

Sources of Occupational Wage Differentials in a « Competitive » Labour Market

Les sources de différences de salaire dans un marché de concurrence

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Article abstract

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Sources of Occupational Wage Differentials in a « Competitive » Labour Market

C. J. Bruce
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Since the publication of George Stigler's classic article, « Information in the Labor Market »¹, the theory of the job search has been one of the major growth areas in labour economics.² Each of the models developed in this literature has been based on the assumption that wage differentials exist within localised labour markets for homogeneous workers, thereby presenting the unemployed worker with an array of potential wage-offers from which to choose.

The existence of such wage differentials, even between workers within finely-defined occupations in the same labour market, has been well documented. For example, Labour Canada, in its publication, *Wage Rates, Salaries, and Hours of Labour*³, identifies average weekly

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¹ G. STIGLER, « Information in the Labour Market », *Journal of Political Economy, Supplement*, Vol. 70, No. 5, Pt. 2, October 1962, pp. 94-105.

² Cf. D. T. MORTENSEN, « Job Search, the Duration of Unemployment, and the Phillips' Curve », *American Economic Review*, Vol. 60, No. 5, December 1970, pp. 847-862; C. C. HOLT, « Improving the Labor Market Trade-Off Between Inflation and Unemployment », *American Economic Association*, Vol. 59, No. 2, May 1969, pp. 135-146; and R. GRONAU, « Information and Frictional Unemployment », *American Economic Review*, Vol. 61, No. 3, June 1971, pp. 290-301.

³ Labour Canada, *Wage Rates, Salaries, and Hours of Work*, Ottawa, (annual).

wages and first and ninth decile wages for a wide variety of occupations on a city-by-city basis. These data clearly indicate that the difference between the first and ninth decile wages is often greater than thirty percent of the average wage rate.⁴

However, although such wage differentials are commonly observed, and play a crucial role in theories of the job search, they also appear to be inconsistent with the neoclassical theory of the operation of competitive labour markets. In spite of this, relatively little work has been done, either theoretically or empirically, to explain why these wage differentials are so great and so persistent. We know of no published works which provide a neoclassical theory of persistent wage differentials within a *competitive* labour market for homogeneous workers, other than those which rely on the assumption of imperfect information on the part of both employers and workers.⁵ Furthermore, while there have been a number of studies which have investigated several determinants of intramarket wage differentials⁶, we know of only one such study which has attempted to deal with these determinants simultaneously using multiple linear regression analysis.⁷

⁴ For example, even when the occupation normally referred to as «Clerk-typist» is broken down into eight sub-categories, the inter-decile range divided by the average wage does not fall below .3 for any category in the city of Calgary. The eight occupations referred to (with interdecile ranges divided by average wages) are: general office clerk, junior (.38), general office clerk, intermediate (.41), typist, junior (.32), typist, senior (.39), secretary, junior (.38), secretary, senior (.37), stenographer, Junior (.35), stenographer, senior (.30). (Each of the occupations referred to included only females. The data was collected in October, 1974 and there were no fewer than 220 observations for any group.)

⁵ cf. M. R. FISHER, «Search in Labor Markets — A Human Capital Perspective», *Intermountain Economic Review*, Vol. 5, No. 1, Fall 1974, pp. 1-16; and L. J. MIRMAN and W. R. PORTER, «A Microeconomic Model of the Labor Market Under Uncertainty», *Economic Inquiry*, Vol. 12, No. 2, June 1974, pp. 135-145.

⁶ cf. D. I. MACKAY, et. al., *Labour Markets Under Different Employment Conditions*, George Allen and Unwin, London, 1971; R. EVANS, Jr., «Worker Quality and Wage Dispersion: An analysis of a Clerical Labor Market in Boston», *Industrial Relations Research Association, Proceedings of the Fourteenth Annual Meeting, 14th Annual Meeting, Dec. 28-29, 1961, New York City, Madison, Wis.: IRRA, 1961*, pp. 246-259; E. H. CONAN, «Worker Efficiency and Wage Differentials in a Clerical Labour Market», *Industrial and Labor Relations Review*, Vol. 16, No. 3, April 1963, pp. 428-433; and G. P. SHULTZ, «A Nonunion Market for White Collar Labor»; in National Bureau for Economic Research, *Aspects of Labor Economics*, Princeton University Press, Princeton, 1962, pp. 107-146.

⁷ A. REES and G. P. SHULTZ, *Workers and Wages in an Urban Labor Market*, University of Chicago Press, Chicago, 1970.

Given the importance of the presence of intra-market wage differentials to the theory of the job search, and the seeming inconsistency of the presence of such differentials with conventional wage theory, it is our feeling that the paucity of information concerning this subject is entirely unwarranted. Accordingly, we have undertaken a survey of the wage-setting practices of a number of employers of clerk-typists in the city of Calgary to provide additional information concerning the determinants of intra-market wage differentials. Analysis of the results of this survey are reported in this paper.

The paper is divided into three sections. In the first section we briefly survey the literature on the determination of wage differentials. In the second section we describe our survey and analyse the resulting data. And, finally, we present our conclusions concerning the presence of intra-market wage differentials.

THÉORIES OF INTRA-MARKET WAGE DIFFERENTIALS

Two bodies of theory concerning the sources of intra-market wage differentials can be identified. The first of these we will refer to as "neoclassical theory". This is the body of theory which is consistent with the assumptions that firms seek to maximise long-run profits and that workers seek to maximise long-run net economic advantages, subject to the constraint that there may be costs associated with the acquisition of information. The second body of theory we shall refer to as «institutional theory». This is composed of theories which are based either on the assumption that firms do not attempt to maximise profits or on the assumption that workers act irrationally, (in the economic sense). In this section we will summarise the main hypotheses which have been associated with these two bodies of theory.

NEOCLASSICAL THEORY

The fundamental hypothesis underlying neoclassical wage theory is that in a competitive labour market for homogeneous workers (and homogeneous work places), wage rates will tend to be equalised in the long-run as long as both employers and workers possess perfect information and as long as workers do not experience costs in moving between firms. Intra-market wage differentials are then explained in neoclassical theory by relaxing many of the assumptions implicit in this hypothesis.

Adam Smith was the first to perceive that it was not money wage rates which would tend to equality in a competitive labour market, but

the « whole of the advantages and disadvantages of employments. »⁸ If employment conditions (including wage rates) in one firm were observed to be relatively more or less attractive than those in the others, the supply of workers to that firm would increase in the first case or decrease in the second, until the *net attractiveness* of the same job in all firms was equated. This leads to the following neoclassical hypotheses concerning sources of wage differentials between firms in the same labour market:

Hypothesis I: wage rates will be lowest in those firms which offer the highest level of fringe benefits.

Hypothesis II: wage rates will be lower, the greater is the intrinsic satisfaction derived from the job and the more pleasant are working conditions.

Hypothesis III: hourly wage rates may be higher for hours worked outside of the « preferred » hours of 8 a.m. to 6 p.m. Monday to Friday than for hours worked in that period.

Hypothesis IV: monthly wage rates will be higher the greater are the number of hours worked during a month.

Hypothesis V: to the extent that a majority of workers may prefer to work in one geographical area (or set of areas) rather than others, the firms in that area may be able to attract workers even though they pay lower wages than firms in other areas.

A second source of wage differentials was elaborated on by Alfred Marshall. He argued that after the net advantages of different employments were accounted for, competition theory predicted that there would be a tendency towards equality of earnings per unit of work performed, or what he referred to as *efficiency earnings*.⁹ That is, according to this hypothesis observed wage variations should be approximated by ratios of workers' marginal productivities, *ceteris paribus*. This leads to the following hypotheses:

Hypothesis VI: wage rates will increase with increased education and training.

Hypothesis VII: wages rates will increase with increased experience.

⁸ Adam SMITH, *The Wealth of Nations*, Book 1, Chapter 10, edited by A. Skinner, Penguin Books, Middlesex, 1973, pp. 202-208.

⁹ A. MARSHALL, *Principles of Economics*, Macmillan, London, 1938, p. 549.

Hypothesis VIII: wage rates will be an increasing function of intelligence and physical aptitude.

Following from the work of George Stigler, a number of authors have suggested that wage differentials may persist in those labour markets in which the participants are not well-informed about market wage rates and working conditions.¹⁰ Thus, we have:

Hypothesis IX: persistent wage differentials may be observed when workers or employers are poorly-informed about wage and employment conditions in the market.

Furthermore, Stigler has also argued that in some situations employers may view wages and employee search costs (including selection, recruitment, and training costs) as substitutes, with high-wage firms attempting to maintain lower turnover rates and attract a given quality of workers with lower recruitment costs than low-wage firms who must search for replacements more often and use higher-cost recruitment channels.¹¹ Thus:

Hypothesis X: some firms may offer higher-than-average wages in order to reduce turnover rates and recruitment costs.

Hypothesis XI: firms which are expanding the size of their labour forces may raise their wages in an effort to reduce the recruitment costs which are associated with short-run inelasticities in the supply of labour.

Finally, although the presence of collusive or monopolistic forces within the labour market may not be consistent with the neoclassical theory of *competitive* labour markets, they are consistent with the neoclassical assumptions concerning the rationality of the economic actors. Therefore, on the supply side, it is not inconsistent with the neoclassical theory of the labour market for profit-maximising employers to deal with trade unions. In these cases, if less than 100 percent of the workers in a labour market are unionised there may be no tendency for union and non-union wages to be equalized. Similarly, on the demand side, a profit-maximising firm may be able to obtain monopsonistic dominance over a labour market. If it used this power to discriminate between employees, wage differentials may be established which will have no tendency to be reduced. That is:

¹⁰ cf. G. STIGLER, «Information in the Labour Market», M. R. FISHER, «Search in Labor Markets...», and L. J. MIRMAN and W. R. PORTER, «A Micro-economic Model of the Labour Market Under Uncertainty».

¹¹ *Ibid.*

Hypothesis XII: unionised and non-unionised workers within the same labour market may receive different wage rates.

Hypothesis XIII: monopsonistic employers may use their power to practice wage discrimination among their employees.

INSTITUTIONAL THEORY

Institutional models identify a second set of wage-determining forces, which are inconsistent with the basic neoclassical assumption that market participants continually maximise profits or net economic advantages. However, these models do not suggest that market behaviour is mainly undirected or chaotic; rather it is often assumed that participants' actions are governed by other goals considered to be equally or relatively more important than pecuniary gain.

One of the most frequently mentioned hypotheses associated with the institutionalist viewpoint is that wages will be higher in large firms than is warranted by worker quality differences or greater search costs. The rationale offered for this behaviour is that ownership may become increasingly divorced from control as firms become larger, resulting in a situation in which large firms will be dominated by their managerial staffs. To the extent that managers are less interested in profit-maximisation than are the owners (shareholders) these firms' primary goals may no longer be to maximise profits. In particular, the managers of these firms may be much more inclined to distribute revenue to their workers, in the form of increased wages, than the profit-maximisation hypothesis would predict.¹² Accordingly:

Hypothesis XIV: the larger is the size of a firm, the higher will be the wages that it will pay.

A closely-related hypothesis is that the wage rates which a firm pays will be positively correlated with its profitability. The argument which is made in this case is that when economic profits are being earned those who are responsible for personnel relations may direct some portion of those profits into wages and fringe benefits in order to «buy» a reduction in industrial unrest.¹³ *In particular, as the firm's*

¹² For an excellent analysis of the goals of managers, see: R. L. MARRIS, *The Economic Theory of «Managerial Capitalism»*, Basic Books, New York, 1964, pp. 46-109.

¹³ cf. L. G. REYNOLDS, *The Structure of Labor Markets*, Harper and Brothers, New York, 1951, pp. 162-166; D. I. MACKAY, et. al., *Labour Markets Under Different Employment Conditions*, p. 391; A. REES and G. P. SHULTZ, *Workers and Wages in an Urban Labor Market*, p. 7; and D. G. BROWN, «Inter-industry Wage Structure in Manufacturing», *Industrial and Labor Relations Review*, Vol. 16, No. 1, October 1962, pp. 45-46.

owners can be expected to judge the firm's financial success by comparing its profits with the profits of other firms in the same industry, we hypothesize that:

Hypothesis XV: the more profitable is a firm relative to other firms in the same industry, the higher will be its wage scale.

A similar argument, following from the previous one, is that product market monopolists, having profits which are higher than normal, will pay above average wage rates.¹⁴

Hypothesis XVI: product market monopolists will pay higher wages than competitive firms.

Finally, to the extent that managers are more aware of their counterparts within the same industry than within other industries, the desire for peer approval may induce a degree of industry wage conformity which is not related to labour market forces.¹⁵ Hence:

*Hypothesis XVII: inter-firm wage differentials may result from intra-industry wage patterns which are not responsive to the forces of the labour market.*¹⁶

EMPIRICAL RESULTS

Our purpose in writing this paper was to test the assumption made in the job search literature that workers searching for jobs in competitive, non-unionised labour markets would be faced with persistent wage differentials. Ideally, therefore, we would have liked to have identified a perfectly competitive labour market in which all workers and all jobs were completely homogeneous and then to have observed the conditions under which wage differentials (if any) were generated in that market.

¹⁴ cf. A. REES and G. SHULTZ, *Workers and Wages in an Urban Labor Market*, p. 7; L. W. WEISS, «Concentration and Labor Earnings», *American Economic Review*, Vol. 56, No. 1, March 1966, p. 99; and R. A. LESTER, «A Range Theory of Wage Differentials», *Industrial and Labour Relations Review*, Vol. 5, No. 4, July 1952, p. 485.

¹⁵ cf. N. W. CHAMBERLAIN and J. W. KUHN, *Collective Bargaining*, Second Edition, McGraw-Hill, Toronto, 1965, pp. 222-231; L. W. WEISS, «Concentration and Labor Earnings», p. 99; and L. G. REYNOLDS, «Wage Differences in Local Labor Markets», *American Economic Review*, Vol. 36, No. 3, June 1946, p. 366.

¹⁶ cf. L. W. WEISS, «Concentration and Labor Earnings», p. 99; L. G. REYNOLDS, *The Structure of Labour Markets*, Harper and Brothers, New York, 1951, p. 157; and P. KUMAR, *Relative Wage Differentials in Canadian Industries*, Queen's University, Kingston, Ontario, 1974, p. 9.

However, no such market exists. Accordingly, we attempted to choose a labour market which reflected the homogeneous, competitive ideal of the job search literature as closely as possible. The market investigated was that for clerk-typists in the central business district of Calgary, Alberta.

This market was chosen for a number of reasons. First, within this market there are a large number of workers performing essentially the same set of tasks.¹⁷ In our survey we included only those jobs which involved copy typing and routine clerical work and excluded those which involved the use of shorthand or the operation of a switch-board.) Second, as the central business district of Calgary is very compact and easily accessible from all parts of the city, the market cannot be said to be divided in a geographic sense. Finally, the length of the work week, the cyclical nature of employment, and the provision of such perquisites as coffee breaks, vacations, and sick leave are fairly standard across firms in this market. Thus, this market reflects, perhaps as closely as any, the assumptions of a perfectly competitive labour market.

In order to collect the necessary data, 10 percent of all firms in the central business district were contacted. 92 firms indicated that they employed one or more clerk-typists. Of these, 73 (79 percent) agreed to allow us to interview them.¹⁸ The data was then gathered by verbally administering two questionnaires in each firm. The first of these was given to a clerk-typist and was used to determine personal characteristics such as age, sex, education, and experience.¹⁹ The second questionnaire was given simultaneously to the clerk-typist's supervisor. This questionnaire was used to identify various aspects of the firm's wage policy.

Unfortunately, constraints of time and money prevented us from returning to the same firms in order to follow the development of their

¹⁷ *Ex post*, we estimated that there were approximately 1400 clerk-typists in the central business district.

¹⁸ *The small sample size leads to the necessity to interpret with some caution the results which follow. However, it should be pointed out (a) that even in the longest of our regression equations, 73 observations provides us with 53 degrees of freedom and (b) that previous studies in this field have also found it necessary, for cost reasons, to limit the number of firms interviewed. (R. Evans, in «Worker Quality and Wage Dispersion...», interviewed only 20 firms; and A. Rees and G. Shultz, in Workers and Wages in an Urban Labor Market, interviewed only 74 firms.)*

¹⁹ For additional information concerning the responses of these clerk-typists see: C. J. BRUCE and J. H. MARSHALL, «Job Search and Frictional Unemployment: Some Empirical Evidence», *Relations Industrielles/Industrial Relations*, Vol. 31, No. 3, 1976, pp. 402-415.

wage policies over a number of years. As a result it was not possible to determine directly whether the wage differentials which we observed represented an equilibrium situation. However, an analysis of the wages of the firms in our sample over the four years preceding our study indicates a remarkable stability in the wage distribution, implying that the market in question had approached a long-run equilibrium.²⁰

The average monthly wage being paid by the 73 firms was \$544.27, with an inter-decile range of \$175. The standard deviation of the distribution was \$70.81, giving a coefficient of variation of 13.01 percent. Analysis of the causes of these wage differentials proceeded in three steps:

NEOCLASSICAL HYPOTHESES

First, we wished to determine the extent to which the neoclassical hypotheses could explain the observed wage differentials. Accordingly, monthly wages were regressed on eight independent variables. These were:

Fringe Benefits (Hypothesis I): the employer's estimate of the dollar value of non-wage benefits. (The coefficient on this variable was expected to have a negative sign.)

Hours Worked (Hypothesis IV): the average number of straight-time hours worked per month. (A positive correlation with wages was expected.)

Education (Hypothesis VI): as all of the workers interviewed had completed high school and none had completed university, it was possible to represent education through the use of two dummy variables: «completed business or technical school», and «completed some business or technical school». (This variable was expected to be positively correlated with wages.)

Experience (Hypothesis VII): the number of months experience which the clerk-typist had in that occupation.²¹ (A positive correlation with wages was expected.)

²⁰ The Spearman rank correlation coefficient comparing the wage distributions of July 1972 and July 1975 was 0.573. This is significant at the 1 percent level.

²¹ Often age is also used as an independent variable in equations such as this. We did not include it, however, as we found it to be highly correlated with experience. Also, a separate variable measuring the clerk-typist's experience with her present firm was included in the initial regression but its statistical insignificance and the need to maintain sufficient degrees of freedom led to a decision to drop the variable in the final model.

Percentage of Time Typing (Hypotheses VI and VII): the approximate percentage of time spent typing (as reported by the clerk-typist) was included as a further indication of the productivity of the employee. It was our assumption that the more capable was an employee, the more varied would be the tasks given to her. Therefore, we hypothesised that, to the extent that an increase in time spent typing would reflect a decrease in the variety of tasks performed, this variable would be negatively correlated with the wage rate.

Test of Applicants (Hypothesis X): on the assumption that those firms which were following a policy of offering high wages in order to attract well-qualified workers would wish to assure themselves of the qualifications of their applicants, each firm was asked whether it used a testing procedure to screen applicants. A dummy variable, with an expected positive sign, was included to indicate whether the firm had used such a procedure.

Changes in Employment (Hypothesis XI): a dummy variable was used to indicate whether the firm had increased the number of clerk-typists which it employed within the last 12 months. (The sign on the coefficient was expected to be positive.)

Union (Hypothesis XII): as 10 of the clerk-typists interviewed belonged to unions, (primarily in the public sector), a dummy variable was used to indicate whether the clerk-typist in question belonged to a union. (Again, the sign on this variable was expected to be positive.)

Hypotheses II, III, IV, VIII, and XIII were not tested as the sample was chosen in such a way that no measurable differences among workers or firms were observed with respect to these variables. Hypothesis IX will be tested separately below.

Logarithms of all of the quantifiable variables were taken and the technique of ordinary least squares was used to regress monthly wage rates on the eight variables listed above. The results are summarised in Table 1.

Four variables proved to be significant at the 5 percent level (one-tailed test). These were: education, experience, hours worked per month, and test of applicants. Surprisingly, neither the fringe benefits variable nor the unionisation variable proved to be significant. One possible reason for the low correlations observed between fringe benefits and wages may have been the difficulty involved in collecting accurate data with respect to this variable. However, an alternative explanation is that applicants for jobs are so poorly-informed concerning fringe

TABLE 1
Explanation of Monthly Wage Differentials
Using Neoclassical Variables Only

<i>Independent Variable</i>	<i>Coefficient</i>	<i>Standard Error</i>	<i>t-Statistic</i>
Constant	2.781	1.389	2.002 ^a
Education:			
High School only	—	—	—
Some Business school	0.027	0.035	0.782
Business school	0.068	0.026	2.640 ^a
Unionisation of Clerk-typists			
No union	—	—	—
Union	0.045	0.038	1.181
Test of Applicants			
No test	—	—	—
Test	0.049	0.027	1.831 ^b
Changes in Employment:			
Stable or decreasing	—	—	—
Increasing	- 0.014	0.027	- 0.519
(1n) Months of experience	0.055	0.010	5.467 ^a
(1n) Percentage of time typing	- 0.016	0.015	- 1.061
(1n) Fringe benefits (\$/mo.)	0.006	0.018	0.309
(1n) Hours per month	0.656	0.275	2.387 ^a
Observations: 73			
R ² : 0.5288 \bar{R}^2 : 0.4636			
Standard Error: 0.0956			

^a Significant at 1 percent level (one-tailed test)

^b Significant at 5 percent level (one-tailed test)

benefits that it is only earnings *net* of fringe benefits which tend to be equalised across firms.

As a crude test of this hypothesis, employers and employees in our survey were asked, separately, to list the fringe benefits available in their firm. Excluding coffee breaks, vacations, and sick leave, which were reported universally, the answers to this question are summarised in Table 2. The first column in this table indicates the number of times that both the employer and the employee responded that a fringe benefit was available. The second column indicates the number of times that only the employer responded and the third column indicates the number of cases in which only the employee responded. The employees were also asked whether there were any fringe benefits which they did not receive but would like to receive. The final column in Table 2 indicates the number of cases in which employees indicated that they would «like to have» a fringe benefit which they were already receiving.

TABLE 2
Number of Fringe Benefits Indicated by Employers and Employees

<i>Fringe Benefit</i>	<i>Employer and Employee</i>	<i>Mentioned by Employer only</i>	<i>Employee only</i>	<i>«Incorrect» Response By Employee</i>
Pension	15	28	—	1
Life insurance	26	29	—	3
Medical insurance	29	21	2	6
Dental plan	3	2	1	—
Disability insurance	7	35	—	—
Drug plan	1	44	—	—
Discounts (on Employer's product)	2	6	3	—
Savings plan	6	3	1	—
Stock option	1	3	4	—
Social club	1	—	5	—
Christmas bonus	—	2	2	—
Profit sharing	—	3	—	—

The data in Table 2 clearly indicates that workers in this occupation are not well-informed concerning the number of fringe benefits made available to them by their present employer. We would not expect workers who were in the process of looking for jobs to be better-informed. Thus, as the employers interviewed by us would have included the costs of all of their fringe benefits in calculating the figure used in our regression, and as potential employees could have been expected to include only a fraction of these costs in comparing the net advantages of different employments, the failure of the fringe benefits variable to contribute to the explanation of wage differentials was not surprising.

The unionisation variable may not have proven significant because the majority of observations in that category came from the public sector, where workers won the right to certify only very recently. That the percentage of time typing variable did not prove to be significant may have resulted from the fact that typing is viewed as an onerous task relative to the other duties performed by clerk-typists. This may result in some firms paying high wages to those employees who spend the greatest amount of time typing. Finally, the lack of significance of the variable which measures changes in the firm's employment was not surprising in the sense that many other authors have found the same result. *The most plausible reason for the low t-statistic on this variable would seem to be that none of the «expanding» firms had added more than two clerk-typists. In a competitive labour market, such as the one being investigated here, such a small change in employment should not*

cause «expanding» firms to encounter any greater supply inelasticities than would be encountered by firms which were just replacing normal labour turnover.

INSTITUTIONAL HYPOTHESES

To determine the explanatory power of the institutional theory, the equation summarised in Table 1 was re-estimated with the addition of proxies for the four institutional hypotheses listed in the first section of this paper. The proxies used were:

Total Employment of Firm (Hypothesis XIV): dummy variables representing employment levels of 50-449 workers and 500 or more workers were used to represent the size of the firm. (A positive correlation with wages was expected.)

Profitability of Firm (Hypothesis XV): *in the absence of any precise data on the profitability of the firms in our sample — many firms were privately-owned and therefore did not publish financial data — we asked each employer to characterise profits in his firm relative to the rest of his industry as «high», «average», or «low».* Dummy variables were used to represent the latter two responses as well as «don't know», or «not applicable», as in the case of government employees. (The coefficients on these variables were expected to have negative signs as «high profits» was used as the reference category.)

Degree of Concentration (Hypothesis XVI): a dummy variable representing the estimated number of product market competitors was used as a proxy for the degree of industry concentration. (This variable was expected to be positively correlated with wages.)

Industry Affiliation (Hypothesis XVII): five industry groups were identified: petroleum, government, insurance, finance, and «other». As the petroleum industry is generally assumed to pay the highest wages in Calgary, it was used as a reference category and the other industries were entered as dummy variables. (The signs on the coefficients of these variables were expected to be negative.)

The resulting equation is summarised in Table 3. Five of the variables in this equation proved to be significant at the 5 percent level. Three of these — education, experience, and hours worked — are associated with neoclassical theory. However, two of the significant variables are associated with the institutional body of theory. The first of these, the industry affiliation variable, proved to be significant in the sense that firms in both the financial sector and in «other» industries,

(including retail firms, employment bureaus, and real estate agencies), paid lower wages than did firms in the petroleum industry, *ceteris paribus*.

The size of the firm, as measured by the number of employees, also proved to be significant but did not have the expected sign. The institutional theory leads us to expect that wages will increase with firm size. But Table 3 clearly indicates that in this market, firms with 50-499 employees pay *lower* wages than firms with fewer than 50 employees. This would be consistent with neoclassical theory if employees could be shown to have a strong preference for firms with 50-499 employees. However, when the clerk-typists in our survey were asked what size of firm they would prefer to work for, a preference was shown for firms of approximately 50 employees. (The mean preferred size was 59.5 employees, while the median preferred size was 48.)²² Thus, an explanation of the negative sign on the 50-499 employees variable would have to be based upon some alternative hypothesis. One possible hypothesis is that the close, personal contact between employer and employees in very small firms (less than 50 employees) may make the employer responsive to wage requests which are based on non-market criteria, thereby resulting in those firms paying relatively high wages. Therefore, there may be a middle range of firms, in which the employment relationship has become depersonalised, where wages will fall below those paid by small firms. Only as firms increase in size beyond this middle range will wages begin to rise again. This hypothesis is partially supported by our findings as the sign on the coefficient for large firms is positive, (although not significant).

The coefficients on the concentration and profitability variables were also insignificant. A possible reason for the lack of significance of these variables was their statistical interdependence.

Finally, it is important to note that the addition of the four institutional variables improved the explanatory power of the regression significantly. The R^2 statistic increased from .53 in the first equation to .70 in the second; while the adjusted R^2 (\bar{R}^2) rose from .46 to .59.²³ Thus, there would appear to be strong evidence to indicate that institutional

²² J. H. MARSHALL, *Job-Search Behavior in a Centralized Market for Homogeneous Labour*, Unpublished MA Thesis, University of Calgary, 1969, p. 69.

²³ An F-test was used to determine whether the increase in the explanatory power of the second regression was significant. The resulting F-statistic of 2.71 proved to be significant at the 1 percent level.

factors are operative in the determination of wage differentials in this labour market.

INFORMATIONAL VARIABLES

One neoclassical hypothesis which was not tested in the equations reported in Tables 1 and 3 was the hypothesis that wage differentials may be related to the amount of information possessed by the participants in the labour market (Hypothesis IX). The main reason for excluding this variable from the regression analysis was that the effect of the absence of information on wage rates is not unidirectional. That is, the expected effect of a lack of information is *not* to either raise or lower the wage rate but to cause the wage rate to differ from the market-determined wage.

To test this hypothesis, therefore, it was first necessary to calculate the wage rate which the market would dictate that the firm «should» by paying and then to compare this with the wage rate which the firm was actually paying. Hypothesis IX would then lead us to predict that the absolute difference between these two wage rates would be inversely correlated with the amount of information possessed by the firm.

As a proxy for the market-determined wage rate we used the expected wage rates given by the regression reported in Table 3. The absolute values of the residuals derived from this regression then served as a measure of the difference between the actual and the market wage rates.

In order to derive a proxy for the amount of labour market information possessed by each firm we asked whether it attempted «...to be familiar with wages offered to clerk-typists by other firms in [Calgary]» and, if so, «...how [it obtained] this information...». Those firms answering that they attempted to remain familiar with local wages through the use of surveys — for example, government and trade association surveys — were considered to be well-informed; while those who made no effort to remain informed or who relied on informal sources, were considered to be poorly-informed.²⁴

Our null hypothesis was then that the absolute values of the wage residuals for those firms which were (by our definition) poorly-informed would not be greater (on average) than those for the firms which were well-informed. To test this hypothesis a t-statistic was formed to compare

²⁴ On this basis, 39 firms were found to be well-informed and 34 to be poorly-informed.

TABLE 3
Explanation of Monthly Wage Differentials Using
Both Institutional and Neoclassical Variables

<i>Independent Variable</i>	<i>Coefficient</i>	<i>Standard Error</i>	<i>t-Statistic</i>
Constant	3.880	1.297	2.992 ^a
Education			
High School only	—	—	—
Some business school	.013	.032	0.400
Business school	.077	.023	3.326 ^a
Unionisation of Clerk-typists			
No union	—	—	—
Union	.138	.096	1.441
Test of Applicants			
No test	—	—	—
Test	.018	.026	0.705
Changes in Employment			
Stable or decreasing	—	—	—
Increasing	-.028	.027	-1.066
(1n) Months of Experience	.059	.009	6.448 ^a
(1n) Percentage of Time Typing	-.004	.014	-0.278
(1n) Fringe Benefits	.002	.020	0.112
(1n) Hours Worked	.450	.256	1.757 ^b
Industry Affiliation			
Petroleum	—	—	—
Government	-.123	.099	-1.245
Insurance	-.055	.046	-1.198
Finance	-.116	.040	-2.900 ^a
Other	-.102	.029	-3.450 ^a
Number of Product Market Competitors			
Less than 10	—	—	—
10 or more	.032	.027	1.216
Total Employment of Firm			
Less than 50	—	—	—
50-499	-.087	.036	-2.406 ^a
Over 500	.024	.037	0.666
Profitability of Firm			
High	—	—	—
Average	-.023	.031	-0.740
Low	-.050	.044	-1.167
Don't know	-.035	.042	-0.834

Observations: 73

R²: 0.7012 \bar{R}^2 : 0.5941

Standard Error: 0.0831

^a Significant at 1 percent level (one-tailed test)

^b Significant at 5 percent level (one-tailed test)

the means of the two sets of residuals.²⁵ The value of this statistic proved to be 1.730, indicating that the null hypothesis was rejected at the 5 percent level of significant (one-tailed test). Thus, we conclude that there is evidence to support the hypothesis that significant wage differentials may be generated in those situations in which firms are poorly-informed about labour market conditions.

SUMMARY AND CONCLUSIONS

In this paper we have contributed to the literature on wage differentials in a number of different ways:

First, due to lack of information, most previous studies have been restricted to inter-industry data and to data which deals primarily with the manufacturing sector. By using a questionnaire technique to gather our information we have been able to provide evidence on wage differentials at the inter-firm level for both the manufacturing and non-manufacturing sectors. This evidence has been used to re-test many of the hypotheses put forward in earlier studies.

Secondly, we have been able to provide evidence with respect to a number of hypotheses which had not previously been tested rigorously. We have shown, for example, that in the Calgary labour market for clerk-typists, there is no statistical support for the hypothesis that the wage rate which a firm pays will be related to the use of tests to screen applicants. Also, of particular importance is the evidence which we have provided to indicate that both the size of a firm and its knowledge of labour market conditions will significantly influence its decisions concerning the wage rates which it will pay. Furthermore, we have shown that the poor performance of the fringe benefits variable in explaining wage differentials in this market may be due to the lack of information possessed by workers concerning the fringe benefits available to them.

Finally, we were able to test the hypothesis that variables associated with the institutional body of theory are capable of contributing to the explanation of the observed wage differentials. We found both that the institutional variables improved the percentage of wage devia-

²⁵

$$t = \frac{\bar{u}_0 - \bar{u}_1}{\sqrt{\frac{(n_0 - 1) S_0^2 + (n_1 - 1) S_1^2}{n_0 + n_1 - 2}} \sqrt{\frac{1}{n_0} + \frac{1}{n_1}}}$$

where \bar{u}_i is the mean of series i , n_i is the number of observations in series i , s_i^2 is the variance of series i , $i = 0$ indicates the residuals associated with the poorly-informed firms, and $i = 1$ indicates the residuals associated with the well-informed firms.

tions explained from 46 percent to 59 percent and that the firm size and industry affiliation variables were statistically significant. One important implication of this finding is that when institutional forces influence the wage distribution, it becomes possible that wage differentials will exist even in those cases in which both workers and employment opportunities are seen to be homogeneous. We may conclude, therefore, that job search theories which require the existence of persistent wage differentials may reflect the operation of actual labour markets — to the extent that these theories are consistent with the institutional approach to the modelling of the labour market.

Les sources de différences de salaire dans un marché de concurrence

Peu d'études ont été faites pour expliquer pourquoi, dans un marché du travail localisé, les différences de salaire sont si grandes et si persistantes, si ce n'est qu'elles résultent d'un manque d'information tant de la part des travailleurs que des employeurs. À partir de cette hypothèse peu justifiée, l'étude ci-dessus rend compte d'une enquête instituée auprès de dactylos et de leurs employeurs au sujet de ces différences dans les traitements.

L'article comprend trois parties: la première partie traite de ce qui s'est écrit sur la caractérisation des différences de salaire; la seconde décrit la nature de l'enquête et en analyse les résultats; la dernière, enfin, dégage quelques conclusions de ce qu'elle a révélé.

Deux théories existent relativement aux causes des différences de salaire. La première, qu'on désigne sous le nom de «théorie néo-classique» repose sur l'hypothèse que les entreprises cherchent à maximaliser les profits et les travailleurs à maximaliser les avantages économiques. La seconde théorie est dite «théorie institutionnelle» et elle repose sur le fait que les employeurs ne cherchent pas à maximaliser les profits ou que les travailleurs agissent d'une façon non rationnelle dans le sens économique du terme.

Selon la première théorie, dans une situation de marché concurrentiel, les taux de salaire ont tendance à s'égaliser au bout du compte en autant qu'employeurs et travailleurs disposent d'une information parfaite et que les salariés n'ont pas expérimenté les coûts de la mutation d'une entreprise à l'autre. Ce ne sont pas les taux de salaire qui ont tendance à s'équilibrer, mais l'ensemble des avantages et des inconvénients de l'emploi, d'où toute une série d'hypothèses: 1° les taux de salaire seraient plus bas dans les entreprises qui accordent plus d'avantages sociaux; 2° les salaires seraient plus bas là où l'on retire plus de satisfaction du travail et où l'on trouve des conditions plus agréables; 3° les taux de salaire seraient plus élevés lorsque le travail ne s'effectue pas pendant les heures normales; 4° plus le traitement mensuel est élevé, plus les heures de travail sont longues; 5° si les salariés préfèrent travailler dans un territoire donné plutôt que dans un autre, ils seront davantage attirés par les entreprises

de ce territoire, même si les traitements sont moindres; 6° considéré sous d'autres aspects, les taux de salaire augmenteraient en fonction du degré de scolarité; 7° ils augmenteraient aussi selon le niveau d'expérience; 8° ils augmenteraient encore en fonction de l'intelligence et des aptitudes physiques du travailleur; 9° sur un autre plan, on peut observer des différences de salaire persistantes lorsque les salariés ou les employeurs sont peu informés des salaires et des conditions de travail sur le marché; 10° un certain nombre d'entreprises paient des salaires plus élevés afin de réduire le taux de roulement de la main-d'œuvre et d'abaisser le coût du recrutement; 11° les sociétés en état de croissance peuvent augmenter les salaires afin de réduire le coût du recrutement; 12° enfin, d'un autre point de vue, des salariés syndiqués et des salariés non syndiqués, à l'intérieur d'un même marché, peuvent toucher des traitements différents; 13° un employeur en situation de monopole peut utiliser son pouvoir pour établir de la discrimination parmi ses employés.

Selon la théorie dite institutionnelle, d'autres facteurs seraient à l'œuvre qui sont incompatibles avec le postulat de la théorie néoclassique selon lequel les participants tendraient toujours à maximiser les profits et les avantages économiques nets. Suivant cette deuxième théorie, les salaires seraient plus élevés que ne le justifient les différences de qualité et le coût plus considérable dans les grandes entreprises du recrutement. La raison en serait que, à mesure que les entreprises s'agrandissent, il y a dissociation entre les propriétaires et les dirigeants, ceux-ci étant moins enclins à maximaliser les profits et, par le fait même, portés à en distribuer les revenus aux salariés sous forme d'augmentation des salaires; d'où l'hypothèse: 14° plus une entreprise est considérable, plus les salaires sont élevés. De plus, il peut arriver aussi que les responsables du personnel puissent distribuer une partie des profits en salaires ou en avantages sociaux, surtout s'ils estiment que les profits de l'entreprise se comparent avec ceux d'autres sociétés dans la même entreprise, d'où l'hypothèse suivante: 15° plus une entreprise réalise de profits par rapport aux autres dans une même industrie, plus l'échelle des salaires sera élevée. La même remarque s'applique également aux entreprises monopolisant un marché: 16° l'entreprise qui détient le monopole d'un marché paie des salaires plus élevés que les entreprises concurrentes. Enfin, une dernière hypothèse: 17° les différences de salaire à l'intérieur d'une entreprise peuvent résulter d'écarts dans les grilles de salaire à l'intérieur de l'industrie sans que les forces en présence sur le marché du travail n'en soient responsables.

L'auteur a ensuite tenté de vérifier un certain nombre des hypothèses précédentes, tant celles de la «théorie néo-classique» que celle de la «théorie institutionnelle» auprès du marché des dactylos dans le centre des affaires de Calgary en Alberta après avoir pris contact avec dix pour cent des entreprises. Pour les fins de l'enquête, 92 entreprises employaient une ou plusieurs dactylos et 73 ont permis de procéder à l'entrevue à partir de deux questionnaires, l'un s'adressant aux dactylos pour connaître leurs caractéristiques personnelles et l'autre, à leurs surveillants, pour s'enquérir de la politique salariale des entreprises.

Au moyen de cette enquête, il s'agissait de savoir dans quelle mesure les hypothèses de l'une et de l'autre théories pouvaient expliquer les différences de salaire.

Des résultats de cette enquête, l'auteur dégage les conclusions suivantes.

En premier lieu, par l'utilisation d'un questionnaire technique pour recueillir les informations, il a été possible d'obtenir des données sur les différences de salaire entre les sociétés à la fois dans le secteur secondaire et le secteur tertiaire.

Deuxièmement, il a été également possible de vérifier un certain nombre des hypothèses qui ne l'avaient pas été encore, du moins d'une façon rigoureuse. Par exemple, en ce qui concerne les dactylos de Calgary, l'hypothèse suivant laquelle les taux de salaire payés par une firme seraient reliés à l'utilisation de tests d'embauchage ne se justifie pas statistiquement. De même, on s'est rendu compte que l'importance de l'entreprise et sa connaissance des conditions du marché du travail ont une influence significative sur les décisions prises en matière de salaire. De plus, il a été démontré que le peu d'importance de la variable des avantages sociaux pour expliquer les différences de salaire peut être occasionnée par un manque d'information.

En troisième lieu, il a été démontré que les hypothèses selon lesquelles les variables se rattachant à la théorie dite institutionnelle peuvent contribuer à l'explication des différences de salaire observées. On y a découvert que lorsque les forces institutionnelles influencent les taux de salaire, il est possible que des différences existent même là où la qualité de la main-d'œuvre et les occasions d'emploi paraissent uniformes.

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