---|---|---|---|
| | 1-19 | 20-99 | 100-499 | 500+ |
| **Total** | 18.0 | 24.0 | 26.6 | 46.8 |
| **CONTROLLING FOR MAJOR INDUSTRIAL GROUP:** | | | | |
| Forestry and Mining | 13.4 | 12.6 | 17.4 | 55.2 |
| Construction | 13.6 | 16.9 | 16.3 | 51.6 |
| Manufacturing | 20.6 | 26.9 | 38.0 | 62.0 |
| Distributive Services | 22.7 | 36.3 | 31.7 | 68.5 |
| Business Services | 25.0 | 28.6 | 21.8 | 35.0 |
| Consumer Services | 16.9 | 21.3 | 18.3 | 27.3 |
| **CONTROLLING FOR MAJOR OCCUPATIONAL GROUP[2]:** | | | | |
| Managers | 40.8 | 70.2 | 44.2 | 70.5 |
| Nat/Soc | 14.4 | 41.3 | 50.7 | 47.9 |
| Clerical | 19.7 | 25.7 | 26.6 | 39.6 |
| Sales | 24.0 | 19.4 | 19.0 | 37.5 |
| Services | 13.1 | 16.8 | 22.7 | 22.4 |
| Prim/Proc | 18.4 | 23.3 | 26.2 | 58.4 |
| Construction | 12.1 | 14.4 | 15.1 | 35.0 |
| Other | 19.4 | 19.6 | 26.6 | 60.7 |

1.Completed spells of employment.

2.The major occupations are the following: 1) Managerial, administrative and related occupations 2) occupations in natural sciences, engineering, mathematics and occupations in social sciences and related fields, 3) clerical and related occupations, 4) sales occupations, 5) service occupations, 6) occupations in mining and quarrying, processing, machining and related occupations, product fabricating, assembling and repairing occupations, 7) construction trades occupations, and 8) other occupations (transport equipment operating occupations, material handling and related occupations, other crafts and equipment operating occupations and artistic, literary, recreational and related occupations).

**TABLE 11**

**REGRESSION RESULTS FOR TENURE[1]**

| SELECTED VARIABLES | (1) COMPLETED SPELLS OF EMPLOYMENT | (2) ALL SPELLS OF EMPLOYMENT |
|---|---|---|
| . HOURLY WAGE | 0.02 | 0.49 |
| | (0.27) | (0.08) |
| . UNIONIZED | -0.64 | 10.12 |
| | (1.74) | (1.29) |
| . COVERED BY PENSION PLAN | 23.26 | 31.66 |
| | (1.62) | (1.18) |
| . FIRM SIZE DUMMIES | | |
| F2099 | 1.32 | 1.83 |
| | (1.39) | (1.30) |
| F100499 | -0.92 | 5.05 |
| | (1.77) | (1.53) |
| F500+ | 11.54 | 20.54 |
| | (1.58) | (1.39) |
| . ADJ. R SQUARE | 0.2748 | 0.4195 |
| . SAMPLE SIZE | 8,927 | 24,297 |

1.Tenure is defined as the number of months spent with the current employer. Standard errors are between parentheses.

Tenure = f(5 education dummies, age, age squared, one marital status dummy, sex, union status, one census metropolitan area dummy, 4 region dummies, one dummy for pension plan coverage, hourly wage, 37 industry dummies and 38 occupation dummies, 3 firm size dummies)

TABLE 12

## PROPORTION OF WORKHOURS FILLED IN 1986 BY WORKERS HAVING COMPLETED COLLEGE OR UNIVERSITY, BY FIRM SIZE

| | NUMBER OF EMPLOYEES WITH THE FIRM | | | | AVERAGE | SHARE OF WORKHOURS FILLED BY A GIVEN GROUP |
|---|---|---|---|---|---|---|
| | 1-19 | 20-99 | 100-499 | 500+ | | |
| TOTAL | 16.3 | 19.1 | 24.1 | 24.2 | 21.1 | 100.0 |
| CONTROLLING FOR: | | | | | | |
| SEX: | | | | | | |
| FEMALE | 14.4 | 15.6 | 23.4 | 21.6 | 18.6 | 32.4 |
| MALE | 17.5 | 20.8 | 24.4 | 25.2 | 22.4 | 67.6 |
| AGE: | | | | | | |
| 16-24 | 12.2 | 13.6 | 13.1 | 18.0 | 14.2 | 17.7 |
| 25-34 | 22.1 | 26.0 | 31.6 | 30.9 | 27.9 | 34.6 |
| 35-44 | 16.9 | 21.8 | 26.8 | 24.1 | 22.4 | 24.4 |
| 45-54 | 12.9 | 10.6 | 17.8 | 20.9 | 16.6 | 15.1 |
| 55-64 | 10.8 | 8.5 | 16.1 | 12.8 | 12.2 | 8.2 |
| TYPE OF OCCUPATION: | | | | | | |
| PROFESSIONALS AND MANAGERS | 35.8 | 43.1 | 52.8 | 49.4 | 46.1 | 23.0 |
| WHITE COLLAR WORKERS | 13.9 | 16.5 | 20.8 | 17.8 | 16.7 | 34.1 |
| BLUE COLLAR WORKERS | 10.7 | 9.6 | 10.8 | 12.7 | 11.2 | 42.9 |
| MAJOR INDUSTRIAL GROUPS: | | | | | | |
| FORESTRY/MINING | 9.9 | 21.0 | 28.7 | 32.8 | 26.7 | 3.6 |
| CONSTRUCTION | 13.0 | 20.8 | 11.8 | 20.2 | 15.7 | 7.0 |
| MANUFACTURING | 18.2 | 14.3 | 18.0 | 21.8 | 19.0 | 30.5 |
| DISTRIBUTIVE SERV. | 14.7 | 16.1 | 24.8 | 24.2 | 21.3 | 19.7 |
| BUSINESS SERV. | 34.2 | 48.1 | 54.8 | 35.1 | 39.7 | 13.7 |
| CONSUMER SERV. | 12.3 | 13.3 | 18.7 | 16.8 | 14.3 | 25.4 |

TABLE 13

OCCUPATIONAL DISTRIBUTION OF EMPLOYMENT, BY FIRM SIZE

| | NUMBER OF EMPLOYEES WITH THE FIRM | | | | |
|---|---|---|---|---|---|
| | 1-19 | 20-99 | 100-499 | 500+ | AVERAGE |
| FORESTRY/MINING | | | | | |
| P/M[1] | 8.9 | 17.6 | 27.2 | 32.2 | 25.5 |
| WC | 7.0 | 8.6 | 9.5 | 10.6 | 9.5 |
| BC | 84.2 | 73.9 | 63.3 | 57.2 | 65.0 |
| CONSTRUCTION | | | | | |
| P/M | 5.7 | 12.9 | 7.5 | 18.7 | 9.1 |
| WC | 6.2 | 8.7 | 7.4 | 11.7 | 7.6 |
| BC | 88.1 | 78.4 | 85.1 | 69.6 | 83.3 |
| MANUFACTURING | | | | | |
| P/M | 13.2 | 15.1 | 17.3 | 20.8 | 18.0 |
| WC | 13.5 | 13.6 | 14.8 | 13.6 | 13.8 |
| CB | 73.3 | 71.3 | 67.9 | 65.7 | 68.2 |
| DISTRIBUTIVE SERVICES | | | | | |
| P/M | 12.3 | 18.6 | 24.5 | 22.5 | 20.3 |
| WC | 31.6 | 39.6 | 33.4 | 34.8 | 34.9 |
| BC | 56.1 | 41.9 | 42.1 | 42.7 | 44.8 |
| BUSINESS SERVICES | | | | | |
| P/M | 43.6 | 53.4 | 49.5 | 45.0 | 46.7 |
| WC | 51.6 | 41.9 | 45.5 | 53.1 | 49.8 |
| BC | 4.8 | 4.8 | 5.1 | 1.9 | 3.5 |
| CONSUMER SERVICES | | | | | |
| P/M | 16.8 | 21.4 | 27.8 | 28.4 | 21.9 |
| WC | 61.3 | 61.3 | 58.8 | 58.3 | 60.3 |
| BC | 21.8 | 17.3 | 13.4 | 13.3 | 17.8 |
| WHOLE ECONOMY | | | | | |
| P/M | 17.4 | 21.7 | 24.5 | 26.7 | 23.0 |
| WC | 40.3 | 33.0 | 29.5 | 32.4 | 34.1 |
| BC | 42.3 | 45.4 | 46.0 | 40.8 | 42.9 |

1. P/M: Professionals and managers.
WC: White Collar Workers.
BC: Blue Collar Workers.

TABLE 14

PROPORTION OF WORKHOURS FILLED IN 1986 BY EXPERIENCED WORKERS, BY FIRM SIZE

| | NUMBER OF EMPLOYEES WITH THE FIRM | | | | |
|---|---|---|---|---|---|
| | 1-19 | 20-99 | 100-499 | 500+ | AVERAGE |
| % AGE 25-64[1] | 73.0 | 80.5 | 85.1 | 88.1 | 82.3 |
| % AGE 35-64 | 41.2 | 45.2 | 49.5 | 52.6 | 47.8 |
| CONTROLLING FOR: | | | | | |
| **Type of Occupation** | | | | | |
| % AGE 25-64 | | | | | |
| PROFESSIONALS AND MANAGERS | 83.8 | 86.2 | 94.4 | 91.9 | 89.7 |
| WHITE COLLAR WORKERS | 68.9 | 75.3 | 77.4 | 81.0 | 75.8 |
| BLUE COLLAR WORKERS | 72.5 | 81.6 | 85.1 | 91.3 | 83.5 |
| % AGE 35-64 | | | | | |
| PROFESSIONALS AND MANAGERS | 48.1 | 46.5 | 54.2 | 52.5 | 50.8 |
| WHITE COLLAR WORKERS | 41.9 | 40.8 | 41.6 | 45.0 | 42.8 |
| BLUE COLLAR WORKERS | 37.6 | 47.9 | 51.9 | 58.8 | 50.1 |
| **SEX** | | | | | |
| % AGE 25 - 64 | | | | | |
| FEMALE | 71.1 | 76.3 | 81.7 | 81.2 | 77.4 |
| MALE | 74.1 | 82.5 | 86.7 | 91.0 | 84.6 |
| % AGE 35-64 | | | | | |
| FEMALE | 43.6 | 43.9 | 43.7 | 41.1 | 42.7 |
| MALE | 39.8 | 45.9 | 52.2 | 57.5 | 50.2 |

1. % AGE 25-64 (% AGE 35-64) refers to the proportion of workhours filled in 1986 by workers in the 25-64 (35-64) age group.

TABLE 15 : Regression results from ordered logit model.

| Variables[2] | ESTIMATED COEFFICIENTS[1] MODEL 1 | MODEL 2 | MODEL 3 | MODEL 4 |
|---|---|---|---|---|
| alpha1 | *-0.0383 | 0.5969 | 0.6213 | 0.6486 |
| alpha2 | 0.8916 | 1.5636 | 1.5877 | 1.6794 |
| alpha3 | 1.5115 | 2.2042 | 2.2282 | 2.3552 |
| somesec | 0.3410 | 0.2696 | 0.2665 | 0.3000 |
| complsec | 0.5988 | 0.4796 | 0.4776 | 0.4742 |
| somepostsec | 0.5860 | 0.4503 | 0.4518 | 0.4394 |
| complcollege | 0.6817 | 0.5341 | 0.5323 | 0.5013 |
| compluniversity | 0.8126 | 0.5916 | 0.5872 | 0.5341 |
| age2534 | 0.6368 | 0.6119 | 0.5532 | 0.4446 |
| age3544 | 0.5312 | 0.4954 | 0.4734 | 0.3129 |
| age4554 | 0.3173 | 0.2930 | 0.2729 | *0.1194 |
| age5564 | 0.3456 | 0.3371 | 0.3286 | 0.2814 |
| male | -0.2240 | *-0.0465 | - | - |
| married | *0.0034 | *-0.0682 | - | - |
| married male | 0.2118 | 0.2747 | 0.1722 | 0.1384 |
| a2534male | *-0.0128 | *-0.0938 | - | - |
| a3544male | 0.3427 | 0.2656 | 0.3069 | 0.3253 |
| a4554male | 0.7573 | 0.6920 | 0.7314 | 0.7069 |
| a5564male | 0.8718 | 0.7876 | 0.8159 | 0.6218 |
| manager | | 0.8325 | 0.8271 | 0.5045 |
| natsoc | | 1.1688 | 1.1591 | 0.6301 |
| clerical | | 1.2639 | 1.2669 | 0.8292 |
| sales | | 0.3931 | 0.3850 | 0.1469 |
| primp | | 0.8678 | 0.8545 | 0.1332 |
| constrc | | *-0.1116 | *-0.1278 | 0.3866 |
| othocc | | 0.8083 | 0.7954 | 0.1440 |
| formining | | | | 1.1178 |
| construction | | | | -0.8761 |
| manufacturing | | | | 1.1565 |
| diservices | | | | 1.0239 |
| buservices | | | | 0.5811 |
| -2log likelihood | 44363.53 | 43578.47 | 43582.57 | 42307.78 |

* : not significant at the 5 % level (chi-square; 1 degree of freedom)

Dependent variable : FIRMSIZE = 0 if 1-19 employees ;
= 1 if 20-99 employees ;
= 2 if 100-499 employees ;
= 3 if 500 + employees ;

[1] Higher coefficients imply higher probabilities of being in a large firm.

[2] Elementary school, age1524, female, not married, age1524 male, Services and Consumer Services are the reference groups.

TABLE 16

ORDERED LOGIT MODEL: SUM OF THE AGE, SEX, MARITAL STATUS, AGE/SEX AND MARITAL STATUS/SEX COEFFICIENTS[1]

| | AGE GROUP | | | | |
|---|---|---|---|---|---|
| | 16-24 | 25-34 | 35-44 | 45-54 | 55-64 |
| MODEL 1 | | | | | |
| MARRIED | | | | | |
| MALE | -0.0122 | 0.6246 | 0.8617 | 1.0624 | 1.2052 |
| FEMALE | 0.0000 | 0.6368 | 0.5312 | 0.3173 | 0.3456 |
| NOT MARRIED | | | | | |
| MALE | -0.2240 | 0.4128 | 0.6499 | 0.8506 | 0.9934 |
| FEMALE | 0.0000 | 0.6368 | 0.5312 | 0.3173 | 0.3456 |
| MODEL 3 | | | | | |
| MARRIED | | | | | |
| MALE | 0.1722 | 0.7254 | 0.9525 | 1.1765 | 1.3167 |
| FEMALE | 0.0000 | 0.5532 | 0.4734 | 0.2729 | 0.3286 |
| NOT MARRIED | | | | | |
| MALE | 0.0000 | 0.5532 | 0.7803 | 1.0043 | 1.1445 |
| FEMALE | 0.0000 | 0.5532 | 0.4734 | 0.2729 | 0.3286 |
| MODEL 4 | | | | | |
| MARRIED | | | | | |
| MALE | 0.1384 | 0.5830 | 0.7766 | 0.8453 | 1.0416 |
| FEMALE | 0.0000 | 0.4446 | 0.3129 | 0.0000 | 0.2814 |
| NOT MARRIED | | | | | |
| MALE | 0.0000 | 0.4446 | 0.6382 | 0.7069 | 0.9032 |
| FEMALE | 0.0000 | 0.4446 | 0.3129 | 0.0000 | 0.2814 |

1.Coefficients which are not significant at the 5% level (chi-square with one degree of freedom) are assumed to equal zero. Higher coefficients imply higher probabilities of being in a large firm.

Table 17: Probabilities of being in a large firm resulting from the logistic regression : model 3.

A) Probability of being in a large firm for workers in PRIM/PROC, 25-34 :

| Education level | (1) Married Male | (2) Others | (3) (1) - (2) |
|---|---|---|---|
| elementary | 0.3433 | 0.3057 | 0.0376 |
| some secondary | 0.4057 | 0.3649 | 0.0408 |
| completed secondary | 0.4574 | 0.4151 | 0.0423 |
| some post secondary | 0.4510 | 0.4089 | 0.0421 |
| completed college | 0.4710 | 0.4284 | 0.0426 |
| completed university | 0.4847 | 0.4419 | 0.0428 |

B) Probability of being in a large firm for workers in PRIM/PROC, having completed secondary school:

| Age group | MALE | | FEMALE | (1)-(3) | (2)-(3) |
|---|---|---|---|---|---|
| | Married (1) | Not Married (2) | (3) | (4) | (5) |
| 16-24 | 0.3265 | 0.2899 | 0.2899 | 0.0366 | 0.0000 |
| 25-34 | 0.4574 | 0.4151 | 0.4151 | 0.0423 | 0.0000 |
| 35-44 | 0.5141 | 0.4711 | 0.3959 | 0.1182 | 0.0752 |
| 45-54 | 0.5696 | 0.5270 | 0.3491 | 0.2205 | 0.1779 |
| 55-64 | 0.6036 | 0.5618 | 0.3618 | 0.2418 | 0.2000 |

*: PRIM/PROC: occupations in mining and quarrying, processing, machining and related occupations, product fabricating, assembling and repairing occupations.

TABLE 18 : Size coefficients from regressions # 1 and # 2.[1]

| Size coefficients + | (1) REG # 1 whole sample | (2) REG # 2 whole sample | (3) REG # 2 Unionized workers | (4) REG # 2 Non Unionized workers |
|---|---|---|---|---|
| A) FIRM SIZE[2] | | | | |
| f2099 | 0.1058 | 0.0895 | 0.0444 | 0.0874 |
| f100499 | 0.1670 | 0.1520 | 0.0982 | 0.1484 |
| f500p | 0.2348 | 0.1919 | 0.1595 | 0.1795 |
| B) ESTABLISHMENT SIZE[3] | | | | |
| e2099 | 0.1048 | 0.0937 | 0.0429 | 0.0908 |
| e100499 | 0.1726 | 0.1570 | 0.0826 | 0.1702 |
| e500p | 0.2396 | 0.1943 | 0.1211 | 0.2240 |
| C) ESTABLISHMENT/FIRM SIZE COMBINATIONS[4] | | | | |
| Establishments 1-19 | | | | |
| e119f2099 | 0.1197 | 0.1004 | *-0.0051 | 0.1082 |
| e119f100499 | 0.1167 | 0.1048 | 0.1220 | 0.0898 |
| e119f500p | 0.1597 | 0.1155 | 0.1195 | 0.0889 |
| Establishments 20-99 | | | | |
| e2099f2099 | 0.1065 | 0.0926 | 0.0490 | 0.0890 |
| e2099f100499 | 0.1798 | 0.1680 | 0.1163 | 0.1558 |
| e2099f500p | 0.2148 | 0.1825 | 0.1414 | 0.1662 |
| Establishments 100-499 | | | | |
| e100499f100499 | 0.1815 | 0.1703 | 0.0939 | 0.1826 |
| e100499f500p | 0.2490 | 0.2164 | 0.1640 | 0.2141 |
| Establishments 500+ | | | | |
| e500pf500p | 0.2950 | 0.2429 | 0.1827 | 0.2604 |
| Sample size | 25356 | 25356 | 6079 | 19277 |

REGRESSION #1: Log hourly wage = f( [5 education dummies, age, age squared, marital status, sex, 1 marital status/sex interaction, union status, 1 census metropolitan area dummy, 4 region dummies, 5 education/sex interactions, 1 age/sex interaction, 1 age squared/sex interaction] and DUMMIES FOR FIRM AND/OR ESTABLISHMENT SIZE)

REGRESSION # 2 : = REGRESSION #1 + 37 industry dummies + 38 occupation dummies

1. The dependent variable in these regressions is the logarithm of the hourly wage rate. Regressions are run using ordinary least squares.
2. f2099 (f500p) refers to a firm with 20-99 (500 or more) employees. Firms with less than 20 employees are the reference group.
3. e2099 (e500p) refers to an establishment with 20-99 (500 or more) employees. Establishments with less than 20 employees are the reference group.
4. e119f2099 refers to an establishment with 1-19 employees in a firm with 20-99 employees. Establishments with 1-19 employees in a firm with 1-19 employees are the reference group for these establishment/firm size combinations.

+: all coefficients except those with a '*' are significant at the 0.1% level.

*: not significant at the 5% level.

TABLE 19 : Size coefficients from regression #2 for various subsamples[1]

| Size coefficients + | (1) Non Unionized Workers | (2) Profes.+ managers | (3) White collar workers | (4) Blue Collar Workers | (5) Non Unionized Workers in Occupations with urate<10% | (6) Non Unionized Workers in Industries with urate<10% |
|---|---|---|---|---|---|---|
| A) FIRM SIZE | | | | | | |
| f2099 | 0.0874 | 0.1603 | 0.0969 | 0.0622 | 0.1652 | 0.1884 |
| f100499 | 0.1484 | 0.2373 | 0.1609 | 0.1120 | 0.2362 | 0.2416 |
| f500p | 0.1795 | 0.2661 | 0.1465 | 0.1995 | 0.2103 | 0.1483 |
| B) ESTABLISHMENT SIZE | | | | | | |
| e2099 | 0.0908 | 0.1264 | 0.0917 | 0.0767 | 0.1301 | 0.1194 |
| e100499 | 0.1702 | 0.1942 | 0.1480 | 0.1422 | 0.1747 | 0.1942 |
| e500p | 0.2240 | 0.2349 | 0.1441 | 0.1846 | 0.2268 | 0.1589 |
| C) ESTABLISHMENT/FIRM SIZE COMBINATIONS | | | | | | |
| Establishments 1-19 | | | | | | |
| e119f2099 | 0.1082 | 0.2069 | 0.0856 | *0.0195 | 0.2253 | 0.2443 |
| e119f100499 | 0.0898 | 0.1353 | 0.1223 | 0.0817 | 0.0982 | 0.1674 |
| e119f500p | 0.0889 | 0.1989 | 0.0895 | 0.1402 | 0.1526 | 0.0763 |
| Establishments 20-99 | | | | | | |
| e2099f2099 | 0.0890 | 0.1550 | 0.1027 | 0.0684 | 0.1557 | 0.1781 |
| e2099f100499 | 0.1558 | 0.2740 | 0.1571 | 0.1030 | 0.2748 | 0.2586 |
| e2099f500p | 0.1662 | 0.2556 | 0.1465 | 0.1899 | 0.2056 | 0.1296 |
| Establishments 100-499 | | | | | | |
| e100499f100499 | 0.1826 | 0.2695 | 0.1941 | 0.1275 | 0.2804 | 0.2747 |
| e100499f500p | 0.2141 | 0.2853 | 0.1827 | 0.2107 | 0.2178 | 0.2237 |
| Establishments 500+ | | | | | | |
| e500pf500p | 0.2604 | 0.3298 | 0.1872 | 0.2251 | 0.2962 | 0.2071 |
| Sample size | 19277 | 4161 | 9684 | 1151 | 3882 | 3088 |

1. The dependent variable in these regressions is the logarithm of the hourly wage rate. All regressions are run using ordinary least squares.

+: all coefficients except those with a '*' are significant at the 5 % level. Occupations (2-digit level) with unionization rate lower than 10 % are: 1) management, 2) other administration, 3) social sciences, 4) service sales and 5) steno and typing. Industries (2-digit level) with unionization rate lower than 10 % are: 1) mining services, 2) finance, 3) insurance and real estate agents, 4) services to business management and 5) personal services.

TABLE 20: Coefficients from regression #2 for: 1) the whole sample, 2) job changers - first job, 3) job changers - second job and 4) first-difference wage equation.[1]

| Selected explanatory variables + | (1) Whole sample | (2) Job changers first job | (3) Job changers second job | (4) Job changers first-difference wage equation |
|---|---|---|---|---|
| stay[2] | - | - | - | 0.0450 |
| EDUCATION | | | | |
| somesec | 0.0637 | 0.3830 | *-0.1125 | - |
| complsec | 0.1329 | 0.4870 | *-0.0526 | - |
| somepostsec | 0.1531 | 0.5410 | * 0.0050 | - |
| complcollege | 0.1925 | 0.6276 | * 0.0525 | - |
| compluniversity | 0.3328 | 0.7586 | 0.2156 | - |
| age | 0.0392 | 0.0629 | 0.0714 | - |
| age squared | -0.0005 | -0.0008 | -0.0009 | - |
| tenure | 0.0012 | *0.0006 | *0.0004 | *-0.0005 |
| tenure squared | -0.000002 | -0.000003 | *-0.000002 | *0.0000 |
| unionized | 0.1252 | 0.2161 | 0.1710 | 0.2422 |
| FIRM SIZE | | | | |
| f2099 | 0.0895 | 0.0810 | 0.0672 | 0.0427 |
| | @(0.0072) | (0.0214) | (0.0200) | (0.0187) |
| f100499 | 0.1520 | 0.1180 | 0.1182 | 0.0767 |
| | (0.0081) | (0.0263) | (0.0231) | (0.0234) |
| f500p | 0.1919 | 0.0703 | 0.1177 | 0.0833 |
| | (0.0073) | (0.0227) | (0.0209) | (0.0213) |
| Adj. R square | 0.4858 | 0.4890 | 0.5227 | 0.1173 |
| Sample size | 25356 | 2638 | 2638 | 2638 |

1. For the first three columns, the dependent variable is the logarithm of the hourly wage rate. For the fourth column, the dependent variable is the first-difference of the logarithm of the hourly wage rate. All regressions are run using ordinary least squares.
2. Stay equals 1 (=0) when job changers stay (do not stay) in the same 2-digit occupation when going from their first to their second job.

\+ In the wage equations in levels, the set of explanatory variables is the same as for regression # 2. In the first-difference wage equation, the set of explanatory variables includes the following variables expressed in first-difference: 1) tenure, 2) tenure squared, 3) union status, 4) 37 industry dummies, 5) 38 occupation dummies, 6) 3 firm size dummies and 7) a dummy variable for job changers who stay in the same two-digit occupation.

* Coefficients not significant at the 5 % level.

@: Standard errors of size coefficients are between parentheses.

TABLE 21: Coefficients from regression #2 for: 1) the whole sample, 2) job changers - first job, 3) job changers - second job and 4) first-difference wage equation.[1]

| Selected explanatory variables + | (1) Whole sample | (2) Job changers first job | (3) Job changers second job | (4) Job changers first-difference wage equation |
|---|---|---|---|---|
| stay | - | - | - | 0.0450 |
| EDUCATION | | | | |
| somesec | 0.0671 | 0.3780 | *-0.1083 | - |
| complsec | 0.1371 | 0.4902 | *-0.0507 | - |
| somepostsec | 0.1612 | 0.5482 | *0.0121 | - |
| complcollege | 0.2001 | 0.6282 | *0.0440 | - |
| compluniversity | 0.3323 | 0.7538 | 0.2005 | - |
| age | 0.0394 | 0.0600 | 0.0698 | - |
| age squared | -0.0005 | -0.0007 | -0.0009 | - |
| tenure | 0.0012 | *0.0006 | *0.0004 | *-0.0006 |
| tenure squared | -0.000002 | -0.000003 | *-0.000002 | *0.000001 |
| unionized | 0.1361 | 0.2114 | 0.1653 | 0.2420 |
| ESTABLISHMENT SIZE | | | | |
| e2099 | 0.0937 | 0.0526 | 0.0774 | 0.0507 |
| | @(0.0060) | (0.0183) | (0.0171) | (0.0165) |
| e100499 | 0.1570 | 0.1150 | 0.1688 | 0.0945 |
| | (0.0074) | (0.0260) | (0.0224) | (0.0244) |
| e500p | 0.1943 | 0.1375 | 0.1511 | 0.1196 |
| | (0.0097) | (0.0464) | (0.0359) | (0.0420) |
| Adj. R square | 0.4833 | 0.4888 | 0.5273 | 0.1179 |
| Sample size | 25356 | 2638 | 2638 | 2638 |

1. For the first three columns, the dependent variable is the logarithm of the hourly wage rate. For the fourth column, the dependent variable is the first-difference of the logarithm of the hourly wage rate. All regressions are run using ordinary least squares.
2. Stay equals 1 (=0) when job changers stay (do not stay) in the same 2-digit occupation when going from their first to their second job.

\+ In the wage equations in levels, the set of explanatory variables is the same as for regression #2. In the first-difference wage equation, the set of explanatory variables includes the following variables expressed in first-difference: 1) tenure, 2) tenure squared, 3) union status, 4) 37 industry dummies, 5) 38 occupation dummies, 6) 3 establishment size dummies and 7) a dummy variable for job changers who stay in the same two-digit occupation.

* Coefficients not significant at the 5 % level.

@: Standard errors of size coefficients are between parentheses.

Table 22: Size coefficients from regression #2: consumer services vs the whole sample[1].

| Size coefficients | (1) REG # 1 Consumer Services | Standard error | (2) REG # 2 whole sample | Standard error |
|---|---|---|---|---|
| A) FIRM SIZE | | | | |
| f2099 | 0.0758 | 0.0125 | 0.0895 | 0.0072 |
| f100499 | 0.1431 | 0.0157 | 0.1520 | 0.0082 |
| f500p | 0.1604 | 0.0125 | 0.1919 | 0.0073 |
| Adj. R square | 0.4019 | - | 0.4858 | - |
| B) ESTABLISHMENT SIZE | | | | |
| e2099 | 0.0873 | 0.0106 | 0.0937 | 0.0060 |
| e100499 | 0.1906 | 0.0151 | 0.1570 | 0.0074 |
| e500p | 0.2148 | 0.0312 | 0.1943 | 0.0097 |
| Adj. R square | 0.4031 | - | 0.4833 | - |
| C) ESTABLISHMENT/FIRM SIZE COMBINATIONS | | | | |
| Establishments 1-19 | | | | |
| e119f2099 | 0.0794 | 0.0250 | 0.1004 | 0.0156 |
| e119f100499 | 0.0902 | 0.0275 | 0.1048 | 0.0167 |
| e119f500p | 0.0689 | 0.0193 | 0.1155 | 0.0116 |
| Establishments 20-99 | | | | |
| e2099f2099 | 0.0774 | 0.0133 | 0.0926 | 0.0075 |
| e2099f100499 | 0.1178 | 0.0232 | 0.1680 | 0.0125 |
| e2099f500p | 0.1644 | 0.0172 | 0.1825 | 0.0096 |
| Establishments 100-499 | | | | |
| e100499f100499 | 0.2144 | 0.0236 | 0.1703 | 0.0101 |
| e100499f500p | 0.2184 | 0.0186 | 0.2164 | 0.0091 |
| Establishments 500+ | | | | |
| e500pf500p | 0.2393 | 0.0314 | 0.2429 | 0.0103 |
| Adj. R square | 0.4064 | - | 0.4880 | - |
| Sample size | 7380 | - | 25356 | - |

1. Consumer services excluding personal services. The dependent variable in these regressions is the logarithm of the hourly wage rate.

## APPENDIX 1 : Data Sources

The Labour Market Activity Survey provides information on the number of **jobs** held by a representative sample of individuals in 1986 as well as on the number of **hours** worked within each job. The distribution of employment across firm sizes may be computed based on persons employed, jobs or hours worked. Since this data refers to employment throughout the entire year, neither persons employed or jobs is totally satisfactory. The problem is that a person employed in a job held for one month receives the same weight as that employed in a job held for the whole year. Looking at the distribution of hours worked - which amounts to weighting each job by the number of hours worked - overcomes this problem. Hence, in this paper, we define employment in a given firm size as the number of **hours** worked in 1986 in this firm size.

We restrict our sample to hours worked by full-time paid workers of all industries except agriculture, fishing and public services. The resulting sample contains 24,297 observations on full-time jobs. We define small firms as having less than 20 employees, large firms as having more than 500 employees and medium-sized firms as having between 20 and 499 employees.

The size of the employer can be measured either at the establishment level or at the firm level. In the LMAS survey, the establishment size is measured by asking workers the following question :

> Q1 : " About how many persons were employed at the location where [you] worked for this employer ? "

The firm is defined as the set of establishments owned by the employer in Canada. The firm size is measured by asking workers the two following questions :

> Q2 : " Did this employer operate more than one location in Canada ? "
>
> Q3 : " In total about how many persons were employed at all locations in Canada in 1986 ? (includes firms with only one location) ? "

## APPENDIX 2 : Comparing Respondents and Partial Non-Respondents

In the 1986 LMAS survey, some people, when interviewed, did not know the size of the firm in which they were employed. In this appendix, we refer to these people as being partial non-respondents. While the 1986 LMAS survey contains 24,297 full-time jobs related to respondents, it also includes 4,286 full-time jobs held by partial non-respondents. Thus, these latter jobs account for 15 % of all full-time jobs (i.e. 4286 / [4286 + 24297] ).

In the following tables we compare respondents to partial non-respondents in terms of the following variables : 1) education, 2) age, 3) sex, 4) degree of unionization, 5) pension plan coverage, 6) occupational group, 7) industrial group, 8) hourly wage rate and 9) tenure. The main conclusion that emerges from this exercise is that partial non-respondents do not differ substantially from respondents. Although the former appear to be : a) less educated, b) older, c) more unionized, and d) more frequently covered by a pension plan than the latter, the differences observed are not dramatic. Moreover, some of these differences (e.g. being older and being more unionized) have opposite effects on measured wage disparities ; wage disparities tend to be higher for older workers and lower for unionized workers. The distribution of employment (as measured by hours worked) by industry or occupation does not differ substantially between the two groups. Similarly, the average and median values of the hourly wage rate and of tenure are fairly similar. All taken together, these points suggest that the bias (due to partial non-response) on the estimated size coefficients is likely to be rather small.

TABLE A2.1 : Percentage Distribution of Workhours by : 1) Education, 2) Age, 3) Sex, 4) Degree of Unionization, 5) Pension Plan Coverage, 6) Industrial Group, and 7) Occupational group : Respondents and Partial Non-Respondents.

| | Respondents | Partial Non-Respondents |
|---|---|---|
| EDUCATION | | |
| Elementary | 10.7 | 11.9 |
| Some Secondary | 22.9 | 27.8 |
| Completed Secondary | 36.7 | 34.6 |
| Some Post Secondary | 8.6 | 9.4 |
| Completed College | 11.2 | 9.4 |
| Completed University | 9.9 | 7.0 |

| | Respondents | Partial Non-Respondents |
|---|---|---|
| AGE | | |
| 16-24 | 17.7 | 18.4 |
| 25-34 | 34.6 | 31.1 |
| 35-44 | 24.4 | 23.7 |
| 45-54 | 15.1 | 15.8 |
| 55-64 | 8.2 | 11.1 |
| SEX | | |
| Male | 67.6 | 69.4 |
| Female | 32.4 | 30.6 |
| DEGREE OF UNIONIZATION | | |
| Unionized | 29.0 | 35.6 |
| Non Unionized | 71.0 | 64.4 |
| PENSION PLAN COVERAGE | | |
| Covered | 45.7 | 50.8 |
| Not Covered | 54.4 | 49.2 |
| INDUSTRIAL GROUP | | |
| Forestry and Mining | 3.6 | 6.2 |
| Construction | 7.0 | 5.6 |
| Manufacturing | 30.5 | 29.2 |
| Distributive Services | 19.7 | 20.9 |
| Business Services | 13.7 | 15.9 |
| Consumer Services | 25.4 | 22.3 |
| OCCUPATIONAL GROUP | | |
| Managers | 16.0 | 12.7 |
| Nat./Soc. Sciences | 5.5 | 4.3 |
| Clerical | 15.9 | 18.6 |
| Sales | 9.7 | 10.7 |
| Services | 8.5 | 10.6 |
| Prim./Processing | 24.7 | 23.3 |
| Construction | 7.3 | 7.2 |
| Other | 12.5 | 12.7 |

TABLE A2.2 : Hourly Wage Rate and Tenure : Respondents and Partial Non-Respondents.

| | Respondents | Partial Non-Respondents |
|---|---|---|
| HOURLY WAGE RATE | | |
| Mean | 11.55 | 11.00 |
| Median | 8.9 | 8.8 |
| Standard Deviation | 6.3 | 5.6 |
| TENURE | | |
| ALL SPELLS OF EMPLOYMENT | | |
| Mean | 67.7 | 64.0 |
| Median | 23.0 | 19.0 |
| Standard Deviation | 90.0 | 91.0 |
| COMPLETED SPELLS OF EMPLOYMENT | | |
| Mean | 26.9 | 21.5 |
| Median | 6.0 | 5.0 |
| Standard Deviation | 57.1 | 49.9 |

**APPENDIX 3 : Estimating the Probability of Being in a Large Firm.**

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Following Idson and Feaster (1990) and Evans and Leighton (1989), assume that workers are sorted across firm sizes according to an index Qi which is a linear function of observable worker characteristics Xi as well as unmeasured characteristics ei :

$$Qi = B0 + B1 * Xi + ei$$

where B0 is a constant term and B1 is a vector of coefficients. Workers are in firms with 1-19 employees if $Qi < S1$, in firms with 20-99 employees if $S1 < Qi < S2$ , in firms with 100-499 employees if $S2 < Qi < S3$ and in firms with 500 employees or more if $Qi > S3$, where S1, S2 and S3 are thresholds defining increasing values for Qi (i.e. $S1 < S2 < S3$). Define alphai = Si - B0, i = 1,...3. Then the above relations imply that workers are in firms with :

1-19 employees if : $B1 * Xi + ei < alpha1$
20-99 employees if : $alpha1 < B1 * Xi + ei < alpha2$
100-499 employees if : $alpha2 < B1 * Xi + ei < alpha3$
500+ employees if : $B1 * Xi + ei > alpha3$

where $alpha1 < alpha2 < alpha3$. The index Qi is not observable and has to be given an interpretation. We define Qi as an index of worker quality and worker stability. This may be justified by the idea that larger firms, being more capital intensive and/or more frequent users of sophisticated technology, may have higher training costs and more needs for higher quality workers. Hence, they may prefer hiring workers with greater stability and/or quality. Assuming that ei follows a logistic distribution, the above relations define an ordered logit model. This can be estimated with a maximum likelihood procedure (Maddala (1983), p. 46).

The probability of a worker with given characteristics Xi being in a given firm size simply equals the probability that $B1 * Xi + ei$ lies within the relevant intervals as specified above. For instance, the probability of being in a large firm is the probability that $B1 * Xi + ei$ exceeds alpha3.

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APPENDIX 4 : Detailed results from ordered logit model.

| Variables[1][2] | MODEL 1 | | MODEL 2 | |
|---|---|---|---|---|
| | Coefficients | Standard error | Coefficients | Standard error |
| alpha1 | *-0.0383 | 0.0724 | 0.5969 | 0.0830 |
| alpha2 | 0.8916 | 0.0726 | 1.5636 | 0.0837 |
| alpha3 | 1.5115 | 0.0732 | 2.2042 | 0.0845 |
| somesec | 0.3410 | 0.0519 | 0.2696 | 0.0529 |
| complsec | 0.5988 | 0.0502 | 0.4796 | 0.0523 |
| somepostsec | 0.5860 | 0.0654 | 0.4503 | 0.0681 |
| complcollege | 0.6817 | 0.0614 | 0.5341 | 0.0642 |
| compluniversity | 0.8126 | 0.0629 | 0.5916 | 0.0701 |
| age2534 | 0.6368 | 0.0684 | 0.6119 | 0.0691 |
| age3544 | 0.5312 | 0.0762 | 0.4954 | 0.0772 |
| age4554 | 0.3173 | 0.0864 | 0.2930 | 0.0876 |
| age5564 | 0.3456 | 0.1147 | 0.3371 | 0.1160 |
| male | -0.2240 | 0.0711 | *-0.0465 | 0.0740 |
| married | *0.0034 | 0.0532 | *-0.0682 | 0.0538 |
| married male | 0.2118 | 0.0686 | 0.2747 | 0.0692 |
| a2534male | *-0.0128 | 0.0881 | *-0.0938 | 0.0890 |
| a3544male | 0.3427 | 0.0978 | 0.2656 | 0.0989 |
| a4554male | 0.7573 | 0.1093 | 0.6920 | 0.1106 |
| a5564male | 0.8718 | 0.1376 | 0.7876 | 0.1393 |
| manager | - | | 0.8325 | 0.0636 |
| natsoc | - | | 1.1688 | 0.0843 |
| clerical | - | | 1.2639 | 0.0624 |
| sales | - | | 0.3931 | 0.0681 |
| primp | - | | 0.8678 | 0.0579 |
| constrc | - | | *-0.1116 | 0.0744 |
| othocc | - | | 0.8083 | 0.0645 |
| formining | - | | - | |
| construction | - | | - | |
| manufacturing | - | | - | |
| diservices | - | | - | |
| buservices | - | | - | |
| -2 log likelihood | 44363.53 | | 43578.47 | |
| -2 log likelihood with intercepts only | 45244.64 | | 45244.64 | |

* : not significant at the 5% level (chi-square; 1 degree of freedom)

(to be continued)

[1] Higher coefficients imply higher probabilities of being in a large firm.

[2] Elementary school, age1524, female, not married, age1524male, Services and Consumer Services are the reference groups.

APPENDIX 4 (continued) : Detailed results from ordered logit model.

| Variables[1][2] | MODEL 3 Coefficients | MODEL 3 Standard error | MODEL 4 Coefficients | MODEL 4 Standard error |
|---|---|---|---|---|
| alpha1 | 0.6213 | 0.0714 | 0.6486 | 0.0722 |
| alpha2 | 1.5877 | 0.0722 | 1.6794 | 0.0732 |
| alpha3 | 2.2282 | 0.0732 | 2.3552 | 0.0742 |
| somesec | 0.2665 | 0.0528 | 0.3000 | 0.0534 |
| complsec | 0.4776 | 0.0522 | 0.4742 | 0.0529 |
| somepostsec | 0.4518 | 0.0680 | 0.4394 | 0.0689 |
| complcollege | 0.5323 | 0.0641 | 0.5013 | 0.0649 |
| compluniversity | 0.5872 | 0.0700 | 0.5341 | 0.0712 |
| age2534 | 0.5532 | 0.0437 | 0.4446 | 0.0446 |
| age3544 | 0.4734 | 0.0629 | 0.3129 | 0.0639 |
| age4554 | 0.2729 | 0.0755 | *0.1194 | 0.0766 |
| age5564 | 0.3286 | 0.1087 | 0.2814 | 0.1102 |
| male | - | | - | |
| married | - | | - | |
| married male | 0.1722 | 0.0380 | 0.1384 | 0.0386 |
| a2534male | - | | - | |
| a3544male | 0.3069 | 0.0704 | 0.3253 | 0.0712 |
| a4554male | 0.7314 | 0.0862 | 0.7069 | 0.0873 |
| a5564male | 0.8159 | 0.1221 | 0.6218 | 0.1238 |
| manager | 0.8271 | 0.0635 | 0.5045 | 0.0660 |
| natsoc | 1.1591 | 0.0841 | 0.6301 | 0.0883 |
| clerical | 1.2669 | 0.0620 | 0.8292 | 0.0659 |
| sales | 0.3850 | 0.0679 | 0.1469 | 0.0697 |
| primp | 0.8545 | 0.0573 | 0.1332 | 0.0647 |
| constrc | *-0.1278 | 0.0735 | 0.3866 | 0.0941 |
| othocc | 0.7954 | 0.0639 | 0.1440 | 0.0697 |
| formining | - | | 1.1178 | 0.0855 |
| construction | - | | -0.8761 | 0.0829 |
| manufacturing | - | | 1.1565 | 0.0458 |
| diservices | - | | 1.0239 | 0.0485 |
| buservices | - | | 0.5811 | 0.0523 |
| -2 log likelihood | 43582.57 | | 42307.78 | |
| -2 log likelihood with intercepts only | 45244.64 | | 45244.64 | |

* : not significant at the 5% level (chi-square; 1 degree of freedom)

[1] Higher coefficients imply higher probabilities of being in a large firm.

[2] Elementary school, age1524, female, not married, age1524male, Services and Consumer Services are the reference groups.

APPENDIX 5: Size coefficients from regression # 1 and regression # 2 : whole sample[1].

| Size coefficients | (1) REG # 1 whole sample | Standard error | (2) REG # 2 whole sample | Standard error |
|---|---|---|---|---|
| A) FIRM SIZE | | | | |
| f2099 | 0.1058 | 0.0075 | 0.0895 | 0.0072 |
| f100499 | 0.1670 | 0.0084 | 0.1520 | 0.0081 |
| f500p | 0.2348 | 0.0071 | 0.1919 | 0.0073 |
| Adj. R square | 0.4089 | - | 0.4858 | - |
| B) ESTABLISHMENT SIZE | | | | |
| e2099 | 0.1048 | 0.0063 | 0.0937 | 0.0060 |
| e100499 | 0.1726 | 0.0073 | 0.1570 | 0.0074 |
| e500p | 0.2396 | 0.0093 | 0.1943 | 0.0097 |
| Adj. R square | 0.4032 | - | 0.4833 | - |
| C) ESTABLISHMENT/FIRM SIZE COMBINATIONS | | | | |
| Establishments 1-19 | | | | |
| e119f2099 | 0.1197 | 0.0165 | 0.1004 | 0.0156 |
| e119f100499 | 0.1167 | 0.0177 | 0.1048 | 0.0167 |
| e119f500p | 0.1597 | 0.0119 | 0.1155 | 0.0116 |
| Establishments 20-99 | | | | |
| e2099f2099 | 0.1065 | 0.0078 | 0.0926 | 0.0075 |
| e2099f100499 | 0.1798 | 0.0131 | 0.1680 | 0.0125 |
| e2099f500p | 0.2148 | 0.0098 | 0.1825 | 0.0096 |
| Establishments 100-499 | | | | |
| e100499f100499 | 0.1815 | 0.0103 | 0.1703 | 0.0101 |
| e100499f500p | 0.2490 | 0.0091 | 0.2164 | 0.0091 |
| Establishments 500+ | | | | |
| e500pf500p | 0.2950 | 0.0098 | 0.2429 | 0.0103 |
| Adj. R square | 0.4118 | - | 0.4880 | - |
| Sample size | 25356 | - | 25356 | - |

1. The dependent variable in these regressions is the logarithm of the hourly wage rate. All regressions are run using ordinary least squares.

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