Inter-Industry Wage Differentials in the Canadian Economy

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Abstract: This study estimates inter-industry wage differentials in Canada for eleven aggregated industry groups using the 1998 Survey of Labour and Income Dynamics and for seven aggregated industry groups using the 1991 and 1996 Canadian Censuses. The findings reveal that inter-industry wage differentials exist in Canada and follow a pattern consistent to historical results found in other capitalist countries. Investigating the main explanations of industry wage differentials for similarly skilled workers, it was discovered that no one theory has the power to fully account for these disparities. Within the competitive explanations, compensating differentials demonstrated the greatest promise to explain the wage premiums associated with the primary and construction industries, while occupational structure displayed the most potential for the professional, scientific and technical services industry. Within the institutional explanations, unionization appeared to be accountable for the wage premiums associated with the health care and social assistance and the educational services industries. Examining the efficiency wage explanations, the results provided inconclusive evidence whether the wage premiums associated with the finance, insurance and real estate and the transportation, communication and utilities industries, reflected economic rents or competitive factors. However, using the 1998 Adult Learning and Training Survey, the provision of employer sponsored training within those industries was found to be a potential motive for the payment of efficiency wages.

I. Introduction

The pattern of inter-industry wage differentials generated by market-based economies is one of the most enduring regularities in the study of labour economics. Consistently, industries characterized as being high wage or low wage industries continue to be so over time and space. Even after controlling for differences in human capital among workers and other non-pecuniary aspects of jobs, inter-industry wage differentials remain large. Various explanations have been offered as to why employers in certain industries pay higher wages to workers with apparently similar skill sets than those in other industries. The major models or explanations consist of competitive models, institutional explanations, and efficiency wage theories. Competitive models include: occupational structure, which entails that industry wage differentials are based on the occupational composition of an industry; compensating differential explanations, which are based on the notion of a wage premium for non-standard work schedules, being faced with the risk of injury or unemployment, and other compensating factors; and the unmeasured labour quality theory, which argues that individual-based micro data sets do not adequately control for labour quality and it is thus being accounted for by industry controls instead of human capital controls. Institutional explanations argue that the presence of unionization in an industry can have significant influence over wages, while efficiency wage theories are based on the notion of rent-sharing with employees to improve worker productivity and worker attachment. Within the efficiency wage framework are several models or rationales for their existence. The shirking model emphasizes the payments of wage premiums in order to deter shirking by workers. Selection pool models emphasize the payment of a wage premium to attract a higher quality labour pool for hiring purposes. Fairness wage models rationalize that firms pay wage premiums in order to improve internal equity, social conventions and employee loyalty. Finally, turnover models argue that firms pay wage premiums in order to minimize turnover costs and encourage longer job tenure.

Numerous studies have explored these explanations with varying results and conclusions. Most economists have attempted, unsuccessfully, to account for industry wage differentials through one model. However, the consistent result of the extensive body of research is that there is no model that can possibly fit all the facts as to completely explain inter-industry wage differentials. According to Gibbons and Katz (1992), no single theory can provide a complete explanation for inter-industry wage differences, because different theories are of greatest importance in different sectors of the labour market. Studies concerning the explanations of inter-industry wage differentials provide valuable insight into the working of the labour market for policy makers and others alike. Understanding the motives of employers for paying certain wages is crucial in developing important labour market policies. The explanations of inter-industry wage differentials can have significant impact in addressing the problem of wage rigidity in high wage industries, which can cause serious unemployment ramifications during economic downturns.

This study has three principle objectives. First, it explores the current nature of inter-industry wage differentials in Canada and compares the findings to the historical differentials for Canada and other capitalist economies. Secondly, the study considers the issue of the phenomenon that similarly skilled workers are paid differently across industries. Lastly, the study explores the main explanations of inter-industry wage differentials, outlined above, in an attempt to discover the motives or foundations for the payment of wage premiums to similarly skilled workers by high wage industries. This final objective will also have the purpose to show that no single theory can possibly have the power to fully explain inter-industry wage differentials.

The first objective will be accomplished by estimating an industry wage model with controls for demographics, human capital, occupational structure and employment characteristics. This will enable us to establish an industry wage structure for Canada. The 1998 Survey of Labour and Income Dynamics (SLID) for Canada will be used as the principle data source for this regression and for all other regressions unless otherwise stated. The second objective will be achieved by estimating an industry wage model for similarly skilled workers, which only includes controls for human capital and demographics. This will allow us to identify the industry wage structure and wage premiums for similarly skilled workers in Canada. The final objective will require the estimation of a number of models. The competitive explanation of occupational structure will be explored by measuring the impact of occupational structure on the industry wage premiums for similarly skilled workers. This will be accomplished by adding occupational dummy variables to the industry wage model for similarly skilled workers. Employment insurance and worker compensation benefit models will be estimated to examine the compensating differential explanations. This will allow us to gauge if the wage premiums for similarly skilled workers in the high wage industries are associated with a greater risk of injury or of unemployment. The unmeasured labour quality explanation will be considered by simply examining the findings of previous studies. Limited data has restricted our ability to perform an empirical analysis. The institutional explanation of unionization will be investigated by measuring the impact of unionization on the industry wage premiums for similar skilled workers. This will be accomplished by adding union and collective agreement dummy variables as controls to the industry wage model estimated for occupational structure. For efficiency wage explanations, the presence of rent sharing within industries will be explored by estimating a job tenure model. The turnover and selection pool rationales for the payment of efficiency wages will be considered by estimating an employer sponsored training model using the 1998 Adult Education and Training Survey for Canada. This will be done in order to provide greater insight into efficiency wage explanations.

The plan of this study is as follows. In section II, a review of the literature will be presented in order to outline the studies that formed the basis of this paper. In section III, the methodology and data sources used in this study will be presented, while section IV will provide evidence of inter-industry wage differentials in Canada. Section V will explore industry wage differentials for similarly skilled workers and section VI will consider the major explanation for those differentials, including the competitive, institutional and efficiency wage explanations. In Section VII, employer sponsored training is explored within the context of the turnover and selection pool rationales of efficiency wages. Section VIII is the conclusion of the study.

II. Literature Review

A vast body of literature has examined the existence, structure and causes of inter-industry wage differentials. In their benchmark study, Krueger and Summers (1988) used the 1974, 1979 and 1984 Current Population Surveys taken in May for the United States to estimate several standard cross-section wage equations in order to examine the importance of industry affiliation in explaining relative wages. Using two digit industry groupings and controlling for human capital and demographic background, they discovered that the industry coefficients had a sizeable impact on relative wages and were of great importance in explaining variations in earnings. They also provided observations concerning the industry wage structure, finding that durable manufacturing products and chemical industries tend to be high wage industries while wholesale, retail and service industries tend to be low wage industries.

Gera and Grenier (1994) produced a comparable study to that of Krueger and Summers. Using the 1986 Labour Market Activity Survey for Canada, they estimated industry wage differentials for two digit industry groupings while controlling for human capital, demographic background and employment characteristics, such as occupation, employer size and unionization. Their results were very similar to those obtained by Krueger and Summers. They found that the industry coefficients were also of great importance in explaining variations in earnings in Canada and observed a similar industry wage structure to that found by Krueger and Summers for the United States. More recently, Gaux and Maurin (1999) using the 1995 Labour Force Survey of France estimated similar regressions to those of Krueger and Summers (1988) and Gera and Grenier (1994) and once again obtained very similar results. Also, all three of these studies found that inter-industry wage differentials are persistent over time and that workers appearing to be equally skilled are being compensated differently across industries

The findings of these three studies on the existence and structure of inter-industry wage differentials are consistent with the results obtain by countless other analyses performed on the subject in many countries and in earlier decades (Slichter, 1950; Cullen, 1956; Tarling and Wilkinson, 1982). However, results from numerous studies on the causes of inter-industry wage differentials for workers appearing to be equally skilled are not consistent and are the source of much debate. The unmeasured labour quality explanation and efficiency wage theories are at the heart of this debate. Using a longitudinal data set, the January 1984 CPS survey of displaced workers for the United States, Krueger and Summers (1988) were able to track workers across time that switched industries. Their results demonstrated that these workers experienced significant wage changes when switching industries that closely paralleled the industry wage structure discovered in their cross-sectional analyses, leading them to conclude against the unmeasured labour quality argument. Through observed variations in job tenure and quits, Krueger and Summers (1988) examined the relationship between turnover and industry wage premiums and discovered it to be negative. They found this result to be consistent with rent-sharing explanations of the labour market, such as those based on efficiency wages. Gera and Grenier (1994) performed comparable analyses for both unmeasured labour quality and efficiency wages and discovered very similar results. They concluded that industry wage differentials cannot be easily explained by unmeasured ability or observed compensating factors and that these differentials appeared to be consistent with efficiency wage explanations.

Gaux and Maurin (1999) and Murphy and Topel (1987), on the other hand, performed very similar analyses to those of Krueger and Summers (1988) and Gera and Grenier (1994) and found in favour of the unmeasured labour quality argument. Gaux and Maurin (1999) examined the wage premiums of displaced workers who shift from one industry to another over time and discovered that these workers did not experience significant wage changes. However, they also identified that inter-industry wage differentials are only a minor component of inter-firm wage differentials. Murphy and Topel (1987) examined earnings growth for individuals who change industries using data drawn from a time series of two-year panels on individuals from eight (1977-84) annual demographic files of the Current Population Survey for the United States. They also discovered that these individuals did not receive the wage premium associated with their newly entered industry and concluded that unobserved differences in individuals' earning capacity account for the majority of observed cross-sectional wage differences. According to Gaux and Maurin (1999), the principle difference between the analyses of unmeasured labour quality performed by them and Murphy and Topel (1987) to that performed by Krueger and Summers (1988) was the level of industry aggregation. While Krueger and Summers (1988) used a highly aggregated seven-industry classification, Gaux and Maurin (1999) and Murphy and Topel (1987) used a far more disaggregated classification of about 140 industries. Gaux and Maurin (1999) indicate that the advantage of a highly aggregated industry classification is that it enables the use of Mellow and Sider's measurement-error information, while the disadvantage is the risk of aggregation bias.

As previously mentioned, Gibbons and Katz (1992) concluded that no single theory has the power to fully explain inter-industry wage differentials. Using January 1984 and 1986 Current Population Surveys of displaced workers for the United States, they found that unmeasured labour quality models do not explain findings of strong pair-wise correlations between industries that pay high average wages and industries that earn large profits, have high capital-to-labour ratios, and are populated by large employers, which Dickens and Katz (1987) found to be characteristics of high wage industries. They also discovered that efficiency wage models do not explain the observed high correlation of the industry wage premium across occupations. Their findings demonstrate the difficulty of explaining the causes of inter-industry wage differentials for similarly skilled workers through one theory.

III. Methodology and Data Sources

The major source of data that will be used throughout this study is the Survey of Labour and Income Dynamics (SLID) for 1998. The Canadian Censuses for 1991 and 1996 will be used in sections IV, V and VI, while the Adult Education and Training Survey for 1998 will be used in section VII. Inter-industry wage differentials are estimated for industries aggregated into 11 groupings when using SLID data and 7 groupings when using the other data sources. The difference between these industry groupings is that the health, professional, management and education industry groupings are all included within the other services grouping when using the Censuses and the AETS data. However, when using the SLID data they are not included in the other services grouping and are estimated separately. The fundamental weakness of this analysis is the over aggregation of the industry groupings due to data limitations with the public use micro data file. Although this study will provide results representative of the major groupings, these results may not necessarily be representative of the sub-industries within those groupings. For this reason, the tremendously aggregated grouping of manufacturing will be completely ignored in section VI when exploring the explanations of industry wage differentials. Nevertheless, the data associated with this grouping will be included in all the estimations of the study.

The samples taken from each survey include paid workers between the ages of 15 and 69 and exclude self-employed workers as well as those employed in the agricultural and public sectors. The analysis is based on the main job held by the individual during the reference year. When using SLID data, the main dependent variable is the implicit hourly wage rate in logarithmic form, which also includes tips, bonuses and commissions. Annual salary and wages in logarithmic form will be the main dependent variable when the Census data is used. The results are reported in terms of the industry coefficient dummy variables. As earlier research, these coefficients are restricted by the weight of their respective industry employment shares in such a way that their sum is equal to zero. This is done in order to allow the industry coefficient to represent the percentage difference between an employee in a given industry with the average employee in all industries. Thus, a positive industry coefficient indicates an above average wage rate or a high wage industry, a negative industry coefficient indicates a below average wage rate or a low wage industry and an industry coefficient close to zero indicates an average wage rate or a medium wage industry. This method was used by Krueger and Summers (1988) and by Gera and Grenier (1994). Explanatory variables for demographics, human capital, occupational structure and job characteristics are entered as controls in the estimations found in Section III, while the estimations found in the other sections control for different combinations of these variables.

Spearman rank correlation coefficients and the weighted adjusted standard deviation (WASD) of industry wage differentials are used to explore the ranking and dispersion of the industry wage differentials. WASD is the same measure used by both Krueger and Summers (1988) and Gera and Grenier (1994). It is calculated as follows:

$$WASD(B) = \{var(b) - \sum_{i=1}^{k} (w_i \sigma_i)^2 / K\}^{1/2}$$

var(b) = weighted variance of the estimated industry coefficients;

K= number of industries;

w_i = the weight of industry i, where the sum of the weights is equal to the number of industries;

σ_i = the estimated standard error of the industry i regression coefficient.

IV. Evidence of Inter-Industry Wage Differentials in Canada

This section investigates the nature of inter-industry wage differentials in Canada. Table 1 displays the estimated coefficients of the industry dummy variables for the 11 industry groupings using SLID data and controlling for demographics, human capital, occupational structure and job characteristics[1]. The 11 industry groupings include primary, manufacturing, construction, transportation, trade, finance, health, professional, management, education and other services. Table 2 displays the estimated coefficients of the industry dummy variables for an aggregated 7 industry groupings using the 1991 and 1996 Canadian Census data, while controlling for demographics, human capital and occupational structure. The 7 industry groupings include primary, manufacturing, construction, transportation, trade, finance and other services. In general, it is observed across all 3 years that trade and service industries are low wage industries, while construction, manufacturing, finance and transportation are high wage industries. In 1998, it can be seen from Table 1 that an employee in the primary industry earns on average 19% more than the average employee in all industries, while an employee in the trade industry earns on average 8% less than the average employee in all industries.

The industry coefficients for 1990 and 1995 are all statistically different from the mean even after controlling for demographics, occupational structure and human capital variables. In 1998, variables were added to control for certain job characteristics and the results obtained demonstrated that all the industry coefficients were again statistically different from the mean except for the aggregated health care industry. This result implies that industry variables are important in explaining variations in earnings. The

[1] The appendix provides detailed results of the regressions for Table1 and for the three columns of Table3. The complete regressions for the other tables can be obtained from the author.

WASD for 1998, which reveals the amount of variation within the industry groups, is about 8% while for 1990 and 1995 it is between 9% and 10%.

The results concerning inter-industry wage differentials for Canada are consistent with the findings of Gera and Grenier (1994) for Canada, Krueger and Summers (1988) for the United States and Goux and Maurin (1999) for France.

Table 1
Estimated wage differentials for industries, Canada, 1998

Industry	Industry coefficient[a]
Primary	0.192
	(0.011)
Manufacturing	0.030
	(0.005)
Construction	0.120
	(0.008)
Transportation, Communications and Utilities	0.080
	(0.008)
Wholesale and Retail Trade	-0.075
	(0.004)
Finance, Insurance and Real Estate	0.054
	(0.008)
Health Care and Social Assistance	0.017
	(0.007)
Professional, Scientific and Technical Services	0.071
	(0.009)
Management, Administrative and Other Support	-0.059
	(0.010)
Educational Services	0.030
	(0.009)
Other Services	-0.102
	(0.004)
Weighted adjusted standard deviation of differentials	0.081[b]
R^2	0.601
Sample Size	32,854

[a] Estimates are based on Survey of Labour and Income Dynamics, 1998. OLS are used. The other explanatory variables include experience, experience^2, education , job tenure, sex dummy, education/sex interaction, experience/sex interaction, marital status/sex interaction, 4 marital status dummies, 1 head dummy, 3 regional dummies, 24 occupation dummies, 1 full time dummy, 1 union dummy, 4 plant size dummies, 1 multiple location dummy and a constant.
[b]The weights used are the employment shares for 1998.
*all figures in parentheses are standard errors.
* the complete list of the estimated coefficients for the independent variables is found in the Appendix

V. Industry Wage Differentials for Similarly skilled workers

The principle reason inter-industry wage differentials are considered so important to the understanding of the labour market is the persistent finding that workers with similar skills are being compensated differently across industries. Before any analysis can be performed on the reasons for this phenomenon, it must be demonstrated that the phenomenon exists. This section attempts to provide evidence of the existence of this persistent finding by examining the effects of human capital variables on the industry wage coefficients, by analysing the results from cross sections of various workers and by outlining the findings of previous studies.

Table 2
Estimated wage differentials for industries, Canada, 1990-1995

	Industry coefficient[a]	
Industry	1990[a]	1995[a]
Primary	0.278	0.390
	(0.033)	(0.031)
Manufacturing	0.109	0.113
	(0.010)	(0.012)
Construction	0.118	0.086
	(0.018)	(0.022)
Transportation, Communications and Utilities	0.154	0.188
	(0.014)	(0.016)
Wholesale and Retail Trade	-0.079	-0.083
	(0.009)	(0.010)
Finance, Insurance and Real Estate	0.053	0.107
	(0.006)	(0.019)
Other Services	-0.097	-0.099
	(0.006)	(0.006)
Weighted adjusted standard deviation of differentials	0.089[b]	0.105[b]
R^2	0.543	0.536
Sample Size	33,528	30,876

[a] Estimates are based on data from the 1991 and 1996 Canadian censuses. OLS are used. The other explanatory variables include experience, experience^2, education , sex dummy, education/sex interaction, experience/marital status interaction, 2 marital status dummy, 4 weeks worked dummies, 6 hours worked dummies, 3 regional dummies, 13 occupation dummies and a constant.
[b]The weights used are the employment shares for 1990 and 1995.
*all figures in parentheses are standard errors.

It would be expected that if similarly skilled workers were being paid the same across industries, the inclusion of human capital variables would eliminate or significantly reduce industry wage differentials. However, the model estimated in Table 1 included controls for human capital and it was discovered that inter-industry wage differentials still persisted. Krueger and Summers (1988) found that by adding education, age and job tenure variables to the model, the WASD was only reduced by 1%. Column 1 of Table 3 presents the estimated industry wage coefficients when adding controls for only human capital and demographics to the wage model using SLID data. This model differs from the one estimated in Table 1 since it does not include additional controls for occupational structure and job characteristics. This was done to observe only the human capital and demographic effects on the industry wage coefficients in order to establish an industry wage structure for similarly skilled workers (this will be used as the starting point in the following analysis on the causes of inter-industry wage differentials for similarly skilled workers). The results demonstrate that the primary, manufacturing, construction, transportation, finance, health, professional and education industries all appear to pay wage premiums to workers with skill sets seemingly comparable to workers in the trade, management and other services industries.

Analyzing cross-sections of various similarly skilled workers can provide insight into the structure of inter-industry wage differentials. Table 4 presents the results of separate cross-section regressions for university graduates and high school graduates and for males and females using 1996 census data. The industry wage structure in all four regressions is very similar to that for the aggregate in 1995 presented in Table 2. High wage industries for the aggregate are still high wage industries in the cross-sections and low wage industries for the aggregate are still low wage industries in the cross-sections. Although the WASD for university graduates and for high school graduates are somewhat different, the spearman correlation coefficient is equal to 1, indicating an identical ranking of the industries by their wage premiums. The WASD between males and females is also different, but once again the spearman correlation coefficient is very strong.

Table 3
Estimated wage differentials for industries, Canada, SLID 1998

Dependent Variable: *Log of Hourly Wage*	Variables: Column 1	Column 2	Column 3
Industry			
Primary	0.195 (0.013)	0.223 (0.012)	0.224 (0.012)
Manufacturing	0.074 (0.006)	0.064 (0.006)	0.064 (0.005)
Construction	0.065 (0.008)	0.060 (0.009)	0.071 (0.009)
Transportation, Communications and Utilities	0.094 (0.009)	0.116 (0.008)	0.095 (0.008)
Wholesale and Retail Trade	-0.135 (0.004)	-0.105 (0.005)	-0.079 (0.005)
Finance, Insurance and Real Estate	0.092 (0.008)	0.043 (0.008)	0.071 (0.008)
Health Care and Social Assistance	0.115 (0.007)	0.069 (0.007)	0.015 (0.007)
Professional, Scientific and Technical Services	0.102 (0.009)	0.011 (0.009)	0.045 (0.009)
Management, Administrative and Other Support	-0.163 (0.011)	-0.121 (0.011)	-0.086 (0.010)
Educational Services	0.157 (0.008)	0.109 (0.009)	0.025 (0.009)
Other Services	-0.184 (0.005)	-0.138 (0.004)	-0.111 (0.004)
Other Variables	*Experience, experience^2, education , job tenure, sex dummy, education*sex, experience*sex, marital status*sex, 3 marital status dummies, 1 head dummy, 3 regional dummies and a constant.	*Column 1 variables and 24 occupation dummy variables.	*Column 2 variables, 1 union dummy and 1 collective agreement dummy.
WASD	0.088	0.087	0.085
R^2	0.489	0.545	0.569
Sample Size	32,854	32,854	32,854

[a] Estimates are based on Survey of Labour and Income Dynamics, 1998. OLS are used.
[b]The weights used are the employment shares for 1998.
*all figures in parentheses are standard errors.

Krueger and Summers (1988), and Grenier and Gera (1994) estimated a number of cross-sections in order to compare the industry wage differentials between two age groups, two education level groups and males and females. They both concluded that age, sex and education could not account for much of the variation in wages across industries. However, the matter of unmeasured skills or unmeasured labour quality needs to be addressed. According to Murphy and Topel (1987) and Gaux and Maurin (1999), labour quality that is not accounted for in the individual based micro data sets has a significant role in explaining inter-industry wage differentials. This subject will be considered in the next section. Therefore, for the time being we will conclude that worker's with 'what seems to be' comparable skill sets are in fact being compensated differently across industries.

Table 4
Alternative Samples and Estimated wage differentials for industries, Canada, 1995

	Industry coefficient[a]			
Industry	University[a]	High School[a]	Males	Females
Primary	0.385	0.310	0.369	0.303
	(0.055)	(0.058)	(0.033)	(0.078)
Manufacturing	0.126	0.120	0.104	0.097
	(0.020)	(0.025)	(0.013)	(0.025)
Construction	0.074[c]	0.053	0.073	-0.019[c]
	(0.039)	(0.022)	(0.023)	(0.056)
Transportation, Communications and Utilities	0.178	0.178	0.142	0.232
	(0.027)	(0.032)	(0.018)	(0.030)
Wholesale and Retail Trade	-0.061	-0.048	-0.111	-0.052
	(0.017)	(0.019)	(0.014)	(0.015)
Finance, Insurance and Real Estate	0.089	0.089	0.072	0.128
	(0.027)	(0.038)	(0.032)	(0.024)
Other Services	-0.078	-0.144	-0.161	-0.044
	(0.009)	(0.017)	(0.012)	(0.007)
Weighted adjusted standard deviation of differentials	0.173[b]	0.184[b]	0.126[b]	0.175[b]
Spearman correlation Coefficient	1.0		0.88	
R^2	0.5693	0.568	0.522	0.522
Sample Size	10,595	6,751	15,585	15,022

[a] Estimates are based on data from the 1996 Canadian censuses. For explanatory variables included, see Table 2. Each column is estimated from a separate cross-section regression.
[b]The weights used are the employment shares for 1995.
[c]Not significant at the 5 percent level
*all figures in parentheses are standard errors.

VI. Explanations of Inter-Industry Wage Differentials

Over the years, economists have presented a broad range of explanations for inter-industry wage differentials among similarly skilled workers. However, industries have very different characteristics and the firms within them face heterogeneous market conditions and use heterogeneous production technologies. As was mentioned in the introduction, to find one theory that explains the persistence of inter-industry wage differentials is unrealistic. It may take one or an array of explanations to account for the reasons an individual industry is characterized as high wage or low wage.

In the previous section, it was discovered that workers with 'what seems to be' comparable skill sets are in fact being compensated differently across industries. It was also established that the aggregated industry groupings of primary, construction, finance, health, education and professional all demonstrated wage premiums for similarly skilled workers and will thus be characterized as high wage industries (the manufacturing industry also demonstrated a wage premium, however, for reasons previously mentioned, it will be ignored in this discussion). This section will attempt to uncover the reasons why these high wage industries pay wage premiums (the ones uncovered in column 1 of Table 3) to workers with skill sets seemingly comparable to workers in low or medium wage industries. This will be accomplished by investigating the three main explanations of inter-industry wage differentials. They include competitive explanations, institutional explanations and efficiency wage explanations.

1. Competitive Explanations

Competitive explanations are based on the notion that industry wage differentials exist because the characteristics of workers and jobs vary across sectors of the economy. Alternatively, wage differentials may also exist due to temporary shifts in labour demand or supply across sectors in the short run.

A. Occupational Structure

If industry wage differentials for similarly skilled workers were completely attributable to the occupational structure of industries, then the inclusion of these variables to the model in column 1 of Table 3 should almost eliminate these differentials. However, column 2 of Table 3 demonstrates that adding occupation dummy variables to the model did not eliminate the industry wage premiums. The WASD was only reduced slightly compared to the WASD in column 1 of Table 3. In fact, most of the high wage industries still demonstrate significant wage premiums. The one exception is the industry-grouping professionals, whose industry wage premium was reduced from 10 % to almost 1%. Occupational structure was able to almost fully explain its industry wage premium.

These results demonstrate, except for the industry-grouping professionals, that occupational structure alone cannot fully explain the inter-industry wage differentials for similarly skilled workers. Comparable results were discovered by Krueger and Summers (1988) for the United States and by Gera and Grenier (1994) for Canada. Helwedge (1992), however, presented a potential concern about occupational structure across industries. His results showed that of the occupations that had enough observations across industries to estimate an industry wage structure, few had wages that were significantly different. This implies that data limitations may not allow us to fully measure the impact of occupational structure on industry wage differentials.

B. Stability in the Industry Wage Structure

Industry wage differentials have the potential to exist due to short-run immobility of labour or temporary labour-demand shocks. Gera and Grenier (1994) estimated wage differentials for industry groups based on census data for 1970, 1980 and 1985. Table 2 above presents the results of the estimation of wage differentials for industry groups based on census data for 1990 and 1995. Analyzing the inter-industry wage structure across the years 1970 and 1995 demonstrated very little change. This is consistent with the findings of many other studies that the industry wage structure is consistent over time.

C. Compensating Differentials

Compensating differential explanations are based on the notion of a wage premium for non-standard work schedules, being faced with the risk of injury or unemployment, and other attributes of the job. Unfortunately, the data sets used in this study do not allow us to see the direct impact of working conditions on industry wage differentials. However, by examining various employee work schedules, employment insurance benefits and workers compensation benefits, some insight can be gained into compensating differential explanations. First, this section will explore a cross-section of workers with irregular work schedules in order to observe if compensation is being provided for the potential inconvenience. And secondly, this section will estimate an employment insurance benefit model and a workers compensation benefit model in order to determine if workers are receiving wage premiums in the high wage industries for the risk of unemployment or for the risk of injury respectively.

Workers with irregular work schedules, including graveyard shifts, rotating shifts, split shifts or 'on call' shifts, may be compensated for the inconvenience. Table 5 presents' results from a cross-section of workers who have irregular work schedules compared to those who do not. Workers with irregular schedules had a much higher WASD than the other regression. Although, the Spearman rank coefficient was found to be close to one, indicating that the pattern of the wage premiums for the industry coefficients was similar

Table 5
Alternative Samples and Estimated wage differentials for industries, Canada, 1998

	Weighted adjusted standard deviation of industry wage differentials[a]	Spearman correlation coefficient	R^2	Sample Size
Unionized and non-unionized[b]				
Unionized workers	0.089	0.93	0.4925	8,654
Non-unionized workers	0.104		0.5437	21,655
Work Schedule[b]				
Regular work schedule[c]	0.096	0.86	0.5775	22,235
Irregular work schedule[c]	0.219		0.5756	7,951

[a] Estimates are based on data from the 1998 Survey of Labour and Income Dynamics.
For explanatory variables included, see Table 1. Each column is estimated from a separate cross-section regression.
[b]The weights used are the employment shares for 1998. Based on wage differentials for industries.
[c]Regular work schedule includes a regular daytime schedule or a regular evening schedule. Irregular work schedule includes graveyard shift, rotating shift, split shift, on call, or other irregular schedules.

between the two groups. Krueger and Summers (1988) and Gera and Grenier (1994) found similar results when comparing full-time versus part-time workers.

Meng and Smith (1999) found in a sample of Ontario workers that the presence of workers compensation insurance coverage reduces the wage-risk trade-off, in that the need of a wage premium for risk of injury is greatly reduced. Table 6 presents results from a cross-section of workers who received worker compensation payments during the reference year. The amount of worker compensation payments was regressed against the industry wage premiums from Table 1 while controlling for other variables. The results presented a negative insignificant relationship between the industry wage premiums and workers compensation payments. This suggests that workers in the high wage industries are not any more likely to receive worker compensation payments than workers in medium or low wage industries. Therefore, receiving a wage premium for risk of injury would not be needed. The finding that industry wage premiums were insignificant is consistent with the findings of Meng and Smith (1999) that worker compensation reduces

Table 6
The effect of industry wage differentials on Worker Compensation Payments and Employment Insurance Benefits, Canada, 1998

	Dependent Variable[a]	
Independent Variables	Amount of worker compensation payments received	Amount of employment insurance benefits received
Industry wage premium[b]	-21.23661 (95.69)[c]	2535.826 (194.29)
Other variables	experience, $experience^2$, education, job tenure, sex dummy, education/sex interaction, experience/sex interaction, marital status/sex interaction, 4 marital status dummies, 1 head dummy, 3 regional dummies, 22 occupation dummies, 1 full time dummy, 1 union dummy, 4 employer size dummies, 4 plant size dummies, 1 multiple location dummy and a constant.	
Sample Size	1,245	6,571
R^2	0.0113	0.1209

[a] Estimates are based on data from the 1998 Survey of Labour and Income Dynamics. OLS is used.
[b] Based on estimated industry wage differentials from Table 1.
[c] Not significant at the 5 percent level.
*all figures in parentheses are standard errors

the wage-risk trade-off. However, what must be kept in mind is the potential sample selection bias with the cross-section of workers used in this analysis since it includes only workers who received such benefits.

Table 7
Probability of having received Employment Insurance Benefits, Canada, 1998

Industry[c]	Dependent variable: if an individual received ei benefits =1, otherwise = 0 [a]
Primary	0.1797
	(0.011)
Manufacturing	0.040
	(0.005)
Construction	0.254
	(0.008)
Transportation, Communications and Utilities	-0.013[b]
	(0.009)
Wholesale and Retail Trade	-0.0537
	(0.005)
Finance, Insurance and Real Estate	-0.010
	(0.009)
Health Care and Social Assistance	-0.044
	(0.003)
Professional, Scientific and Technical Services	- 0.078
	(0.010)
Management, Administrative and Other Support	0.015[b]
	(0.012)
Educational Services	-0.014[b]
	(0.007)
Other Services	-0.024
	(0.005)
Sample Size	6,571(for EI recipients)

[a] Estimates are based on Survey of Labour and Income Dynamics, 1998.
Linear probability model was used. The other explanatory variables include only a constant.
[B]Not significant at the 5 percent level.
[C]The weights used are the employment shares for 1998.
*all figures in parentheses are standard errors.

Murphy and Topel (1987) found that variables measuring the probability and duration of unemployment do not substantially reduce industry wage differentials. However, they found unemployment risk to be highest in the construction industry. This is consistent with the view that within the construction industry for a fixed level of aggregate demand, demand varies considerably among firms. Table 6 presents results from a cross-section of workers who received employment insurance benefits during the reference year. The amount of employment insurance benefits was regressed against the industry wage premiums from Table 1 while controlling for other variables. The results presented a positive significant relationship between the industry wage premiums and employment insurance benefits. This suggests that workers in high wage industries are more subject to loss of employment risk, as compared to their counterparts in medium and low wage industries and may be receiving a wage premium for this added risk. However, what must be kept in mind once again is the potential sample selection bias with the cross-section of workers used in this analysis since it includes only workers who received such benefits.

Table 8 [2]
Job Tenure across Industries, Canada, 1998

Industry	Log of Job Tenure[a] (in months)
Primary	- 0.177
	(0.039)
Manufacturing	0.206
	(0.017)
Construction	-0.502
	(0.030)
Transportation, Communications and Utilities	0.289
	(0.030)
Wholesale and Retail Trade	-0.152
	(0.017)
Finance, Insurance and Real Estate	0.273
	(0.032)
Health Care and Social Assistance	0.430
	(0.021)
Professional, Scientific and Technical Services	- 0.185
	(0.036)
Management, Administrative and Other Support	- 0.600
	(0.043)
Educational Services	0.580
	(0.025)
Other Services	-0.441
	(0.017)
Sample Size	30,297

[a] Estimates are based on Survey of Labour and Income Dynamics, 1998. OLS was used. The other explanatory variables include only a constant.
*all figures in parentheses are standard errors

The previous finding only demonstrated the general relationship between the industry wage premiums and employment insurance benefit. Another analysis is needed to determine which of the high wage industries are more likely to face this loss of employment risk. Table 7 presents the probability of having received Employment

[2] The industry wage coefficients are identical to those obtained using the ANOVA approach.

Insurance Benefits for being in a certain industry. Estimating a linear probability model[3] (received EI benefits =1; else = 0) on the industry variables and controlling for no other variables in order to catch the gross probability effect, it was found that most of the industry coefficients were negative or insignificant. However, the construction industry as well as the primary industry had large, positive and significant coefficients. This is consistent with the findings of Murphy and Topel (1987) for the construction industry. The primary industry is cyclical in nature and hence the attachment of a wage premium for the risk of unemployment could be fathomable. The results from examining job tenure across industries further reinforce this conclusion. Table 8 shows that of the high wage industries, workers in the construction, primary and professional industries tend to have lower than average job tenure indicating a greater amount of job separation. The construction industry tends to have 50% shorter job tenure than the average, while the primary industry has 18% less than the average. An analysis over time is needed in order to discover if working in the construction or primary industries consistently translates into a greater probability of unemployment.

It can be concluded that consistent with previous studies, compensating differentials for irregular work schedules or for the risk of injury do not appear to be instrumental in explaining industry wage differentials for similarly skilled workers. However, evidence showed that a wage premium for the risk of unemployment might be a factor in explaining the wage premiums associated with the construction and primary industries.

D. Unmeasured-Labour Quality Argument

It has been argued that individual-based micro data sets do not adequately control for labour quality and therefore certain productive abilities of workers are not accounted for. The unmeasured labour quality theory argues that the unmeasured productive abilities of workers may vary significantly across industries and are thus being accounted

[3] A probit model was also estimated and provided similar results.

for by the industry controls instead of the human capital controls. Studies completed to examine unmeasured labour quality have obtained varying results. As previously outlined in Section II, most of these studies have concentrated on examining displaced workers who shift from one industry to another. Krueger and Summers (1988), Gera and Grenier (1994) and Gibbons and Katz (1992) found that displaced workers received the wage premium associated with their new industry. While Murphy and Topel (1987) and Gaux and Maurin (1999), found that inter-industry wage differentials are chiefly due to the unmeasured labour quality of workers across industries. Unfortunately, the data sets used in this study do not allow us to examine displaced workers who shift from one industry to another. Therefore, this study is incomplete because we are unable to test the unmeasured labour quality explanation.

2. Institutional Explanations

The presence of unionization in an industry can have significant influence over wages. Table 5 above presents the results for a cross-section of unionized and non-unionized workers. The WASD for the two groups are quite similar and the Spearman rank coefficient is close to one. Therefore, unionized and non-unionized workers have relatively the same industry wage premiums. This finding is consistent with numerous studies done on the subject. Krueger and Summers (1988) mention that nations that vigorously oppose unionization, such as Poland, have very similar industry wage structures to those that do not.

Column 3 of Table 3 presents the results from adding unionization and collective agreement dummy variables to the wage model in column 2 of Table 3 that included controls for occupational structure, human capital and demographics. The estimated coefficients for both variables are positive and statistically significant. The WASD was only reduced slightly compared to the WASD of column 2 of Table 3. Nevertheless, when comparing the two columns, it can be observed that of the high wage industries, only the health and education industry wage coefficients were significantly affected by the

Table 9[4]
Probability of being unionized, Canada, 1998

Industry[b]	Dependent variable: if an individual is unionized =1, otherwise = 0 [a]
Primary	-0.144
	(0.011)
Manufacturing	-0.061
	(0.005)
Construction	-0.166
	(0.008)
Transportation, Communications and Utilities	-0.010[c]
	(0.008)
Wholesale and Retail Trade	-0.309
	(0.005)
Finance, Insurance and Real Estate	-0.334
	(0.009)
Health Care and Social Assistance	0.132
	(0.005)
Professional, Scientific and Technical Services	- 0.357
	(0.010)
Management, Administrative and Other Support	-0.317
	(0.012)
Educational Services	0.266
	(0.006)
Other Services	-0.290
	(0.005)
Sample Size	8,888(for unionized)

[a] Estimates are based on Survey of Labour and Income Dynamics, 1998.
Linear probability model was used. The other explanatory variables include only a constant.
[b]The weights used are the employment shares for 1998.
[c]Not significant at the 5 percent level.
*all figures in parentheses are standard errors.

inclusion of unionization in the model. The health industry wage premium was reduced from 7% to about 1.5% and the education industry wage premium was reduced from 11% to 2.5%. Therefore, unionization appears to play a significant role in explaining industry wage premiums within the health and education industries. Table 9 reinforces this finding by demonstrating that the health and education industries are the only high wage industries to have a significantly greater chance than the average of being unionized[5]. In fact, the remainder of the high wage industries have a less than average chance of being unionized.

[4] The industry wage coefficients are identical to those obtained using the ANOVA approach.
[5] A probit model was also estimated and provided similar results.

3. Efficiency Wages

Efficiency wage theories are based on the notion of rent sharing between employers and employees (see: Akerlof and Yellen 1986). They suggest that high wages or rents are paid in order to improve worker productivity and worker attachment to firms. This in turn will lead to a reduction in costs to firms associated with employee turnover, hiring and training. As previously outlined, within the efficiency wage framework are several models or rationales for their existence, which include the shirking model, selection pool models, fairness wage models and turnover models. These rationales for paying efficiency wages have the common belief that in doing so the gains from increased worker productivity will outweigh the cost of paying higher than competitive wages. Several authors have argued in favour of the gains involved to firms with rent sharing and the efficiency model hypothesis. Goldsmith and Veum (2000) analyzed the relationship between real wages and worker effort using the 1992 National Longitudinal Survey of Youths for the United States. They concluded that receiving an efficiency wage enhances significantly a person's effort in the workplace. Altman (1998) argues along the lines of Leibenstein's X-inefficiency hypothesis, that higher real wages pressures firms to cut down on wasteful procedures and expenditures and induces firms to innovate.

The previous findings of this section demonstrated that competitive factors and unionization appeared to have important roles in explaining the wage premiums associated with the primary, construction, professional, health and education industries. However, these factors were unable too fully explain the wage premiums associated with the transportation and finance industries, nor were we able to investigate the explanation of unmeasured labour quality.

Table 10[6]
Job Tenure Across Industries, Canada, 1998

Independent Variables	Dependent variable: Log of Job Tenure (in months) Column 1	Column 2
Transportation, Communications and Utilities	0.112 (0.028)	0.026[b] (0.027)
Finance, Insurance and Real Estate	0.103 (0.028)	0.012[b] (0.028)
Other Variables	experienced, experiences^2, education, sex dummy, education/sex interaction, experience/sex interaction, marital status/sex interaction, 4 marital status dummies, 1 head dummy, 3 regional dummies, 22 occupation dummies and a constant	Employer Size
		20 to 99 Employees 0.160 (0.019)
		100 to 499 employees 0.350 (0.021)
		500 to 999 employees 0.370 (0.024)
		100 or more employees 0.580 (0.017)
		Other Variables Column 1 other variables
Sample Size	32,919	32,919

[a] Estimates are based on Survey of Labour and Income Dynamics, 1998. OLS was used.
[b]Not significant at the 5 percent level.
*all figures in parentheses are standard errors.

This section will attempt to identify if the transportation and finance industries are more likely to be paying economic rents to their workers and thus have the potential to be paying efficiency wages or if the wage premiums are more likely to reflect competitive factors such as unmeasured labour quality or compensating differentials. This will be investigated by analyzing the relationship between job tenure and industries. Along the lines of an argument presented by Krueger and Summers (1988) and used by Gera and Grenier (1994), it would be expected that if the wage premiums associated with the transportation and finance industries reflected competitive factors, workers would have no reason to treat their job as inherently valuable. Hence, we would expect to find no intrinsic relationship between these industries and job tenure. However, if wage premiums reflected economic rents and not competitive factors, workers would have reason to find their jobs innately valuable, since their alternative is a similar job at a lower

[6] Table 10 only presents the results for the Finance and Transportation industries, however all the industries where included in the regression.

wage rate. In this case, we would expect to find a positive relationship between these industries and job tenure.

Previously, Table 8 presented the gross industry coefficients for job tenure. It was discovered that the transportation industry had 29% longer job tenure than the average and the finance industry had 27% longer job tenure than the average. The causes of this above average job tenure must be investigated to determine exactly how much is attributable to the industry effect in order to test the argument presented above. Column 1 of table 10 presents the results from adding demographic, human capital and occupation

Table 11 [7]
Employer Size, Canada, 1998

Independent Variables	Dependent variable: Employer Size greater than 499 =1; otherwise = 0
Primary	0.028
	(0.013)
Manufacturing	0.056
	(0.006)
Construction	-0.252
	(0.010)
Transportation, Communications and Utilities	0.132
	(0.010)
Wholesale and Retail Trade	-0.001[b]
	(0.006)
Finance, Insurance and Real Estate	0.181
	(0.011)
Health Care and Social Assistance	-0.005[b]
	(0.005)
Professional, Scientific and Technical Services	-0.119
	(0.012)
Management, Administrative and Other Support	-0.124
	(0.015)
Educational Services	0.202
	(0.008)
Other Services	-0.114
	(0.013)
Sample Size	12,608

[a] Estimates are based on Survey of Labour and Income Dynamics, 1998.
Linear Probability model was used. The other explanatory variables include only a constant.
[c]Not significant at the 5 percent level.
*all figures in parentheses are standard errors.

variables to the model of Table 8 in order to control for their effects on the industry coefficients. The results show that the coefficients of the transportation and finance

[7] The industry wage coefficients are identical to those obtained using the ANOVA approach.

industries still have positive significant relationships with job tenure, indicating that these industries are strongly associated with higher job tenure. However, column 2 of Table 10 demonstrates that after adding employer size dummy variables to the model, the finance and transportation industry coefficients are greatly reduced and are no longer statistically significant. Employer size and job tenure has an increasing positive relationship. Table 11 reinforces this finding, by showing that workers in the transportation industry have a 13% greater chance of working for an employer with over 500 people employed than the average, while workers in the finance industry have an 18% greater chance[8]. Therefore, employer size appears to play a significant role in explaining the strong association between high job tenure and the transportation and finance industries.

This analysis has left it unclear if the wage premiums associated with the transportation and finance industries are more likely to reflect competitive factors or economic rents. Large employers may have certain characteristics that naturally lead to longer job tenure, such as opportunities for professional advancement within the firm. Therefore, the above average amounts of job tenure within the transportation and finance industries cannot necessarily be attributed to the presence of rents.

VII. Efficiency Wages and Employer-Sponsored Training

The previous analysis was unable to demonstrate whether the wage premiums associated with the transportation and finance industries had the potential to reflect economic rents and hence efficiency wages. However, exploring the rationales for the payment of efficiency wages may provide greater insight into the nature of the wage premiums. As previously mentioned, among these rationales are the turnover and the selection pool models. In this section, we will explore the provision of employer sponsored training within the context of these two models. This will be done in order to

[8] A probit model was also estimated and provided similar results.

observe if training has the potential to be a motive for the payment of efficiency wages within the transportation and finance industries.

Employer Sponsored Training (EST)

Employer sponsored training (EST) for the purpose of this study will be defined as any training or education including courses, private lessons, correspondence courses, workshops, apprenticeships, or any other training or education sponsored or paid for by

Table 12
Employer Sponsored Training (EST) and Industry Wage Premiums, Canada, 1998

	Dependent Variable[a]
Independent Variables	Dependent variable: if an individual received EST =1, otherwise = 0
Industry wage premium[b]	0.485 (0.073)
Job Tenure	0.004 (0.000)
Employer Size	
100 to 199 employees	0.041 (0.011)
200 to 499 employees	0.111 (0.011)
500 or more employees	0.120 (0.011)
Sample Size	3,124 (for EST=1)
R^2	0.103

[a] Estimates are based on data from the 1998 Adult Training and Education Survey for Canada. Linear Probability Model was used. The other explanatory variables include age, education, sex dummy, education/sex interaction, experience/sex interaction, marital status/sex interaction, 4 marital status dummies, 1 head dummy, 3 regional dummies, 22 occupation dummies, 1 full time dummy, 1 union dummy, 3 employer size dummies, and a constant.
[b] Based on estimated industry wage differentials from Table 1.
*all figures in parentheses are standard errors.

the employer. This training includes both general and specific training as defined by Becker (1964). General training is defined as training that is portable across firms, while specific training is also portable across firms but without value. The basic human capital model claims employees will finance the entire cost of general training, while the employer and employee will share the cost of specific training. As the employee gains more human capital the wage earned will increase. However recent evidence provided by Green (2000) finds that firms are willing to finance some general training. He claims that social skills are as important to the company as technical skills. Therefore, firms will fund investment in transferable general technical training if the acquisition of social skills is a joint product. Veum (1999) and numerous other studies have also concluded against the human capital theory in that firms in today's economy are willing to finance general training in order to remain competitive.

Table 12 presents the results of regressing a linear probability model on the industry wage premiums from table 1 using the 1998 Adult Education and Training Survey, where the dependent variable is equal to one if the worker received employer sponsored training and equal to zero if the worker did not[9]. The results show a positive and significant relationship between having received employer sponsored training and industry wage premiums. This indicates that people working in industries with wage premiums, which include the transportation and finance industries, are more likely to have received employer sponsored training. Veum (1999) and numerous others also found a positive relationship between training and wages. These results are consistent with Becker's human capital model. Table 12 also presents a positive and significant relationship between the dependent variable and job tenure. This is consistent with the findings of Vanden Linden and Karaa (1998), who discovered that active labour market policies such as on the job training lead to longer lengths of job tenure among workers. Table 13 presents the probability of having received employer sponsored training for working in a certain industry. Estimating a linear probability model[10] (received EST=1; else = 0) on the industry variables and controlling for no other variables in order to catch the gross probability effect, found that the transportation and finance industries had positive significant coefficients. Workers in the transportation industry had a 6.5%

[9] A probit model was also estimated and provided similar results.
[10] A probit model was also estimated and provided similar results.

greater chance of receiving EST than the average worker in all industries and workers in the finance industry were found to have a 15% greater chance of receiving EST than the average.

This analysis on employer sponsored training revealed that the employers within the transportation and finance industries tend to provide greater amounts of employer sponsored training to their workers compared to the average of all the industries.

Efficiency Wages

Attempting to rationalize the payment of rents to workers is a complicated task. Firms are faced with various constraints inside and outside the organization, which in turn leads to countless motives for the existence of efficiency wages. Therefore, any one of

Table 13[11]
Probability of having received Employer Sponsored Training, Canada, 1998

Industry[b]	Dependent variable: if an individual received EST =1, otherwise = 0 [a]
Primary	0.071 (0.02)
Manufacturing	-0.018 (0.007)
Construction	-0.254 (0.075)
Transportation, Communications and Utilities	0.064 (0.014)
Wholesale and Retail Trade	-0.045 (0.007)
Finance, Insurance and Real Estate	0.152 (0.015)
Other Services	-0.001[c] (0.005)
Sample Size	3,124 (for EST=1)

[a] Estimates are based on data from the 1998 Adult Training and Education Survey for Canada. Linear Probability Model was used. The other explanatory variables include only a constant.
[b]The weights used are the employment shares for 1998.
[c]Not significant at the 5 percent level.
*all figures in parentheses are standard errors

[11] The industry wage coefficients are identical to those obtained using the ANOVA approach.

the efficiency wage models, outlined in the previous section, cannot possibly explain alone why rents are paid. In fact each situation where rents are present has the potential to be explained by a different efficiency wage model or a combination of them. Lang and Kahn (1990) pointed out that Carmicheal (1990), in his critical piece on efficiency wages, was wrong to think that several of the efficiency wage models could not be combined together.

The turnover model of efficiency wages emphasizes that employers pay wage premiums in order to reduce the costs involved with turnover such as those associated with hiring and training. In doing so, employees are more motivated and gain longer job tenure, which equates into higher productivity. However, the selection pool models emphasize the payment of a wage premium to attract a higher quality labour pool for hiring purposes. If labour quality is not directly observable in the recruitment process, then this will be desirable. It was previously discovered that the employers within the transportation and finance industries tend to provide greater amounts of sponsored training to their workers compared to the average of all the industries. The provision of this training is an investment in the employee that results in a cost to the employer. The intent is for the cost to be recovered by the added productivity of the newly trained employee. Thus, these employers have the incentive to reduce turnover and encourage longer job tenure to reap the full benefits of the investment in training. Therefore, offering a wage premium to achieve this objective of reducing turnover and encouraging longer job tenure may be desirable by employers within the finance and transportation industries. This is consistent with the turnover model of efficiency wages. According to Winter-Ebmer (2001), large employers may actively search for stable, reliable and long-term orientated employees, because otherwise investment in training will be less useful. However, Kalaitzidakis (1997) points out that employers training costs depend negatively on the expected ability of their labour force and positively on the technology of the firm, which leads them to seek workers able to 'learn at least cost'. Therefore, employers within the finance and transportation industries will potentially seek a heterogeneous set of workers that are stable (to protect their investment in employer sponsored training) and that have the ability to 'learn at least cost'. If these abilities are not directly observable to employers within the finance and transportation industries, it may be desirable for them to offer a wage premium in order to attract a higher quality pool of applicants possessing these abilities. This is consistent with the selection pool model of efficiency wages.

This analysis identified that the provision of employer sponsored training could potentially create motives, which are consistent with the selection pool and the turnover models of efficiency wages, for employers within the finance and transportation industries to pay rents. However, in no way did this analysis prove the actual existence of rents or the validity of these models.

VIII. Conclusion

In analyzing the principle objectives of this study, valuable and interesting results were discovered. First, inter-industry wage differentials exist in Canada and follow a pattern consistent with historical results found in other capitalist countries. Secondly, the phenomenon that workers with similar skills are paid differently across industries exists. Thirdly, varying factors account for the wage differentials of similarly skilled workers across the industry groupings. It was argued that within the competitive explanations framework, compensating differentials demonstrated the greatest promise to explain the wage premiums associated with the primary and construction industries, while occupational structure displayed the most potential for the professional, scientific and technical services industry. Within the institutional explanations, unionization appeared to be accountable for the wage premiums associated with the health care and social assistance and the educational services industries. Examining the efficiency wage explanations, the results provided inconclusive evidence whether the wage premiums associated with the finance, insurance and real estate and the transportation, communication and utilities industries, reflected economic rents or competitive factors. However, it was argued that the provision of employer sponsored training within those industries a potential motive for the payment of efficiency wages. These findings also support the view that no single theory has the power to fully explain inter-industry wage differentials.

The main weakness of this study was the over aggregation of the industry groupings due to availability of data. However, the results obtained can still provide significant insight into inter-industry wage differentials. The findings concerning the explanations of industry wage differentials must be taken as the general or most dominant reason for the wage premium in a given industry grouping. This is necessary for two reasons. The first being that industry wage differentials are highly correlated across occupations. According to Dickens and Katz (1987), if an occupation in a certain industry is highly paid then all occupations in that industry tend to be highly paid, however, not necessarily for the same reasons. The second reason has to do with the large industry groupings. The findings identify the general or most dominant explanation for the wage premiums associated with the high wage industries. However, different explanations might become relevant with a higher level of disaggregation.

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APPENDIX

Estimated wage differentials for industries, Canada, SLID 1998

Variables				
Dependant Variable: Log of Hourly Wage	Table 1	Table 3		
		Column 1	Column 2	Column 3
Intercept	1.924	1.827	1.984	1.978
	(0.018)	(0.018)	(0.019)	(0.018)
Industry				
Primary	0.192	0.195	0.223	0.224
	(0.011)	(0.013)	(0.012)	(0.012)
Manufacturing	0.030	0.074	0.064	0.064
	(0.005)	(0.006)	(0.006)	(0.005)
Construction	0.120	0.065	0.060	0.071
	(0.008)	(0.008)	(0.009)	(0.009)
Transportation, Communications and Utilities	0.080	0.094	0.116	0.095
	(0.008)	(0.009)	(0.008)	(0.008)
Wholesale and Retail Trade	-0.075	-0.135	-0.105	-0.079
	(0.004)	(0.004)	(0.005)	(0.005)
Finance, Insurance and Real Estate	0.054	0.092	0.043	0.071
	(0.008)	(0.008)	(0.008)	(0.008)
Health Care and Social Assistance	0.017	0.115	0.069	0.015
	(0.007)	(0.007)	(0.007)	(0.007)
Professional, Scientific and Technical Services	0.071	0.102	0.011	0.045
	(0.009)	(0.009)	(0.009)	(0.009)
Management, Administrative and Other Support	-0.059	-0.163	-0.121	-0.086
	(0.010)	(0.011)	(0.011)	(0.010)
Educational Services	0.030	0.157	0.109	0.025
	(0.009)	(0.008)	(0.009)	(0.009)
Other Services	-0.102	-0.184	-0.138	-0.111
	(0.004)	(0.005)	(0.004)	(0.004)
Experience				
Experience	0.016	0.020	0.018	0.017
	(0.000)	(0.001)	(0.000)	(0.000)
Experience^2	-0.000	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Education	0.025	0.042	0.029	0.029
	(0.000)	(0.001)	(0.001)	(0.000)
Demographics				
Head of Family	0.128	0.179	0.156	0.145
	(0.004)	(0.004)	(0.004)	(0.004)
Single	-0.099	-0.140	-0.117	-0.110
	(0.006)	(0.007)	(0.007)	(0.007)
Divorced	-0.083	-0.117	-0.096	-0.093
	(0.008)	(0.008)	(0.008)	(0.008)
Widowed	-0.109	-0.165	-0.133	-0.126
	(0.020)	(0.022)	(0.021)	(0.020)

APPENDIX (Continued)

Estimated wage differentials for industries, Canada, SLID 1998

Dependant Variable: Log of Hourly Wage	Variables Table 1	Table 3 Column 1	Column 2	Column 3
Female	-0.180	-0.254	-0.161	-0.160
	(0.021)	(0.023)	(0.022)	(0.022)
Interactions				
Sex-Education Interaction	0.011	0.015	0.011	0.010
	(0.001)	(0.001)	(0.001)	(0.001)
Sex- Experience Interaction	-0.002	-0.002	-0.002	-0.002
	(0.000)	(0.000)	(0.000)	(0.000)
Sex –Married	-0.025	-0.031	-0.033	-0.034
	(0.008)	(0.009)	(0.008)	(0.008)
Occupations				
Senior Mgmt	0.430	------	0.380	0.430
	(0.028)		(0.029)	(0.029)
Other Mgmt	0.209	------	0.180	0.213
	(0.009)		(0.009)	(0.009)
Prof. Bus. & Fin.	0.231	------	0.226	0.242
	(0.015)		(0.016)	(0.015)
Secretarial	0.113	------	0.070	0.093
	(0.010)		(0.010)	(0.010)
Nat. & App. Sci.	0.215	------	0.235	0.242
	(0.010)		(0.011)	(0.011)
Prof. Health	0.310	------	0.337	0.309
	(0.014)		(0.015)	(0.015)
Tech. Health	0.064	------	0.057	0.044
	(0.013)		(0.014)	(0.014)
Social Sci. Occ.	0.118	------	0.085	0.099
	(0.013)		(0.014)	(0.014)
Teachers	0.187	------	0.175	0.155
	(0.013)		(0.014)	(0.014)
Arts Occ.	0.087	------	0.056	0.060
	(0.013)		(0.014)	(0.014)
Whole & Ret. Sales Occ.	0.223	------	0.198	0.220
	(0.013)		(0.014)	(0.014)
Sales Clerks	-0.117	------	-0.141	-0.136
	(0.009)		(0.010)	(0.010)
Chefs and Cooks	-0.125	------	-0.168	-0.151
	(0.011)		(0.011)	(0.011)
Protec. Services Occ.	-0.082	------	-0.068	-0.091
	(0.024)		(0.025)	(0.025)
Childcare	-0.134	------	-0.214	-0.188
	(0.014)		(0.015)	(0.014)
Sales and Service	-0.103	------	-0.120	-0.124
	(0.008)		(0.008)	(0.008)
Contractors Trades	0.143	------	0.108	0.118
	(0.021)		(0.022)	(0.022)
Const. Trades	0.057	------	0.022	0.011
	(0.015)		(0.016)	(0.016)

APPENDIX (Continued)

Estimated wage differentials for industries, Canada, SLID 1998

Variables				
Dependant Variable: Log of Hourly Wage	Table 1	Table 3		
		Column 1	Column 2	Column 3
Other Trades	0.117	------	0.118	0.095
	(0.010)		(0.010)	(0.010)
Trans. & Equip Ops.	-0.028	------	-0.073	-0.064
	(0.011)		(0.011)	(0.011)
Labourers	-0.048	------	-0.052	-0.063
	(0.013)		(0.014)	(0.013)
Primary Occ.	-0.021	------	-0.036	-0.034
	(0.014)		(0.015)	(0.015)
Manufac. Occ.	-0.003	------	0.003	-0.017
	(0.010)		(0.010)	(0.010)
Processing Occ.	-0.056	------	-0.054	-0.084
	(0.014)		(0.015)	(0.014)
Provinces				
Atlantic	-0.197	-0.229	-0.220	-0.217
	(0.005)	(0.005)	(0.005)	(0.005)
Quebec	-0.082	-0.079	-0.084	-0.097
	(0.005)	(0.006)	(0.005)	(0.005)
West	-0.032	-0.037	-0.039	-0.042
	(0.004)	(0.005)	(0.004)	(0.004)
Employment Characteristics				
Union	0.066	------	------	0.268
	(0.005)			(0.004)
Collective Agreement	-------	------	------	0.152
				(0.014)
Full Time	0.010	------	------	------
	(0.005)			
Job Tenure	0.000	0.001	0.001	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Multiple Location Employer	0.042	------	------	------
	(0.003)			
Plant Size				
No. of employees 20-99	0.051	------	------	------
	(0.004)			
No. of employees 100-499	0.096	------	------	------
	(0.005)			
No. of employees 500-999	0.145	------	------	------
	(0.009)			
No. of employees 1000 or more	0.183	------	------	------
	(0.009)			
R^2	0.601	0.489	0.545	0.569
WASD	0.081	0.088	0.087	0.085
Sample Size	32,854	32,854	32,854	32,854