Unions and the Male-Female Earnings Differential

By

Tara Griggs

University Of Ottawa

925896

Major Paper presented to the Department of Economics of the University of Ottawa in partial fulfillment of the requirements of the M.A. Degree

Supervisor: Professor Gilles Grenier

Ottawa, Ontario
January 2003

Abstract: Using microdata from the 1994 General Social Survey, this study examines the effects of unions on the wage differential between males and females. The female-male earnings ratio stood at about 70 percent in 1994, up dramatically from its 1967 figure of 58 percent. A great number of factors influenced this convergence, including an increase in female labour force participation, increased investment in education and reduced work interruptions by females, and changing social roles. Another reason for this convergence comes from the effect of unions on the wages of males and females. Though it was found in earlier studies that unions actually increased the differential, more recent studies, including this one, have found that unions contribute to a reducing of the wage gap. In this study we find that unions tend to increase females wages by approximately 16 percent, while they have almost no effect on males wages, thus creating pressure on reducing the male-female earnings differential. As well, it was found that although the wages of males still surpass those of females in both the union and non-union sectors, the gap is considerably smaller in the union sector, 21.7 compared with 35.8 percent in the non-union sector.

Introduction

The discrepancy between earnings of males and females has been an issue of great debate and political concern for most, if not all of the twentieth century. Although much has changed over the last 100 years and continues to change, the gap, though smaller, still persists. In 1994, a full-time, full-year female worker earned, on average, about 70 percent of what her male counterpart earned. This figure, while up quite significantly from the 1967 figure of 58 percent, still provides evidence of the enormous wage disparity between men and women in Canada (Benjamin *et al*, 1998, p426).

Much research has been done in order to uncover the reasons for this convergence and also to find some explanation why wage differences still exist. During the 1970s and 1980s, women dramatically increased their labour force participation. At the same time, a trend towards greater training and education began to increase the ties women had with the labour force. As well, in more recent years women have become increasingly less likely to interrupt their paid work, and when interruptions do occur, they are much shorter

in duration than in the past. (Statistics Canada, 1998) This increase in attachment and growth in educational investment meant better jobs and thus higher earnings potential. More recently certain policy changes (pay equity for example) have helped reduce gender discrimination and subsequently have contributed to reducing the wage gap (Benjamin *et al*, 1998, p437).

Another possible source that has received a limited amount of attention is that of union effects on the male-female earnings differential. Unions affect the wages of those who are unionized as well as those who are not. The likelihood of being unionized also indirectly affects wages. With this in mind, if unions influence the wages of males and females differently and/or if rates of unionization for males and females are different, then this will have an effect on the male-female wage differential.

In this paper, I will try to identify how unions affect the wages of males and females and the magnitude of these effects to determine how unions contribute to the male-female wage gap. The paper will be divided into the following sections. Section One gives a brief account of the union movement and explores the history of the male-female wage gap. In addition, links between unions and the male-female earnings differential are discussed and measurement issues are highlighted. Section Two reviews previous empirical work with regard to union effects on the male-female wage gap. Section Three presents my empirical analysis, including methodology, data and results and as well discusses certain policy implications of the findings. Finally, Section Four sums up the main arguments of the paper.

1. History and Overview

1.1 Union Density and Male-Female Differences

Unions and their resulting wage effects have been an area of great consideration for many decades. The Canadian literature regarding this issue, although informative and insightful, is somewhat limited and conflicting at times, particularly vis-à-vis the effect on the male-female wage gap.

Union membership in Canada increased steadily during the 1900s. In 1911, 133,000 workers were unionized representing 4.9 percent of all nonagricultural paid workers. By 1996 those figures had jumped to 4 million union members, representing 33.9 percent of the nonagricultural paid workforce (Krahn and Lowe, 1993, p332).[1]

Canada, unlike some countries[2], has seen union membership continue to grow or at least remain stable up until the early 1990's. The last century has seen three distinctive growth spurts. The first two coincide with the two World Wars, when labour shortages and economic growth created an ideal climate for union recruitment. The third surge took place in the 1970s, with the rise of the public sector unions supported by legislation

---

[1] Union density is a measure of actual union members to potential members. Agricultural workers are excluded because they are usually self employed and therefore ineligible for union membership. More accurate results are achieved with this exclusion.

[2] Australia has seen its union density go from 64 percent in 1970 to 61 percent in 1987; Japan, during the same time frame has also seen a decline from 35 percent to 28 percent; and most notably during that time frame the US has seen its membership density go from 31 percent to just 17 percent. On the other hand some countries saw a sharp rise in union densities during that time, for example, in Denmark union density went from 66 percent in 1970 to 95 percent in 1987, in Finland the rates went from 56 percent to 85 percent and finally Sweden's rates went from 79 percent to 96 percent (Benjamin *et al*, 1998, p492)

(Krahn and Lowe, 1993, p333)[3]. In more recent years union density, though still relatively high, has begun to decline. Specifically from 1992 to 1999 Canadian union density declined from 36 percent to 31 percent where the years prior to that had seen rates fluctuate between 34 and 36 percent (Johnson, 2002, p335). Also, projections for the future of union density suggest that the last ten years are a good indication of what is to come. It seems that a changing legal environment, increased employer resistance and the type of political regime that we have seen in recent years, have all created and will continue to create an atmosphere that does not support unionization (Johnson, 2002).

This overview looks at the economy as a whole, however, and says little about the union membership of individual groups, specifically males and females. Although in earlier years union membership had been on the rise, the difference between union membership of males and females was extremely divergent. For example, in the late 1960s, males were more than twice as likely to be unionized as females (Benjamin *et al*, 1998, p503). This trend has seen a remarkable change more recently, as female unionization rates have gone from 16 percent in 1966 to more than 29 percent in 1989. This is a significant dissimilarity from the male rates, which have remained relatively stable over that twenty-year period, at about 38 percent, with only a slight decline in recent years (Benjamin *et al*, 1998, p503). An alternative means of comparison comes from examining the change in female members as a percentage of total union members. In 1962, women made up only 16.4 percent of all union members, by 1991, that figure had jumped to 41 percent (Krahn and Lowe, 1993, p346).

---

[3] This decade saw civil servants, teachers, nurses, and other public employees join the ranks of organized labour. This large growth in public sector unions in the 1970s prompted a great amount of research to explore the potential consequences of this surge.

What is the catalyst behind this change? Why has female membership increased so dramatically whereas males' has actually declined, albeit only slightly? The decline in male union membership has definitely come from structural changes in industry and the economy as a whole. Changing technology has resulted in a shift away from employment in the heavily unionized manufacturing sector. As well, we have seen increased market competition from foreign competitors and extensive deregulation of heavily unionized industries (Even and Macpherson, 1993). All of these changes result in fewer males being in jobs or industries where unionization is available or exists at all.

From the female perspective, many reasons could explain why there has been such a remarkable increase in membership. Changes with respect to *occupational gender segregation*[4] have made an enormous impact (Krahn and Lowe, 1993, p161). Women are no longer excluded from "non-traditional" male-dominated and often heavily unionized industries or occupations (Statistics Canada, 1998). Also, as mentioned previously, women's labour force characteristics on a whole have changed significantly. Participation rates, educational investments, and reduced work interruptions, have all affected the rate of unionization of women, because they have allowed women to enter jobs and industries that were previously "off limits" to them. Now women have much greater access to unionization or unionized jobs where forty or fifty years ago they did not.

[4] Refers to the concentration of men and women in different occupations, particularly channeling women into a limited number of occupations where unionization is not prevalent.

Another reason for the dramatic increase in female unionization stems from the public sector. From 1976 to 1992, employment in the public sector increased by 294,000, women represented a gain of 370,000 jobs while men represented a loss of 76,000 jobs (Statistics Canada, 1998). At the same time public sector union growth saw a dramatic increase. This increase was "largely facilitated by supportive legislation, in [the 1970's which] brought many civil servants, teachers, nurses, and other public employees into organized labour's fold" (Krahn and Lowe, 1993, p244). The combination of the two circumstances inevitably led to an increase in the female unionization rate. It is worth mentioning that during this same time frame the male-female wage gap decreased by almost 12 percent (Benjamin *et al*, 1998, p426).

Unions themselves have also played a role in the increase in female unionization rates. Many years ago, unions, in an effort to maintain higher wages, adopted policies to restrict access for women to certain jobs. Over the past decade unions have strived to change these policies in an effort to combat the under-representation of women in unions (International Labour Organization, 2000). For example, over the past decade unions have adopted policy statements "pledging to improve the lot of women workers and to encourage women to seek leadership posts in the union" (International Labour Organization, 2000). Also, "some unions have changed their structure and working methods to help women overcome barriers which they encounter" in trying to achieve union membership status (International Labour Organization, 2000). This change in attitudes of unions has also helped bridge the gap between male-female union densities.

1.2 How Unions May Affect the Male-Female Wage Differential

Extensive research has documented the fact that unions benefit their members financially. Keeping this in mind, if one group of workers has a much greater rate of unionization, then they are likely, as a whole, to have higher wages than those workers who are comparable but not unionized. This logic can be extended to a male-female comparison. As has been highlighted above, there has always existed a difference in the unionization rates of males and females. If unions raise the wages of their members to the detriment of those who are not unionized, then it would make sense that because of this divergence in rates, part of the reason why a male-female earnings differential exists could be due to unions. That being said, it could also be surmised that the emerging increase in female unionization may have had and continues to have a large bearing on the male-female wage differential. This paper will attempt to determine how much the effect of unions contributes to the reduction in the male-female wage differential. By examining how unions affect the wages of males and females differently and how certain characteristics affect wages differently under a union versus a non-union situation, we will be able to accurately assess the total effect of unions on the male–female earnings differential.

1.2.1 Theoretical Impact of Unions

Abstracting from the macroeconomic effects of unions[5], this section takes a narrower focus, looking only at potential effects of unions on individual firms. To begin with, we will examine union effects in general and then look more specifically at the male-female

[5] A higher overall wage rate created by the threat of unionization as well as unions themselves results in higher unemployment. At the same time certain policies created by unions may result in better overall working environments for all workers.

breakdown. Unions bargain and negotiate on behalf of the employees they represent. "Typically, the daily activities of unions focus on two types of goals: control over work, and the rewards of work"[6] (Krahn and Lowe, 1993, p235). Because unions represent a powerful voice, they are able to negotiate effectively for higher or more financially pleasing wages (rewards). Unions wish to attain the highest wage possible for their employees, whether this wage is the prevailing competitive wage or not. As with other wage-fixing arrangements, wages in the unionized sector would be set artificially higher than under normal competition (Benjamin *et al*, 1998, p545). What should be the effect in the nonunion sector? Two potential effects exist.

First, the result of higher wages in the union sector relative to the nonunion sector should cause a reduction in employment in the union sector and an increase in supply of workers in the nonunion sector. This increase in supply will depress wages in the nonunion sector. This is called the *supply or spillover effect* (Renaud, 1997). The second effect is called the threat effect. Employers who are not unionized may increase wages in order to avoid the threat of having their workers become unionized. Because of this *threat effect*, higher union wages may push up nonunion wages in comparable sectors (Benjamin *et al*, 1998, p547). The two effects will have offsetting results on wages and the magnitude of the two effects will determine the differential between wages of those who are unionized and those who are not.

[6] Rewards refer to salaries, benefits, and any other types of monetary or non-monetary benefits. For this study we will concern ourselves with just salaries.

This framework can be extended to male-female wage effects. Essentially, the overall result of unions on the male-female earnings differential can be broken down into three distinct effects: "1) the male-female union membership effect, 2) the extent to which unions differentially affect the wages of union members, and 3) the extent to which unions differentially affect the wages of non-union males and females" (Maki, 1990, p306). Looking at each of these separately highlights the problems that arise when trying to accurately assess the impact. As was stated previously, the difference between union membership of males and females, although small, is still in favour of the male population. If unions tend to raise wages of their members, then the first effect is to increase the male-female wage differential. The second element highlights the fact that although unions may raise the wages of their members, if members differ in certain characteristics (for example, sex) this may have a bearing on the magnitude of the effect. For example, unions may raise wages for females more than they do for males. As with the third element many factors come into play, not all of which will have the same sign or magnitude. The overall effect of unions on the earnings differential therefore "depends upon the relative magnitude of a large number of opposing forces" (Maki, 1990, p306). Accordingly, we cannot only rely on theory to answer our questions; this is an empirical issue.

1.3 Problems in Measuring the Union Wage Impact

There are two main problems encountered when trying to measure the union wage impact - selectivity and causality. The first of the two deals with the idea that workers in the unionized sector are not necessarily there randomly; instead they may have self-selected

themselves into the organized sector where wages are more attractive. Because of the higher wages offered in the organized sector, potential employees form a queue of applicants from which employers can choose. Because of this queue, employers in the organized sector can be more selective when they decide on whom they are going to hire. The resulting hires should have more productivity-related characteristics (Benjamin *et al*, 1998, p551-552). But the measurement problem does not arise simply because unionized employers can be more discerning when they employ workers, the real problem lies in measuring the characteristics that set certain workers apart from each other. Both self-selection by potential employees and more rigorous hiring practices in the organized sector may lead to higher quality workers in the organized sector. Quality differences, which are unmeasureable, cannot be controlled for, and the "resulting union-nonunion wage differential will be upwardly biased" (Renaud, 1997, p214). There is certainly a wage premium created by unions but there will also be a wage premium occurring because of higher quality workers.

The second of the two problems, causality, deals with the question, "Do unions create higher wages or do high wages create unions?" It is understandable to believe that unions create higher wages. But at the same time, one could look from the opposite stand point and argue that higher wages lead to unionization. If employees in a certain sector have high wages they may wish to obtain a powerful voice to represent them so as to maintain those higher wages. Alternatively, workers may receive high wages to compensate for poor working conditions and they may wish to change their working

conditions without losing any of their wages. In either case, workers would be looking for a stronger voice to protect them and their elevated wages (Renaud, 1997).

In order to deal with the problems of selectivity and causality, one must specify a model that accounts for the determination of union membership status and the union wage impact simultaneously. One such method is the ***Heckman-Lee Technique*** which consists of doing the following: 1) using a reduced form probit equation, the probability of being a union member is estimated; 2) the Inverse Mills Ratio (IMR)[7] is constructed for each of the union and nonunion workers using fitted values from the preceding reduced form equation; 3) in order to yield unbiased estimates of the union-nonunion wage differential, the appropriate IMR is added as a selection correction term in ordinary least squares estimates of the union and the nonunion wage equations (Renaud, 1998).

Unfortunately, correctly accounting for selectivity bias and causality does not always lead to accurate results. For example, Kumar and Stengos (1986) report a wage differential of 58 percent when they control of selectivity bias, compared with a much more reasonable finding of 11 percent finding when they do not control for it. White (1994) provides another striking example, where his differential goes from 18-20 percent to 221-240 percent after correcting for selectivity bias. Other Canadian studies, such as Robinson (1989), Green (1991) and Simpson (1985), also report larger comparable estimates when controlling for selectivity.

[7] The standard normal density function divided by the cumulative distribution of the standard normal.(Hirsh and Addison, 1986, p126)

It is obvious from the above that measuring the impact of unions on wages, in this case those of males and females, is not completely straightforward. At times, certain methods (like the one discussed) are used to overcome the problems. If precautions are not taken, then results may be inaccurate. The method employed will depend on a number of factors and will ultimately become the decision of the researcher. Many times, researchers will employ more than one method and then view their results to see which ones make more sense or follows previous work. In any case, section 3 will go into detail about which method I will employ and the reasoning I used to make my decision.

2. Survey of Empirical Work

2.1 Earlier Studies – Unions Increase the Male-Female Wage Gap

While the main thrust of my paper is the effect of unions on the male female wage differential, I still wish to highlight some of the main findings with regards to union effects in general. Thus, I will look at studies that have explored the issue of union effects on wages but that also look at the results with respect to males and females. As this is a study using Canadian data, I highlight previous Canadian studies. US research, summarized by Lewis (1986), will be used, at times, as a comparison base.

Robinson and Tomes (1984) conducted a study exploring the potential effects of unions, where their particular focal point was union effects on the public-private wage differential. They wished to test the idea that the then recent higher public sector wages were due to the recent increase in unionization in the public sector. Earlier research probing public sector wages had elicited questions with regard to whether wages were

actually higher in the public sector relative to the private sector and as well how males and females were differently affected. For example, Morley Gunderson (1979) examined the male-female wage differential in Canada during the 70s and in his assessment he concluded "apart from the service sector, the government wage advantage [was] considerably greater for females than for males, suggesting that wage discrimination against females is smaller in the government sector" (Gunderson, 1979, p484). Auld *et al* (1980) also explored the public-private phenomena but concluded that "the estimated wage change equation for total public sector (was) not significantly different than the estimated wage equation for the private sector" (Auld *et al*, 1980, p383).

Robinson and Tomes' study would thus further explore these issues in order to shed some light on the previously conflicting findings. Their study was the first to allow "for the determination of union sector status in estimating both potential union-nonunion and public-private sector wage differentials."(Robinson and Tomes, 1984, p107) Their data source was the Social Change in Canada Survey for 1979. Using the Heckman-Lee technique explained previously, and estimating union and nonunion wage equations for both public and private sector hourly paid workers individually, Robinson and Tomes found the following.

For private sector unionized workers, schooling, tenure and skill level all had positive and significant effects on wages. The same results were found for the private non-union sector but the differentials were larger. Of interest to this study, they found that private sector unionized males earned 42 percent more than their female counterparts (holding all

other characteristics the same), while the private, non-union sector male-female differential was only 17 percent. These findings are consistent with the idea that unions tend to increase the male-female wage differential. This is in contrast to more recent studies done on the effects of unions on the male-female wage differential, but the fact that this only looks at the private sector may be one reason behind the conflict.

For their public sector results the sample sizes were very small, because they found that few workers in the public sector were paid on an hourly basis[8]. As such, they felt that their results were to be viewed with caution. With this mind, I will not go into the specifics of what they found and will instead simply detail their ultimate conclusions. They found some evidence to support the idea that there are larger union gains in the public sector than in the private sector. In keeping with the theme of this paper we look at the differential with respect to males and females. They found that for the average unionized males the public-private sector wage differential was 6.42 percent, while for the average unionized females it was 14.75 percent. This result elicits the idea that unions may have different effects in the public sector relative to the private sector with respect to males and females. Finally, when they controlled for union status, they found a significantly reduced estimate of public-private differentials, which suggested to them that the then recent higher public sector wages might have been the result of the increase in unionization in the public sector.

[8] The dependent variable in their study was hourly wages and thus only those who reported their wages on an hourly basis were included.

Wayne Simpson (1985), using a different survey that also included information on union status, attempted to test the robustness of this earlier study and to re-examine other questions addressed by previous studies done with aggregate data. Simpson used the 1974 Labour Canada Wages Survey to test the effect of unions on wages. Like Robinson and Tomes, he felt that union status was not random and therefore needed to be accounted for in the model. With his two wage equations, representing the union and nonunion sectors, Simpson made estimations using the entire sample as well as four sub samples – manufacturing, non-manufacturing, the public sector, and the private sector. The second of the two sub-samples enabled him to make comparisons with the previously mentioned work of Robinson and Tomes.

Simpson had the following results. Looking at skill level comparisons, Simpson found a distinct compression of the skills differential in the union sector. With respect to the public and private sectors, Simpson found that the "non-unionized public sector workers [did] 10.6 percent better than unionized public sector workers because the advantage held by skilled workers in the non-unionized public sector more than offsets the advantage held by unskilled workers in the unionized public sector" (Simpson, 1985, p171). He found a similar situation in the private sector, but because private sector differentials were uniformly higher, the overall differential was 18.9 percent in favour of the unionized sector. These results were similar to the findings of Robinson and Tomes.

Also similar to Robinson and Tomes, but in contrast with more recent studies, Simpson found that unions heightened the male-female earnings differential. Although their

conclusions are similar, Simpson's figures were markedly lower. He found the male-female wage differential in the union sector to be 23 percent compared to 20 percent in the non-union sector. Robinson and Tomes figures were 42 and 17 percent respectively. The factors behind this large discrepancy in magnitudes may be due to the fact that the figures of Robinson and Tomes came from regressions that just included private sector unionized workers, whereas Simpson's regressions included both public and private sector unionized workers. As was stated earlier, the effects of unions in the public sector may be different[9] from those in the private sector and therefore this might make up for some of the discrepancy. This idea may become more of an issue when we look at studies that conflict with this result. For now, regardless of the magnitude of the difference in the results, they still lend further evidence to the notion that unions increase the male-female earnings differential.

Using part of the work done by Wayne Simpson and summary work prepared by Gregg Lewis (1986), Maki and Ng (1990) attempted to examine specifically the effect of unions on the male-female wage differential. Lewis had previously concluded, after reviewing 41 U.S. studies, that the effect was ambiguous in sign and that the numerical magnitude was close to zero (Lewis, 1985, p118). Simpson, as we have already alluded to, found that unions might have in fact widened the male-female earnings gap. Maki and Ng, using the 1984 Survey of Union Membership, estimated wage equations for male and females, with union status entering as a dummy variable. Also, they had separate

[9] Recall, the wage differential between public/private sector female workers is much larger than the male differential, suggesting that unions have a larger impact on female wages in the public sector relative to male wages.

estimates for private and public sectors. This dichotomy allowed comparison with the results of Robinson and Tomes.

Like researchers before them, Maki and Ng recognized the problem of selectivity bias and thus corrected for it using the Heckman-Lee procedure. Unlike the others though, they also did simple OLS estimation and found the results to be almost identical. As such, they only reported the OLS estimates in their findings.

They found the union coefficient to be larger for males than for females. Specifically, the overall contribution of the union variable to the male-female earnings differential was about 30 cents per hour. They further decomposed this figure and found that 17 cents per hour was due to the wage effect and 13 cents per hour was due to the membership effect (males have a higher union density than females).

Using Robinson and Tomes findings that union wage effects were approximately the same for both private and public sectors, Maki and Ng attempted to further test this idea in the context of the male-female earnings differential. Thus, they just re-estimated their basic model (wage equation for males and females) separately for the public and private sectors. For the private sector results, the coefficients for the union variable indicated that unions had increased the male-female wage gap by approximately 31 cents per hour and that almost 20 cents of this was due to the wage effect. Conversely, their results for the public sector showed that unions actually reduced the male-female wage differential by $1.35 per hour, with $1.32 accounting for the wage effect. As was suggested earlier,

these conclusions suggest that unions affect males and females differently depending on whether they are public or private sector workers (a result that was also found by Robinson and Tomes). For the entire sample, the findings indicate that unions have indeed increased the male-female differential; thus it appears that, in this case, the private sector wage effects dominate the public sector.

2.2 More Recent Studies – Unions Reduce the Male-Female Wage Gap

The above studies, using data from the 1970s and early 1980s, seemed to find that unions increased the male-female wage gap. The more recent studies uncover different results.

Doiron and Riddell (1994), like Maki and Ng before them, wished to look specifically at how unions affected the wages of males and females and how these different effects affected the wage gap. Doiron and Riddell went a step further and also looked into the reasoning behind the convergence, overtime, of the male-female rates of unionization. During the time frame of their study, 1981-1988, the male-female unionization gap narrowed considerably. They tested whether this narrowing had an effect on the male-female earnings differential.

Doiron and Riddell used three data sets, which spanned the decade of the 1980s: the 1981 Survey of Work History, the 1984 Survey of Union Membership, and the 1988 Labour Market Activity Survey. They acknowledged the fact that the earnings gap did not only depend on the impact of unions on the wages of males and females but "also on the factors accounting for differences between male and female rates of unionization"

(Doiron and Riddell, 1994, p505). One of their key objectives was to "analyze gender earnings differences taking into account the factors affecting unionization of males and females rather than simply treating union status as exogenously determined" (Doiron and Riddell, 1994, p505). Accordingly, to allow for this, they developed a methodology based on earlier work done by Even and Machpherson (1993).

The method involved the decomposition of the unionization gap[10], "based on a Taylor series approximation to the probability of unionization functions" (Doiron and Riddell, 1994, p505) as well as the decomposition of the earnings gap with endogenous union status. They felt that these decompositions would allow for more accurate analysis with respect to the contribution of individual explanatory variables.

Using the decomposition of the unionization gap, they found that the reduction in the gender gap in unionization was the outcome of two conflicting trends, "a reduction in the male-female gap in returns and an increase in the contribution of differences in characteristics" (Doiron and Riddell, 1994, p519). They also found that industry, occupation, and job tenure were the most important factors contributing to the unionization gap but that age and public sector status also had an effect.

Using the 1984 data, breaking down the actual effect of unions on wages of males and females, Doiron and Riddell exposed a very important finding. They found that union coverage had a larger impact on the earnings of females than males, 20 percent versus only 15 percent compared to non-union. If unionization rates were equal, this would

[10] This was accomplished by estimating a separate union incidence model for both males and females.

mean that unions would unequivocally reduce the gender gap. Unfortunately, unionization rates are not quite the same and although the gap is rather small, the difference still exerts an opposing effect on the wage gap.

Another interesting finding by Doiron and Riddell was that the gender earnings differential in the nonunion sector made a substantially larger contribution to the gender earnings gap than did the differential in the union sector. This conclusion is in harmony with the argument that unions diminish the influence of gender discrimination on wages, an argument that goes against the findings of the previously reviewed studies. Doiron and Riddell's final conclusion was that the considerable decline in the unionization gap, over their studied time frame, prevented a 7 percent increase in the overall gender differential that would have occurred in absence of the decline in unionization differential.

Renaud (1998) deals with the effects of unions on wages. He goes a step further than the other Canadian studies by extending wages to include compensation (fringe benefits) as well. Renaud used cross sectional data from the Canadian General Social Survey of 1989 as his data source. Renaud's estimation strategy, like many others previous to him, accounted for the potential selection bias by using the Heckman-Lee technique. Like Maki and Ng (1990) he also did simple OLS regression as a comparison, but he did not find the results to be almost identical; instead he found the corrected results yielded a union wage impact of 107 percent, a figure that is unquestionably sizeable at best. Gregg Lewis (1986), in his book *Union Relative Wage Effects* found this to be a common

problem, reflecting the dilemma of correctly identifying the union choice equation. In lieu of this situation and given his results, Renaud only reported the OLS estimates.

He showed that the overall union wage differential was about 10.4 percent but when benefits as well as wages were included in the calculations the differential was 12.4 percent. He went further to clarify that even though the difference was only 2 percentage points, because these benefits only encompassed about 6 percent of total compensation[11] in his sample, the true "percentage impact of unions on benefits (was) estimated to be 45.5 percent" (Renaud, 1998, p1). This implies that unions tend to provide much greater benefits for their members. The figure for the union impact on wages alone (10.4 percent) was low relative to previous findings, but Renaud stated that this could simply be because a different econometric specification was used and/or that previous studies might have failed to control for vital determinants of wages. Tenure is a good example. The GSS has questions that address this issue and so Renaud was able to control for this significant variable. Previous studies did not have access to surveys that provided this type of information.

Renaud also looked at the union effects for selected groups. Of particular interest to this study are, of course, his findings for males and females, but we will first highlight briefly some of the other interesting findings that he reported on. This will allow for some comparison with previously mentioned studies.

[11] The measure of total compensation that Renaud used was "an additive composite of both the respondents' reported annual income, and the average employer's cost of individual employee benefits by industry expressed in 1989 dollars per employee per year."(Renaud, 1998, p7)

In terms of skill level or educational attainment, Renaud found that those workers who had less than a high school education were one of the groups that benefited the most from unionization. This is in line with the compression of skills differential that Simpson found. But in conflict with this conclusion, Renaud also found an unexpected result for those workers who had a post graduate degree. Their wage differential was estimated to be 18.6 percent, far and above the largest differential for all skill levels.

An area of interest that has not been highlighted in any of the studies thus far is the union effect on the wages of immigrants. Renaud found that although unions tended to increase wages for both immigrant and non-immigrant workers, the increase was more substantial for immigrants. Lending credence to the idea that unions "are successful in protecting immigrants against discrimination and help in reducing the immigrant-nonimmigrant wage gap" (Renaud, 1998, p14).

Renaud also looked at differences across industries and occupations, in particular between the public and private sectors. He found that the union-nonunion differentials were 4 and 12 percent respectively. These findings were consistent with Simpson, who found a greater union-nonunion earning differential in the private sector relative to the public sector.

Finally we look at his findings with respect to the male-female differential. Renaud reported that female workers received a much greater union-nonunion wage differential than their male equivalent. He looked at males and females individually and found that

unionized females earned 14.6 percent more than nonunionized females. Whereas unionized males earned only 7.8 percent more than their nonunionized male counterparts. These findings are consistent with the earlier mentioned work of Doiron and Riddell as well as work by Christofides and Swidinsky (1994). Christofides and Swidinsky found that unionized males earned only a 5.7 percent larger wage differential than their non-union counterpart whereas unionized females earned a 12.7 percent larger wage differential than their comparable non-union equal[12].

To summarize this survey of empirical work, it appears that earlier work in this area found that unions increased the male-female earnings gap (for example Robinson and Tomes 1984, Simpson 1985 and Maki and Ng 1990). This is in direct conflict with the more recent studies. At the same time, in recent years we have seen dramatic changes in the union density rates of males and females as well as overall union density rates. Can this explain the change in the effects of unions on male/female wages? Why have more recent studies conflicted with the findings of earlier researchers? The remainder of the paper will attempt to examine whether unions continue to have a positive effect on the male-female earnings differential and why we have seen a change in results in recent years relative to studies done in the 1980s and early 1990s.

3 Empirical Analysis

Using the 1994 General Social Survey and the previously mentioned study done by Stephane Renaud, which used the 1989 General Social Survey, as a comparison, I will

[12] Based on hourly earnings for all employed workers in all industries.

unionized females earned 14.6 percent more than nonunionized females. Whereas unionized males earned only 7.8 percent more than their nonunionized male counterparts. These findings are consistent with the earlier mentioned work of Doiron and Riddell as well as work by Christofides and Swidinsky (1994). Christofides and Swidinsky found that unionized males earned only a 5.7 percent larger wage differential than their non-union counterpart whereas unionized females earned a 12.7 percent larger wage differential than their comparable non-union equal[12].

To summarize this survey of empirical work, it appears that earlier work in this area found that unions increased the male-female earnings gap (for example Robinson and Tomes 1984, Simpson 1985 and Maki and Ng 1990). This is in direct conflict with the more recent studies. At the same time, in recent years we have seen dramatic changes in the union density rates of males and females as well as overall union density rates. Can this explain the change in the effects of unions on male/female wages? Why have more recent studies conflicted with the findings of earlier researchers? The remainder of the paper will attempt to examine whether unions continue to have a positive effect on the male-female earnings differential and why we have seen a change in results in recent years relative to studies done in the 1980s and early 1990s.

3 Empirical Analysis

Using the 1994 General Social Survey and the previously mentioned study done by Stephane Renaud, which used the 1989 General Social Survey, as a comparison, I will

[12] Based on hourly earnings for all employed workers in all industries.

test the theory that unions affect the wages of males and females differently, in such a way that they have a diminishing effect on the male-female earnings differential.

In order to look at the evolution of the effects of unions over time, our results will be compared to those of earlier studies. It is hoped that we will be able to reach certain conclusions as to how the change in male-female union density rates has resulted in a continued reduction in the male-female wage gap over time.

3.1 Methodology

In my model I chose not to correct for selectivity bias. As I mentioned earlier in the paper, a great number of researchers have found that correcting for selectivity bias does not produce reasonable results (Renaud, 1997). Gregg Lewis was a strong advocate against correcting for selectivity bias. In his book, *Union Relative Wage Effects A Survey* (1986), Lewis reviewed a great number of U.S. studies done by previous researchers, using many different types of data, and he concluded that applying this technique simply does not work. He cited serious misgivings about the robustness of the results that were obtained when selection bias was accounted for. Identification problems that occur in estimating a system of simultaneous equations are generally recognized as the logic behind those questionable results.

3.1.1 Estimated Equations

Two sets of equations were estimated for this study in order to examine both direct and indirect effects of unions on the male-female wage gap.

The following wage equation was estimated separately for males and females:

$$W_k=X_kB_k + D_kU_k +\varepsilon_k \qquad (1)$$

where W_k is the vector of the log of wage rates, X_k is the matrix of characteristics, B_k is the vector of coefficients, D_k represents the union status coefficient, U_k is the dummy variable taking the value of one for union status and zero for non-union status, and ε_k is the vector of error terms; the subscript k=m,f, where m represents male workers and f represents female workers.

The second equation was estimated separately for union and non-union members:

$$W_j= X_jB_j + C_jM_j + \varepsilon_j \qquad (2)$$

where W_j is the vector of the log of wage rates, X_j is the matrix of characteristics, B_j is the vector of coefficients, C_j represents the gender coefficient, M_j is a dummy variable taking the value one for males and zero for females, and ε_j is the vector of error terms; the subscript j=u,n, where u represents union workers and n represents non-union workers.

The first equation is used to look at how unions affect the wages of males and females differently and hence how unions will affect the male-female earnings differential. Taking the analysis a step further, with the second equation, I am able to look at not only the relationship between unions and gender but other characteristics as well. In this way,

assuming as I have, that in recent years union densities have seen major changes, I am able to develop some theories regarding potential indirect effects of unions on the male-female wage gap.

3.1.2 Oaxaca Decomposition

From equation one we are able to identify the male-female earnings gap. This gap can be decomposed into two terms:

$$W_m - W_f = (Z_m - Z_f)T_m + Z_f(T_m - T_f)$$

where W_m and W_f represent the log of wages of males and females respectively, the Z represents the mean values of the characteristics variables from equation one, including the union variable, and T_m and T_f are least squares estimates of the parameters in equation one. The first term on the right hand side is the element of the earnings differential "that can be attributed to differences between men and women in the average endowments of earnings-related characteristics"(Doiron and Riddell, 1994, p508), while the second term is "associated with differences between men and women in the returns to those endowments."(Doiron and Riddell, 1994, p508)

The decomposition is useful as it allows us to identify where and if males and females differ with respect to certain characteristics, i.e. education levels, and also the different returns to those characteristics. This method of decomposition will be used with equation one. This will help determine how much of the effect of unions on wages can be

associated with differences in union densities between males and females and how much can be attributed to how unions affect the wages of males and females differently. The other characteristics will also be examined and measured with reference to the union variable.

3.1.3 Wage Measurement

The General Social Survey questionnaire allows respondents to report their wages on an hourly, daily, weekly, bi-weekly, monthly, or yearly basis. In order to avoid any wage measurement errors, all recorded wages were converted to annual salaries, by assuming a 40-hour workweek and using 50 weeks as the base number of weeks per year. Although, the 40-hour workweek may tend to overstate the number of hours people work, using 50 weeks per year as the base number of weeks may partially correct for this.

3.2 Data and Variables

The initial sample of the 1994 General Social Survey included 11876 respondents. As I wanted to be able to compare my results with those of Renaud, many of my exclusions and variable choices mimicked what he did in his study. Because of the nature of the study, only those who were employed at the time of the survey were included. With the aim of maintaining consistency with previous studies and to limit the scope of my study, another restriction on employment was necessary. Only those who had been employed

on a full time basis in the past year were included[13]. A restriction on age was also incorporated, limiting the scope of the study to those between the ages of 20 and 65. So as to ensure that those who reported being employed on a full time basis were not volunteer workers, only those who reported earning wages or salary in the past year were included. Finally, those who reported being self-employed[14] were excluded. Taking into account missing variables, the ultimate number of respondents used from the survey was 2652 for the first equation (1481 males and 1171 females), and 2599 for the second equation (839 union members and 1760 non-union members).

Many different individual characteristics tend to affect wages, but in order to maintain some sort of consistency with Renaud's model and to achieve results that I could conceivable compare; I selected the following characteristic variables.

Common to any wage equation is a variable to represent education. In my model education was broken down into five categories with less than high school as the base, then high school, Bachelors degree, Masters degree, and finally Doctorate.

A variable to represent age was also created and broken down into 4 categories, the base being those ages 20-24, with the rest of the ranges being 25-34, 35-49 and 50-64 respectively.

---

[13] Those persons who listed their work as "full time" and who worked 48 weeks or more in the last year were considered full time workers, all others were excluded.
[14] Those who are self-employed are not eligible for union membership.

Tenure and firm size variables were also represented. Both of these variables tend to affect wages differently depending on whether a person is unionized or not and therefore I wanted to test and see if results, in this regard, would be consistent with previous findings. Both tenure and firm size were broken down into four categories respectively. The base for tenure was respondents with less than five years on the job and then the divisions were 5-10 years, 11-24 years and finally 25 years or more. Less than 99 employees was the base for firm size with category ranges of 100-499 employees, 500-999 employees and finally 1000 or more employees.

Variables for marital status and region were also included, again representing typical components of any wage equation. The regional variable had Ontario as its base with the West representing BC and Alberta, the Prairies - Saskatchewan and Manitoba, and finally the Atlantic provinces encompassing NFLD, PEI, Nova Scotia and New Brunswick. Single was the base for marital status with only two other divisions corresponding to married and divorced.

The next variable, immigrant status, like that of sex, is extremely interesting and important when developing a wage equation, as it facilitates the testing of the extent of discrimination in the economy. As well, it is often examined with reference to union status, to test whether unions tend to lessen the effects of discrimination on immigrants.

One of the two key variables of interest in this study, gender is the next variable to identify. In the first equation we run regressions for males and females separately but in

the second equation a dummy variable for gender is used to examine the effect of unions on wages with regard to sex differences. The dummy variable takes on the value one for males and zero for females.

Finally, the last variable to discuss, and of particular interest, is the union variable. In the 1994 GSS questions were asked about union membership as well as about being part of a collective agreement. For the purpose of this study, only those who reported being a union member were considered to have union "status". In equation one union membership is a dummy variable, taking the value one for union status and zero for non-union status. In equation two a separate equation is run for union members and nonunion members.

3.5 Findings

Appendix (1) and (2) present a summary of each variable in both the male/female wage equation and the union/non-union wage equation and also report the weighted means of each variable. Table (1) below provides the results of the regressions for the male-female wage equation. To help with further analysis, Table (2) provides the decomposition of this equation. Table (3), which provides results for the regressions on the union/non-union wage equation, will be discussed later. In both sets of regressions the R squared for each category is fairly good, ranging from a high of 0.4120 to a low of 0.3190. As well most coefficients are significant at a 5% level in a two-tailed test.

3.5.1 Regression Results for Males and Females

In reporting my results I make use of Renaud's work as a direct comparison, as his estimation method and data are similar to mine. His findings will serve as the best yardstick for assessment. I will also draw on the work of other researchers to extract parallels and make accurate conclusions.

Table (1)

Wage Regressions for Males and Females, 1994

Variable	Male Coefficients	t-value	Female Coefficients	t-value
Intercept	9.70414	157.73	9.46948	127.37
HS	0.09658	3.09	0.17937	4.45
BA	0.4821	12.96	0.59243	12.88
MA	0.52692	9.47	0.65053	8.23
Phd	0.76386	8.77	0.86618	4.01
Tenure25pls	0.19643	4.08	0.22381	3.34
Tenure1124	0.19708	5.5	0.20485	4.73
Tenure510	0.06738	2	0.14793	3.76
Union	-0.01765	-0.59	0.15917	4.37
Firm499	0.21275	5.48	0.20425	4.3
Firm999	0.23246	4.42	0.24628	3.68
Firm1000pls	0.23127	7.23	0.1748	4.71
Age2534	0.29584	5.17	0.26806	4.18
Age3549	0.40511	6.83	0.31845	4.87
Age5064	0.36879	5.69	0.2191	2.99
Married	0.15437	4.83	-0.03052	-0.83
Divorced	0.07866	1.40	-0.02584	-0.49
Maritime	-0.23029	-5.66	-0.24101	-4.89
Quebec	-0.12661	-3.31	-0.18537	-3.9
Prairie	-0.15811	-3.84	-0.28368	-5.34
West	-0.00242	-0.07	-0.02744	-0.62
Immigrant	-0.18311	-4.97	-0.10689	-2.46
R-squared	0.3261		0.3202	
Observations	1481		1171	

Looking at the union variable in Table (1), we can immediately see that unions have almost no effect on the wages of males but a large, almost, 16 percent increase on the wages of females. From this finding one can immediately ascertain that unions cause a decrease in the male-female wage gap. However, in order to be able to say exactly how unions contribute to the earnings differential we will make use of the Oaxaca decomposition (see Table (2)). We will also make use of this decomposition to derive comparisons between unions and other characteristics of interest.

Table (2) Oaxaca Decomposition

Category	Diff. in Characteristics	Diff. In Returns	Decompostion Total	
HS	-0.005173791	-0.038814436	-0.043988226	
BA	-0.022316409	-0.027605669	-0.049922078	-0.07879 Edu
MA	0.008341144	-0.005805962	0.002535182	
PHd	0.013107838	-0.000523878	0.012583959	
Tenure25	0.01105508	-0.001823782	0.009231299	
Tenure1124	0.007154004	-0.002136595	0.005017409	-0.00893 Tenure
Tenure510	-0.000820688	-0.022355847	-0.023176535	
Union	-0.000336409	-0.05405741	-0.054393819	-0.05386 Union
Firm499	-0.000278703	0.00120496	0.000926258	
Firm999	0.001559807	-0.000849792	0.000710015	0.019998 Size
Firm1000pls	-0.000878826	0.019241023	0.018362197	
Age2534	0.000502928	0.008018419	0.008521347	
Age3549	-0.009358041	0.037520314	0.028162273	0.079308 Age
Age5064	0.012199573	0.030424493	0.042624066	
Married	0.015401495	0.10989122	0.125292715	
Divorced	-0.005181334	0.014010315	0.008828981	0.134122 Marital Status
Maritime	0.00292238	0.001894974	0.004817355	
Quebec	-0.000612792	0.01134068	0.010727888	0.03507 Region
Prairie	-0.003255485	0.016406976	0.013151491	
West	2.71766E-05	0.006345823	0.006372999	
Immigrant	0.003003004	-0.012366695	-0.009363691	-0.0095 Immi.
Intercept	0	0.23434	0.23434	
Totals	0.027061951	0.324299131	0.351361082	

Before we get into a detailed examination of each category it is necessary to briefly discuss some aspects of the totals. From the decomposition we can see that the total difference in wages of males and females is 35 percent. This finding is not out of the ordinary but what is worth highlighting is that the majority of that 35 percent is due to differences in returns to characteristics, sometimes referred to as discrimination (in this case against female workers) rather than differences in characteristics themselves. Females have significantly narrowed the gap with their male counterparts in terms of individual characteristics that affect wages[15]. Unfortunately due to the continued presence of discrimination, this is not enough to eliminate the earnings differential.

To further analyze the decomposition we will now look at the total decomposition for each category and then look at the breakdown between the two effects[16] so that we can see why and how the wages of males and females differ. Of the mentioned 35 percent discrepancy between male and female wages, 23 percent is embodied in the intercept term. Recall, that the reference group was a single person of non-immigrant status living in Ontario with less than high school, with less than five years on the job, a non-union member, in a firm with less than 100 employees, and between 20 and 24 years of age. In seeing that such a large proportion of the difference due to discrimination is related to the constant term we can further highlight the large discrepancy in wages in favour of the male population. In this case males from the reference category earn on average 23 percent more than their female counterpart. Unfortunately, given that the constant term

[15] Increased education, increased tenure (job duration), are just two of the areas where women now compete evenly with males.

[16] Recall that one effect shows how males and females differ in endowments and the other shows how they differ with respect to the returns to those endowments.

includes all the reference categories we cannot be specific about which characteristics are causing the discrimination but we can draw certain conclusions. Thus, we can deduce that some groups of females suffer more from discriminatory practices than others. For example, those females with minimal education, limited tenure and of non-union status may earn significantly less than males with similar characteristics.

Turning our attention now to the specific characteristic categories we can see that education, tenure, union membership and immigrant status all serve to reduce the earnings differential, while firm size, age, marital status, and place of residence all put increasing pressure on the wage gap. These combined effects, along with the constant term, produce a male wage advantage of approximately 35 percent, slightly higher than the findings of earlier studies but in the expected range.

The breakdown of certain variables produce interesting findings and therefore some of these categories will be outlined in more detail. For example, if we look at the two separate effects in each division of education we can see that with regard to high school and Bachelors degrees, females actually have an advantage over males in endowments in these divisions. In the MA and PhD divisions males have an advantage, but only a small difference exists. This provides evidence that females are indeed increasing their education levels and are beginning to be on a level playing field in this regard. As well, in all four divisions the returns to each form of education are greater for females and thus cause decreasing pressure on the male-female wage gap.

Though tenure has a limited impact on the earnings differential, I wish to highlight one interesting part of its decomposition. The difference between males and females, with regard to levels of tenure, is quite small for all categories but I found it particularly interesting for the categories of 11-24 years and 25 years or greater. My initial feeling would be that males would far outpace women in this respect, given the forced interruptions in work on the part of females. This provides further evidence that females are beginning to level the workforce playing field.

Age is another category worthy of mentioning. In both the age ranges of 35 to 49 and 50 to 64 the returns to age are greater for males, explaining a large portion of the age effect. As well, the difference in the amount of male and female workers between the ages of 50 and 64 (more males work during this time frame) also creates pressure on the wage gap.

Marital status accounts for the largest difference in male-female earnings. Of the 36 percent differential, marital status represents over 13 percent. Looking at the decomposition, we see that most of this difference comes from the returns to marital status particularly married workers, in favour of males. Table (1) shows that a married male earns approximately 15 percent more in wages relative to his single counterpart, whereas a married female actually earns less relative to a female of single status. Though this is a well-known fact, an explanation for this anomaly is not obvious. If this study had used data from the early 1950s then one could possibly argue that family structure and roles were the reason for this finding. Males were the breadwinners and in order for them to be able to maintain their family and their lives, employers may have felt

compelled to pay them a wage premium. If married women worked they did not necessarily need this premium as they could rely on their husband's income. This is one possible explanation for this strange finding, but given the drastic changes in society and 'traditional' family structures in the last 50 years this no longer seems like a plausible explanation. Because the potential implications of this finding are enormous, this oddity needs much greater study. Unfortunately the scope of this paper does not allow for this and I leave it up to the reader to further investigate.

With reference to place of residence, we see that males and females are relatively similar in how they are dispersed throughout the country. However, returns to place of residence in both Quebec and the Prairie provinces seem to favour males, resulting in pressure on the male-female earnings differential. The types of industries (more male oriented) in these areas may help to explain this discrepancy, but without any further exploration I chose not to make any definite conclusions. Finally, both immigrant status and firm size have limited effects on the differential and thus I have chosen not to go into extended detail about them.

Turning our attention to the variable of interest in this study, we see that of the 35 percent wage differential, unions actually explain a negative 5 percent portion, meaning that unions decrease the male-female earnings gap[17]. The decomposition of this variable shows that almost the entire differential exists because of the difference in returns to union status for males and females rather than differences in endowments of unions

[17] Were it not for unions the wage differential would have been 5 percent higher.

between the two groups. This finding supports the idea that union density rates between males and females have dramatically converged. Although there was a time when males were twice as likely to be unionized, those days are long since past and now rates are near identical. This convergence is extremely important when one analyzes the effects of unions on the male-female earnings differential.

As highlighted previously in this study, earlier studies found that unions increased the earnings differential. More recent studies, including this one, have found that unions actually reduce the earnings gap. The most important implication behind this change, I believe, comes from the change in union density rates of males and females. This change represents the most significant shift in recent years within the union framework. Though overall union density rates have fluctuated somewhat in the past and more recently shown some downward pressure (Johnson, 2002), the notable change has been the convergence in male-female density rates. The studies done with data from the 1990s and early 1980s have found that unions increased the wage gap because of the difference in unionization rates rather than the returns to union status. Accordingly, when the difference in rates began to diminish the overall effect showed pressure towards reducing the earnings differential (the finding of more recent studies)

3.5.2 Regression Results for the Union/Non-union Members

Though equation one is sufficient for determining how unions affect the wages of males and females differently, I decided to go a step further and try to uncover other potential indirect effects that might also affect the male-female wage gap. As will become evident

from our analysis below, by looking at the impact of unions on wages in general and combining this with the changes we have and continue to see in the labour force[18], we are able to make certain suppositions about how union may and could continue to affect the earnings differential.

Table (3) shows the results for the union/non-union wage equation. Each variable will be analyzed so that certain theories can be postulated about indirect effects of unions on the male-female wage gap. We begin by looking at one of the most common of wage equation variables, education. It has been widely documented that unions also "tend to narrow wage differentials that reflect productivity-related characteristics such as schooling, experience, skill level, etc., by securing a constant wage rise for their members and hence dampening the impact of market forces" (Benjamin *et al,* 1998, p559). In essence, those with the least amount of education benefit the most from union membership.

My results lend support to the positive relationship between wages and education and concur with the conclusions of Benjamin *et al*, that the relationship between earnings and education is weaker in the organized sector (Benjamin *et al,* 1998, p559). With the exception of those with a MA, the returns to education were greater, albeit only slightly in some categories, in the non-union sector than in the union sector.

[18] Females now have increased union membership, greater educational investments, fewer and shorter work interruptions, and increased overall participation rates.

Table (3)

Wage Regressions for Union/Non-Union Members, 1994

Variable	Union Coefficients	t-value	Non-Union Coefficients	t-value
Intercept	9.73934	137.02	9.36361	148.78
HS	0.10773	3.48	0.12902	3.88
BA	0.4421	13.09	0.56924	14.22
MA	0.58759	11.84	0.56969	8.63
PhD	0.76615	8.38	0.8014	6.84
Tenure25pls	0.25523	5.24	0.28171	4.47
Tenure1124	0.1893	5.38	0.22895	6.15
Tenure510	0.11528	3.26	0.10546	3.19
Male	0.22228	9.31	0.3757	13.83
Firm499	0.08422	2.19	0.23833	5.78
Firm999	0.12203	2.74	0.3026	4.76
Firm1000pls	0.13709	4.33	0.20308	6.18
Age2534	0.16699	2.58	0.30259	5.62
Age3549	0.20129	3.05	0.40125	7.19
Age5064	0.22532	3.17	0.27903	4.46
Married	0.07866	2.67	0.06706	2.09
Divorced	0.0746	1.71	0.03281	0.61
Maritime	-0.20959	-5.74	-0.22775	-5.27
Quebec	-0.09779	-2.87	-0.1569	-3.75
Prairie	-0.15993	-4.12	-0.22124	-4.95
West	-0.00256	-0.07	-0.00998	-0.27
Immigrant	-0.16243	-4.59	-0.15275	-4.08
R-Squared	0.412		0.3448	
Observations	839		1760	

Therefore, although the male-female earnings differential is diminishing due to the larger returns to education realized by females (results from equation one), this reduction will not be further bolstered by women increasing their level of unionization. Being a union member will actually reduce returns to education and thus if the difference in returns is large enough, with women entering the ranks of unions more and more, this may tend to increase the male-female wage gap.

The next variable of interest, job tenure, is usually found to have similar characteristics as education, demonstrating that increased experience, in this case at a particular job, tends to have a strong positive relationship with wages. Green (1991), Swidinsky and Kupferschmidt (1991), and Robinson and Tomes (1984) all expressed a significant relationship between tenure and hourly wage rate. Findings were that wages increased with tenure, at a decreasing rate. Renaud's results were consistent with these conclusions but, contrary to what would be expected, he found the relationship to be stronger in the non-union sector. This result may appear surprising in view of the fact that seniority rules represent one of the important bargaining chips for unions. My findings support the results put forth by Renaud, as I found the relationship between tenure and wages to be slightly stronger in the non-union sector. An explanation behind this anomaly may be that in the non-union sector job retention and therefore the resulting acquirement of tenure may be based on performance. Thus, workers with greater amounts of tenure may be more productive than their tenured union counterparts and thus firms are more willing to pay higher wages to reflect that productivity[19]. Another equally compelling argument could be that retention of workers in the non-union sector requires higher rewards because of the lower fringe benefits they receive relative to those in the union sector.

What are the potential underlying impacts of this finding on the female workforce? As it has been found that women are increasing their workforce attachment, this may mean increased tenure also. If this is the case, then those women who are union members may

[19] The idea is that in the union sector seniority simply means time on the job it does not reflect productivity increases. Considering that unions tend to create situations that make dismal of employees rather difficult, achieving seniority becomes an inevitability for those willing to stay the course.

not be receiving the same financial gain that comes with tenure as their non-union counterparts. With the ranks of unions being increasingly filled with women and male union density actually declining, this could have adverse effects on the male-female wage gap.

Firm size also has a fairly important impact on wages. Past literature suggests that there is a strong positive correlation between wages and firm size (Benjamin *et al,* 1998, p558). More formal assessment procedures, rigid work schedules and more costly monitoring help account for this relationship. (Benjamin *et al,* 1998, p225).

My results in both sectors are consistent with this finding[20]. When compared with Renaud and the differences with respect to the union and non-union sectors the results are also compatible. Like Renaud, I found that there was a significant positive relationship between wages and firm size and that the relationship was appreciably stronger in the non-union sector. This result is also postulated by Benjamin *et al* (1998) who feel that this shows that unions tend to standardize wage rates across firms and occupations – "which implies raising wages more in smaller firms" (Benjamin *et al,* 1998, p559). The reason for this greater relationship in the non-union sector could also be attributed to the threat effect. Larger firms may pay higher wages to avoid their employees choosing to organize. From my estimates in the non-union sector the wage premium, potentially to avoid unionization, is extremely high. For example in firms in the non-union sector with between 500 and 999 employees the wages paid to employees are 30 percent higher than

[20] With the exception of firms with over 1000 people in the non-union sector all other variables show an increasingly positive relationship between wages and firm size (i.e. those with firm size 99 or less earn the least, 499 or less the second least, 999 or less the third least and finally 1000 or more earn the most).

those in firms with less than 99 employees; whereas in the union sector the premium is only 12 percent. Although one cannot conclude with any certainty that these higher wages are in place to curb the threat of unionization, this is the likely reason for these results.

What are the implications, if any, on the female workforce? In order to properly assess this question one needs to learn more about the types of firms women tend to be working in presently. As has already been mentioned, gender segregation, although diminishing in recent years, is still a factor in determining where most women work. As such it appears that "women's jobs are far more likely to be in service industries"(Krahn and Lowe, 1993, p162). Using the mean values from Appendix (1) we can see that males and females are divided almost identically within the four categories. Approximately 50 percent of the workforce works in firms with 99 employees or less, 14 percent in firms with between 100 and 499 employees, 6 percent in firms with 500 to 999 employees and finally 33 percent working in firms with over 1000 employees. Given the virtually identical divisions between males and females within firm sizes (no effect from differences in characteristics) and if female rates of unionization continue to increase, this may lead to a reduction in the wage gap. If more females belong to a sector that tends to standardize wage rates, then female wages will realize less of a discrepancy given the size of firm they are employed in.

My results for the relationship between age and wages were fairly consistent with most common earlier findings that wages tend to increase with age till the mid to late 40s and

then tend to decrease. One discrepancy I found was in the union sector where wages continue to increase through till age 64. Though these results were consistent in direction with Renaud they were not consistent in the differences between union and non-union sectors. As I stated previously wages do rise with age, but I found the relationship to be significantly greater in the non-union sector[21]. For example, those between the ages of 25 and 34 earned, on average, about 16 percent more in the union sector than a comparable 20 to 24 year old, while the difference in the non-union sector was a much more substantial 30 percent. Due to these considerable and conflicting results and because of their potential effects on the male-female wage gap, it is important to further investigate this area. Again we make use of the first equation to determine the age range where we find the greatest number of female workers. From Appendix (1) we see that 43 percent of the female workforce is between the ages of 35 and 49, the age that receives the greatest wage advantage in the non-union sector. If women tend to enter the workforce more and more as union members then they will not be benefiting by nearly as much due to their age than if they were entering as non-union members. This situation could lead to a further increase the male-female wage differential.

With regard to marital status, my results are similar to Renaud's but do have some significant differences. In both the union and non-union sectors, I found that married and divorced workers earned significantly more than their single counterparts. In the union sector, my results showed that married workers earned 7.8 percent more than their comparable single counterpart, in the non-union sector the difference was around 6.7

[21] Renaud found that wages increase with age, until about age 44, then they begin to decline, but he also found the relationship to be somewhat stronger in the union sector. My findings are the opposite and the magnitudes of the differences are much greater.

percent. Also, divorced workers tended to benefit more financially from union status, where their wage difference for a single worker was 7.5 percent compared to the non-union member, where the difference was only 3.2 percent.

Renaud found that although married workers earned more in both sectors, those in the non-union sector benefited more so than those in the union sector (11.8 percent non-union, 5.9 percent union). As well, with regard to divorced workers he found an appreciable difference in the non-union sector (divorced workers earned 17.1 percent more than single workers) but no noteworthy difference in the union sector. Given the similarity in data and econometric methodology, this discrepancy needs additional investigation to determine the reasons behind this change[22].

With reference to the effect on the male-female wage gap, it is better not to speculate. It is commonly known (it is also shown in equation one) that marital status affects the wages of males and females differently (negatively for females and positively for males), and since the sample for equation two contains both males and females I cannot make any conclusive arguments.

Regional variables are of great importance to any wage equation, as they help demonstrate regional wage disparities. Previous research dealing with the effect of unions on wages has found that "unions tend to standardize wages across regions"

[22] Renaud used a simple regression method with the GSS of 1989; I also used a simple regression method with the GSS of 1994. Over this 5-year time span what could have changed?

(Renaud, 1998, p11). As with the finding that unions tend to reduce skill differentials, unions have also been found to reduce regional differentials.

My results are consistent with earlier findings. Although wage differentials across regions existed in both the union and non-union sectors, the magnitudes of the differentials were much greater in the non-union sector, lending evidence to the conclusion that unions do indeed tend to normalize wages across regions.

From the mean values in Appendix (1) we see that the division of males and females within different regions are relatively similar. Thus if unions tend to standardize wages across regions then this effect will tend to reduce the male-female wage gap, by reducing overall wage differentials.

The final variable that needs to be mentioned before the male-female component is examined is that of the effect of unions on wages with respect to immigrant status. In absence of the union/non-union framework, it has been found that immigrants tend to earn significantly less than their domestic counterparts when they first immigrate, but that, over time and through assimilation, this disparity diminishes. (Benjamin *et al,* 1998, p401). The question of interest then, is do unions tend to exacerbate this difference or moderate it?

Renaud's results show that "unions increase wages for both immigrant and non-immigrant workers compared to the non-union sector, but this increase is more

substantial for immigrants" (Renaud, 1998, p14). My results conflict with this finding. I found that immigrants earn less than their domestic born counterparts in both sectors, and that the difference for both sectors is almost identical, 16 and 15 percent respectively for the union and non-union sectors. Using these results to form conclusions with regard to the potential effects on the male-female earnings differential was not done because of certain limitations in our study[23].

The gender variable in equation two represents one of the most important elements of examination as it isolates the effect of sexual characteristics on wages and in particular, in the case of this study, with respect to the union and non-union sectors. My results showed that even though wages are significantly higher for males in both the union and non-union sectors, the difference is considerably smaller in the union sector, 21.7 percent and 35.8 percent respectively. These findings are consistent with the results produced by Renaud that "unions tend to reduce wage discrimination against women" (Renaud, 1998, p10). This is an important conclusion because, as we have also seen with equation one, it supports more recent work done in this regard. As highlighted in earlier sections, work done on the effects of unions on the male-female earnings differential have tended to produce conflicting results – D. Maki and I. Ng (1990) and W. Simpson (1985) both concluded that the differential was actually smaller in the non-union sector, leading to a greater wage gap; W. E. Even and D. A. Macpherson (1993), D. Doiron and W. C. Riddell (1994), and S. Renaud (1998) all uncovered the same conclusion as I have, that unions tend to reduce gender wage discrimination. As mentioned previously this conflict

[23] We did not include years since migration and therefore were not able to view the wages of male and female immigrants over time.

in findings could be explained in large part by the change in male-female union density rates.

Although, it seems that female's rates of unionization will continue to increase, the overall union density has declined since 1992 and is projected to continue falling (Johnson, 2002). These positive effects of unions on the male female wage gap may tend to diminish with the decline in overall union density[24]. Hopefully as this occurs certain pay legislations will help to supplement the declining effects.

3.6 Policy Implications

The subject of sex discrimination, though less of an issue today than before, continues to represent a major concern facing policy makers. The main focus areas for public policy, in this respect, have taken on three principal forms: equal pay legislation (including pay equity or equal pay for work of equal value)[25]; equal employment opportunity legislation (including employment equity or affirmative action)[26]; and policies designed to facilitate

---

[24] Even if the percentage of female union members continues to increase, if overall union density declines all outcomes of unions on wages will tend to moderate.

[25] These forms of legislation concentrate on ensuring that similar jobs or jobs of equal value receive the same wage structures. Pay equity is restricted in scope because it is limited by the fact that it deals with only one aspect of discrimination – wage discrimination within the same job within an establishment (Benjamin *et al,* 1998, p438) Equal Value or Comparable Worth Legislation on the other hand is argued to have more rational because it is thought to be able to deal with both "wage discrimination as well as occupational segregation – the later on the grounds that comparisons can be made across different occupations as long as they are of the same value as determined by job evaluation procedures" (Benjamin *et al,* 1998, p441). Unfortunately this procedure can be extremely costly and also difficult as the policy is dictated by complaints-based system.

[26] "Equal employment opportunity legislation is designed to prevent discrimination in recruiting, hiring, promotion, and dismissals" (Benjamin *et al,* 1998, p444). "In spite of the fact that this procedure is time-consuming and cumbersome, equal employment opportunity legislation does have the virtue of increasing the demand for female labour at the recruiting, hiring, and promotion stages. This, in turn, should increase female wages and employment" (Benjamin *et al,* 1998, p444). Affirmative action focuses on providing preferential treatment for women, on a temporary basis, so as to combat the cumulative history of discrimination (Benjamin *et al,* 1998, p444).

female employment and to alter attitudes and preferences[27] (Benjamin *et al,* 1998, p437-438).

Although each one of these policy areas has both positive as well as negative sides, some prove to be better suited to the working environment than others. In other words, the costs and administration behind some of the policies can be rather onerous[28] and therefore make them much less attractive than other alternatives. As well, it needs to be determined which is more detrimental to the wages of women, wage discrimination or occupational segregation. Some argue that the two problems exist in concert with one another[29] and that all three types of policies are needed to operate together to completely address the issues involved. It is from this argument that I will begin my brief discussion.

Unions, as has been shown, in many cases positively affect the wages of their members. In my results I found that unions tend to reduce regional disparities, reward educational attainment, and reduce wage discrimination against certain groups, for example immigrants and females. I believe that some of these important union consequences need to be taken into consideration by policy makers when determining policies designed to combat pay inequity. The most important consequence of unions is their affect on wage discrimination. Coupled with this is the ability of unions to tend to regionally standardize wages. Both of these factors could have potentially encouraging results on the wages of

---

[27] These policies are designed to help expand the range of choices available to women and hence afford them the means to join the labour force in any capacity that they wish.

[28] For example, with equal pay for equal work, the onus lies with businesses to develop job descriptions that identify characteristics that must be quantified and then assessed value. This process can be time consuming and extremely difficult in the case of some jobs.

[29] That is, not only do women earn less than men in particular jobs, but they also earn less than men overall as they are restricted access to certain occupations.

certain groups, females in particular. Through a standardization of wages and a reduction in wage discrimination, unions could be used in partnership with certain policies to ultimately reduce gender wage bias. I believe that if policy makers could manipulate the true impact of unions, they could eliminate certain, current and costly pay policies that are used to combat wage discrimination.

Increased unionization, affirmative action and a more rigorous, cost effective pay equity policy would ensure that females get access to the same jobs as their male counterparts and as well receive equal wages. As was obvious from the decomposition above, females have effectively narrowed the gap in individual characteristics that affect wages. Government should recognize this and as well the large discrepancy between male and female wages that still exists and revamp pay equity policies so that they are more effective in reducing wage disparities while at the same time, utilizing the effects of unions to make up any difference that still exists. Affirmative action would ensure proper access to jobs in the first place. Though this suggestion may seem simple and not very rigorous, I recommend it to prove a point. If used properly[30], unions, making up where pay equity policy falls short, could serve Canada and the Canadian public very well.

It has already been discussed that the increase in public unionization in the 1970s lead to an increase in the female rate of unionization. Another push of this kind, toward increased unionization, should continue to have the same results. If the rate of female

[30] Benefits of unions need to be clearly identified and then exploited.

unionization follows the same path as in the last 20 years and the positive wage effects of unions persist, unions will continue to be a factor in the male-female wage gap.

In contrast to this conclusion I cite the work of two other authors who feel that although public sector unions contributed to significantly reducing the wage gap in the mid to late 1960s (Fortin and Huberman, 2002) their effects are no longer felt. Instead they argue that because of recent declining union densities and a shift in the bargaining units, the role of unions in application of pay equity has become complex and cumbersome. In light of these problems, they feel that in the future unions will have little to bargain over. (Fortin and Huberman, 2002) This comes in direct conflict with my supposition but adds to the potential future areas of research as it highlights another possible result of unions.

4. Conclusions

The goal of this paper was to examine the theory that union effects on wages have contributed to the reduction in the male-female wage gap and that the continued convergence in male-female unionization rates explains the conflict in findings of earlier studies relative to more recent work.

In order to go about testing this theory, separate wage equations were estimated for males and females (with union status entering as a dummy variable) and also for union and non-union sectors (with gender entering as a dummy variable). My goal was to look at both the direct as well as the potential indirect effects of unions on the wages of males and females respectively.

With the male-female wage equations we were able to see that unions have a significantly large effect on the wages of females, almost 16 percent, while they have virtually no effect on the wages of males. Decomposing the union variable we were able to see that most of this difference came from returns to union status rather than difference in union endowments. This decomposition helps highlight the possible underlying reason behind the conflict in findings in previous studies. Earlier studies may have reported that unions negatively affected the earnings differential because the difference in characteristics was the dominant effect. More recently, due to the convergence in union density rates between males and females, this effect has been almost eliminated and the returns to union status embody the whole effect of unions on the male-female earnings differential.

Using the union/non-union equations I found that the gender variable showed that although males in both sectors earn more than their female counterparts, the disparity was much greater in the non-union sector. This again supported the finding that unions tend to diminish gender wage discrimination. Continuing to employ the same equation I examined the individual effects of certain personal characteristics (i.e. education, tenure) on wages with respect to the union and non-union sectors. In this regard, I surmised that the greater (relative to the non-union sector) positive relationship between wages and education in the union sector would ultimately benefit the female population and thus potentially reduce the male-female wage gap. As well, I felt that because of the effects of unions on region of residence and immigrant status, these areas might also help reduce the earnings differential. The relationship between wages and tenure, firm size, and age

were all stronger in the non-union sector. Bearing this in mind, I feel that these factors may tend to increase the male-female wage gap. Regarding marital status, I was not confident in making any statement on the potential effect on the male-female earnings differential.

To conclude, it is obvious from this study that unions tend to decrease the male-female wage gap. Though earlier studies counter this finding, the true cause for this discrepancy may be due entirely to the difference in union density rates. With the difference nearly eliminated, the true effect of unions on wages of males and females has been revealed.

Appendix (1) Variables and their Weighted Means 1994

Name	Brief Description	Male Sample	Female Sample
	Reference education group is less than high school		
HS	Respondent has a high school diploma;	0.41526	0.46883
BA	Respondent has a bachelors degree;	0.20392	0.25021
MA	Respondent has a masters degree;	0.0628	0.04697
PhD	Respondent has a doctorate;	0.02228	0.00512
	Reference is less than five years of tenure.		
Tenure25pls	Respondent has 25 years or more of tenure;	0.12289	0.06661
Tenure1124	Respondent has between 11 and 24 years of tenure;	0.31128	0.27498
Tenure510	Respondent has between 5 and 10 years of tenure;	0.26536	0.27754
Union	Respondent is a union member at work.	0.32478	0.30572
	Reference firm size is 99 employees or less.		
Firm499	100 to 499 persons employed by firm;	0.14045	0.14176
Firm999	500 to 999 persons employed by firm;	0.0682	0.06149
Firm1000pls	1000 or more persons employed by firm;	0.33693	0.34073
	Reference age group is 20 to 24 years.		
Age2534	Respondent is between 25 and 34 years of age;	0.29034	0.28864
Age3549	Respondent is between 35 and 49 years of age;	0.40986	0.43296
Age5064	Respondent is between 50 and 64 years of age;	0.23633	0.20325
	Reference category is single.		
Married	Respondent is married or common law;	0.69413	0.59436
Divorced	Respondent is divorced or separated;	0.0682	0.13407
	Reference region is Ontario.		
Maritime	Respondent is living in an Atlantic province;	0.16408	0.17677
Quebec	Respondent is living in Quebec;	0.19784	0.193
Prairie	Respondent is living in a Prairie province;	0.15125	0.13066
West	Respondent is living in Alberta or British Columbia;	0.2424	0.25363
Immigrant	Respondent was not born in Canada;	0.14585	0.16225
LNWAGE	Annual wage rate (natural logarithm).	10.45152	10.09985

Appendix (2) Variables and their Weighted Means 1994

Name	Brief Description	Union Sample	Non-union Sample
	Reference education group is less than high school		
HS	Respondent has a high school diploma;	0.38856	0.46193
BA	Respondent has a bachelors degree;	0.26341	0.20682
MA	Respondent has a masters degree;	0.07151	0.04886
PhD	Respondent has a doctorate;	0.01669	0.01364
	Reference is less than five years of tenure.		
Tenure25pls	Respondent has 25 years or more of tenure;	0.11085	0.06534
Tenure1124	Respondent has between 11 and 24 years of tenure;	0.4124	0.2483
Tenure510	Respondent has between 5 and 10 years of tenure;	0.26698	0.28068
Male	Respondent is male.	0.5733	0.55284
	Reference firm size is 99 employees or less.		
Firm499	100 to 499 persons employed by firm;	0.18117	0.12614
Firm999	500 to 999 persons employed by firm;	0.10727	0.04716
Firm1000pls	1000 or more persons employed by firm;	0.53635	0.25398
	Reference age group is 20 to 24 years.		
Age2534	Respondent is between 25 and 34 years of age;	0.24195	0.31136
Age3549	Respondent is between 35 and 49 years of age;	0.48272	0.39148
Age5064	Respondent is between 50 and 64 years of age;	0.2348	0.21591
	Reference category is single.		
Married	Respondent is married or common law;	0.6615	0.64432
Divorced	Respondent is divorced or separated;	0.11561	0.0875
	Reference region is Ontario.		
Maritime	Respondent is living in an Atlantic province;	0.18355	0.16193
Quebec	Respondent is living in Quebec;	0.23838	0.175
Prairie	Respondent is living in a Prairie province;	0.13945	0.14432
West	Respondent is living in Alberta or British Columbia;	0.19905	0.27102
Immigrant	Respondent was not born in Canada;	0.13707	0.1625
LNWAGE	Annual wage rate (natural logarithm).	10.46318	10.222

Bibliography

Articles and Books

Auld, D.A.L.; Christofides, L.N.; Swidinsky, R.; and Wilton, D.A. *"A Microeconomic Analysis of Wage Determination in the Canadian Public Sector."* Journal of Public Economics 1980, 13: 369-87.

Benjamin, Dwayne, Morley Gunderson and W. Craig Riddell. *Labour Market Economics Theory, Evidence, and Policy in Canada, 4th edition,* 1998, McGraw-Hill Ryerson Limited, Toronto, Ontario.

Christofides, L. N., and R. Swidinsky. *"Wage Determination by Gender and Visible Minority Status: Evidence from the 1989 LMAS."* Canadian Public Policy 1994, 20: 34-51.

Doiron, D.J., and W.C. Riddell. *"The Impact of Unionization on Male-Female Earnings Differentials in Canada."* Journal of Human Resources 1994, 29: 504-534.

Even, William E., and David A. Macpherson. *"The Decline of Private-Sector Unionism and the Gender Wage Gap."* The Journal of Human Resources 1993, 28: 279-96

Fortin, Nicole M. and Michael Huberman. *"Occupational Gender Segregation: Public Policies and Economic Forces."* Canadian Public Policy 2002, May Special Edition, S1-S10.

Green, D.A. *"A Comparison of Estimation Approaches for the Union-Nonunion Wage Differential."* UBC Department of Economics 1991, Working Paper 91-13.

Gunderson, M. 1975. "Male-Female Wage Differntials and the Impact of Equal Pay Legislation." Review of Economics and Statistics 57m 462-69.

Gunderson, Morley. *"Decomposition of the Male/Female Earnings Differential: Canada 1970."* Canadian Journal of Economics 1979, 12: 470-85.

Hirsh, B.T., and J.T. Addison. *The Economic Analysis of Unions: New Approaches and Evidence,* 1986, Allen and Unwin, Boston.

Johnson, Susan. *"Canadian Union Density 1980 to 1998 and Prospects for the Future: An Empirical Investigation."* Canadian Public Policy 2002, 333-349.

Krahn, Harvey J. and Graham S. Lowe. *Work, Industry, and Canadian Society 3rd edition,* 1998, ITP Nelson, Scarborough, Ontario.

Kumar, P., and T. Stengos. *"Interpreting the Wage Gap Estimate from Selectivity Correction Techniques Using Micro-Data."* Economics Letters 1986, 20: 191-195.

Lewis, H.G. *Union Relative Wage Effects A Survey*, 1986, The University of Chicago Press Ltd., Chicago.

MacDonald, G.M. *"The Size and Structure of Union/Non-Union Wage Differentials in Canadian Industry: Corroboration, Refinement, and Extension."* Canadian Journal of Economics 1983, 16; 480-85.

Maki, D. and I. Ng. *"Effects of Trade Unions on the Earnings Differential Between Males and Females: Canadian Evidence."* Canadian Journal of Economics 1990, 23: 305-311.

Oaxaca, R.L. *"Male-Female Wage Differentials in Urban Labour Markets."* International Economic Review 1973, 14: 693-709.

Renaud, S. *"Union and Wages in Canada: A Review of the Literature."* Proceedings of the 33rd Annual Conference of the Canadian Industrial Relations Association 1997, St. Catherines: CIRA, 211-225.

Renaud, S. *"Unions, Wages and Total Compensation in Canada: An Empirical Study."* Industrial Relations 1998, 53: no.4.

Robinson, C., and N. Tomes. *"Union Wage Differentials in the Public and Private Sectors: A Simultaneous Equation Specification."* Journal of Labor Economics 1984, 2: 106-127.

Robinson, C. *"The Joint Determination of Union Status and Union Wage Effects: Some Tests of Alternatives Models."* Journal of Political Economy 1989, 97: 639-667.

Simpson, W. *"The Impact of Unions on the Structure of Canadian Wages: An Empirical Analysis with Microdata."* Canadian Journal of Economics 1985, 18: 164-181.

Swidinsky, R., and M. Kupferschmidt. *"Longitudinal Estimates of the Union Effects on Wages, Wage Dispersion and Pension Fringe Benefits."* Industrial Relations 1991, 46: 819-838.

White, G.F. *"The Union/Non-Union Earnings Differential for Professionals."* Proceedings of the 30th Annual Conference of the Canadian Industrial Relations Association 1994, E.Deom and A.E. Smith, ed. Quebec: CIRA, 269-279.

Internet Sources

International Labour Organization (2000). "Gender! A Partnership of Equals – Gender Equality." Retrieved August 21st, 2002 from www.ilo.org/public/english/bureau/gender/beijing5/contribu/briefing/tradeuni.htm

Statistics Canada (1998). "The Rise of Unionization Among Women." Retrieved September 25th, 2002 from www.statcan.ca/english/indepth/75-001/archive/1998/pear1998010004s4a05.pdf.