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Department of
Economics

OCCUPATIONAL GENDER COMPOSITION AND WAGES IN CANADA: 1995

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http://www.student.lu.se/~nek99scs

Bachelor's Thesis

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March 2000

Acknowledgment

This bachelor's thesis was written while I was participating in CANEX (Canada Exchange Program) as an exchange student at Queen's University, Canada for the fall semester of 1999. I would like to appreciate Professor Christopher Ferrall, Department of Economics, Queen's University, Canada, for his help with the statistical software STATA and for providing the Survey of Work Arrangement 1995 data set from Statistic Canada. I also appreciate Professor Curt Wells, Department of Economics, Lund University, Sweden, for supervising the thesis. Unfortunately, it was not allowed to take out or use the data set outside Queen's University, Canada. Thus, it was impossible to benefit from Curt Wells' help with the estimated model's specification and the amendment of a variable intercept, which would have improved considerably my estimation.

Abstract

Occupational gender composition and its relationship with wages for Canada during 1995 are examined. This relationship has been the basis for pay equity/comparable worth legislation in Canada, which has some of the most extensive pay equity legislation in the world. Although women's average wage rate has improved after the implementation of the comparable worth legislation, the comparable worth legislation has been more successful in improving the discrimination issue in mixed jobs. I also find that, although there is some heterogeneity across subgroups, the wage penalty in female jobs is statistically insignificant for both women and men, i.e. an occupation's gender composition is not a statistically important determinant of earnings for Canada 1995.

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1. Introduction

There are several remarkable stylized facts about the disadvantageous status women have in the labor market. The severity of this discrimination can be shown by the fact that both women and men earn less as the proportion female in an occupation increases at the same time that this negative relationship is stronger among men than women. This inequality motivated the discussions around comparable worth (or Pay Equity). But this debate has been relatively recent, and in the case of Canada began around the 1980s (Abbott, 1990). The basic notion underlying comparable worth is that jobs of the same worth should receive the same pay. The worth of a job is assessed by a composite of four kinds of factors: skill, effort, responsibility and working conditions.

The decade of the 1980s witnessed the widespread adoption in Canada of equal pay policies based on the principle of comparable worth or "equal pay for work of equal value". By the summer of 1991, no fewer than eight provinces (all except Alberta and Saskatchewan), one territory (the Yukon) and the Government of Canada had enacted or announced comparable worth equity initiatives (Abbott, 1990). All this new legislation gave Canada some of the most extensive pay equity legislation in the world.

Baker et al. (1999) has investigated the relationship between occupational gender composition and wages in Canada for 1987 and 1988. The motive for investigating this relationship is that it is the basis of pay equity/comparable worth legislation. The chosen time period of the paper, late 1980s, is chosen because the labor market was largely free of the effects of comparable worth. Thus estimates of the penalty to work in female jobs from this period provide, by some measures, an upper bound on the potential benefits of these initiatives. The conclusion of their research is that although there is some heterogeneity across subgroups, most of the estimates of the relationship between wages and gender composition for Canadian women are quite small and typically statistically insignificant. On the other hand, they find uniformly negative and substantial penalties for males in female jobs.

The objective of my paper is to investigate the situation of the Canadian labor market *after* the implementation of this new legislation and try to compare my results with those obtained by Baker et al. (1999). My hopes are that this paper's results will provide some help in the evaluation of the Canadian comparable worth legislation. The used data for 1995 was obtained from the Survey of Work Arrangements of Statistics Canada. The model to investigate the relationship between the femaleness of occupation and the wage rates was the same that Baker et al. (1999) used. The model is $\ln \omega_i = \delta + \gamma PFEM_i + \varepsilon_i$ where $\ln \omega_i$ is the natural logarithm of the wage rate and $PFEM_i$ is the proportion of employment which is female in the corresponding occupation. Apart from estimating this relationship, I also analyze the evolution of the average wage rate for both women and men and the female/male wage ratio.

The results of my investigation indicate that women's average wage rate has been improved after the implementation of the comparable worth legislation. But this improvement in the average wage rate has been more important for women in mixed jobs. Thus it can be concluded that the comparable worth legislation might have been more successful in improving the discrimination issue in mixed jobs. On the other hand, it might have been less successful in improving the discrimination issue in male jobs. The estimation of the relationship between wages and the PFEM show that it is statistically insignificant for both women and men, i.e. an occupation's gender composition is not a statistically important determinant of earnings for Canada 1995.

Before continuing with the paper, it is worth noting that, although the econometric framework I have used is quite similar to the one used by Baker et al. (1999), there are some limitations to the research I have done. These limitations deteriorate the results I come up with and worsen the comparability of the two papers. There are two main reasons for the limitations in the research. Firstly, the data I use is of worse quality than the one used by Baker et al. (1999). Secondly, their analysis is more extensive and detailed than mine due to the use of more complicated and advanced econometric procedures. The limitations are discussed in several parts of the paper whenever appropriate to do so.

Section 2 of this paper provides a discussion about the concept of comparable worth and the objectives sought with implementation of comparable worth policies. Section 3 makes a short review of the abundant legislative activity on comparable worth in Canada, which predominately took place in the late 1980s and early 1990s. The Survey of Work Arrangement, from where the data set is obtained, is analyzed and described in section 4. In section 5, the applied restrictions on the data set are examined. The censoring on the public use micro-data files, which is one of reasons for the limitations in my research, is also discussed in this section. Section 6 presents the model that was used to investigate the relationship between wages and occupational gender composition. Here, I also discuss the limitations and short-comes of the econometric model, which is the second reason for the limitation in my research. The results of the investigation are presented and analyzed in section 7. Finally, in section 8, conclusions are drawn from the presented results.

2. Comparable worth

The disadvantageous status women have in the labor market is the main motivation behind the discussions around comparable worth. But this debate has been relatively recent, and in the case of Canada began around the 1980s (Abbott, 1990). The basic notion underlying comparable worth is that jobs of the same worth should receive the same pay. On the other hand, jobs of different worth can legitimately receive different pay. It is widely accepted by supporters of comparable worth (or "pay equity", as it is sometimes called) that predominantly female jobs such as nursing, teaching or library work differ in terms of their functions and duties from predominantly male jobs such as plumbing, tree trimming or truck driving. However, they argue that predominantly female jobs are often paid considerably less than predominantly male jobs in spite of the occupations being quite similar in terms of skill, effort, responsibility, and working conditions. They argue that such underpayment of women's jobs is discriminatory.

"Comparable worth" of jobs can be defined in two different ways. The first definition considers comparable worth from the employers' standpoint, and the second definition considers

it from the employees' standpoint. Most discussions about comparable worth define it by taking into account the second definition. From the viewpoint of employers the worth of jobs can be defined as its marginal productivity. Thus, jobs of comparable worth would be those who for a given type of labor have the same marginal productivity. On the other hand, from the viewpoint of employees the worth of jobs will be related to the compensating wage differentials, which will determine their jobs' desirability. According to this definition two jobs will be of comparable worth if they are comparable in terms of a composite of four kinds of factors: skill (e.g., education and training requirements), effort, responsibility and working conditions.

In general, these two definitions are different. For example, although working conditions may not usually have much to do with productivity, they will usually play an important part in workers' views of different jobs. Moreover, the two definitions have quite different implications. To determine whether two jobs are comparable in the marginal productivity sense, one would need to measure the contribution each makes to the employer's output, whereas an assessment of the comparability of two jobs in the compensating wage differential sense requires an evaluation of the jobs in terms of skill, effort, responsibility and working conditions, or what the jobs ask of workers.

Pay equity or comparable worth should not be confused with the concept of equal pay for equal work. The equal pay for equal work concept means that two jobs should be paid the same wage if the jobs require the same or similar skill, effort, responsibility, and working conditions. This concept requires that jobs be compared on a factor-by-factor basis and implies that if there are any minor difference in any of the factors comparison is not possible. Instead, comparable worth involves comparing dissimilar jobs where the value of the job to be compared is based upon the composite skill, effort, responsibility, and working conditions.

As said before, the notion of comparable worth arose with the concern that women were discriminated in the labor market. Some of the most striking stylized facts about women's disadvantage in the labor market are the following (Killingsworth, 1990):

a) Despite working in the same job or occupation and having the same qualifications (education, years of work experience, etc.), women earn usually less than men.

b) Even when having the same qualifications than men, women are typically crowded into low-wage jobs or occupations (e.g., clerical as opposed to managerial).

c) Both women and men earn on average less as the proportion of females in a job or occupation increases. High “femaleness” is associated with lower pay in that occupation.

d) Although there is a negative relationship between wages and the proportion of females in a job or occupation, this negative effect is stronger for men than it is for women. The wage differential between working in female jobs and male jobs is greater among men than among women.

Supporters of comparable worth or pay equity believe that this discrimination is caused by labor market discrimination. They argue that the implementation of equal pay policies based on the principle of comparable worth can alleviate this discrimination in the labor market. Moreover, they consider comparable worth as just a part of a broader set of measures to achieve equality in the workplace. There are three different initiatives that should be implemented to achieve employment equity, which is the main objective to avoid discrimination. They are equality of opportunity, equality of working conditions and comparable worth (Abbott, 1990).

Equality of opportunity refers to the right of access to jobs and the right to advancement and promotion. In order to begin to address the wage gap, it is important that women expand beyond the traditional occupational groups where they have been found. In order to do so, women need language and skills training to increase their job choices. Equality of opportunity has also been called affirmative action.

Secondly, equality of working conditions is necessary in order to provide equality in the workplace. This concept does not mean treating each person the same, i.e. equal treatment, but rather means equality of result. It implies a workplace where all may be given the opportunity to achieve and fulfill their objectives no matter their own special characteristics. There are many situations in which it is necessary to treat people differently so that equality is achieved. For example, an employer might be required to construct a ramp in order to provide workplace access for an employee in a wheelchair.

The final initiative is the implementation of equal pay policies based on the principle of comparable worth. The fundamental objective of comparable worth policies is to reduce the male/female earning gap, or more specifically to eliminate discriminatory pay differentials between female-dominated and male-dominated jobs. Accordingly, the standard by which comparable worth policies will ultimately be judged is the extent to which they raise the relative pay rates of female-dominated jobs relative to those of comparable male-denominated jobs without generating adverse side effects on the employment of women relative to men.

But there are also critics of the comparable worth concept (Killingsworth, 1990). They argue that comparable worth does not provide useful information about discrimination. Women may be crowded into particular low-paid occupations due to preferences or to past or present discriminatory barriers to alternative occupations. These discriminatory barriers may be caused both by supply-side factors (sex differences in job preferences and/or job qualifications, due to sexual role differentiation, societal discrimination, etc) as well as demand-side employer discrimination (based on preferences or statistical discrimination). If the concentration of women in low-paid jobs is caused by supply-side factors, then unequal pay for jobs of comparable worth is not necessarily evidence of employer discrimination, and equal pay for jobs of comparable worth is not necessarily an appropriate standard for evaluating pay differences among jobs. Their argument concludes that equal pay for jobs of comparable worth is not necessarily fair, and unequal pay for jobs of comparable worth is not inherently discriminatory.

The advocates' response to this criticism is that the empirical evidence suggests clearly that discrimination by employers is responsible for a significant part of the male/female pay gap,

even though supply-side factors, including societal discrimination, are not unimportant. Moreover, they argue that societal discrimination is discrimination too. Thus they argue that, even if literal adherence to a policy of equal pay for jobs of comparable worth is unwarranted, increases in pay for low-wage predominantly female jobs –moving pay in such jobs closer to levels prevailing in higher-wage but comparable (and predominantly male) jobs- will complement conventional antidiscrimination measures (discussed above), help close the pay gap and help redress some of the effects of societal as well as employer discrimination.

3. Comparable worth in Canada

The decade of the 1980s witnessed the widespread adoption in Canada of equal pay policies based on the principle of comparable worth or "equal pay for work of equal value". By the summer of 1991, no fewer than eight provinces (all except Alberta and Saskatchewan), one territory (the Yukon) and the Government of Canada had enacted or announced comparable worth equity initiatives (Abbott, 1990). Although all are predicated on the fundamental premise that persons in jobs evaluated as being of equal value (or comparable worth) in terms of their skill, effort, responsibility and working conditions should receive the same rate of pay regardless of inherent personal attributes such as sex and race, these initiatives differ greatly in several respects: some are mandated by legislation, others are implemented through the collective bargaining process; some take a complaint-based approach to enforcement and compliance, others a proactive, regulatory approach; most apply only to public sector employees, although Ontario's extends coverage to the private sector.

The first province to introduce the concept of equal pay for work of equal value into the human right code was Quebec in 1977 (Abbott, 1990). The federal government introduced it in 1978. However, this legislation was not very effective because the right enforcement in those Acts was complaint based. The complaint-based approach to enforcement and compliance, made it difficult for individual women to have the courage, sophistication and skill to raise complex

issues against their current employer. Based upon this experience, women's groups and unions advocated for a proactive approach in pay equity.

A proactive approach means recognizing that the wag gap is not based on the fault of a particular employer but rather is a problem of systematic discrimination. Accordingly, employers are required to develop and implement a comparable worth plan regardless of whether a complaint of discrimination has been filed or whether there exists evidence of discrimination. The distinguishing characteristic of the proactive approach is that it places both initial and ultimate responsibility for achieving and maintaining pay equity on the employer, whereas complaint-based programs place the initial burden of responsibility on employees or employee representative to file a complaint against the employer (Abbott, 1990).

The first jurisdiction in Canada to legislate a proactive approach to pay equity was Manitoba in 1985. The Act required the Manitoba government to bargain with its unions to eliminate the gender discrimination in wages and to make its first pay adjustments in October 1987. Crown corporations, universities and hospitals were required to complete that process one year later. One of the criticisms of the Act was that there were no long-term obligation on the parties to maintain pay equity, and therefore the gains made by women could be eroded over time (Abbott, 1990).

The second province to proclaim pay equity was Ontario on January 1, 1988. The Ontario Act covers all employees in the broader public sector and all private sector employers who employ ten or more employees in the province. Compliance with the Act was phased in over a five-year period. First, all broader public sector employers and all private sector employers of more than 500 employees had to negotiate and post their pay equity plans by January 1, 1990. The broader public sector employers had to make their first pay adjustments on January 1, 1990. The first adjustments for the largest employers were to be made one year later. The coverage of other private sector employers was staged based upon the number of employees (Abbott, 1990).

In the following months, several other provinces announced that they were planning to enact pay equity legislation. Prince Edward Island enacted pay equity legislation for the broad

public sector effective October 1, 1988. In the same month, the Newfoundland government negotiated an agreement with its public sector unions. In Nova Scotia the pay equity process began September 1, 1988, while New Brunswick enacted its legislation in 1989. In March 1991, the government of British Columbia announced that the pay equity process was complete. The Yukon had enacted complaint-based pay equity in 1987 and by 1991 was still discussing a proactive approach (Abbott, 1990).

This brief review of the Canadian legislation on comparable worth shows that prior to 1988 there were few public sectors, and no private sector, pay equity initiatives in Canada. In contrast, by 1995 the legislative environment had changed dramatically. Most of the legislation on pay equity had already been enacted and had been applicable for a couple of years.

4. The Survey of Work Arrangements

Statistics Canada first conducted the Survey of Work Arrangements (SWA) in November 1991.[1] The need for information on work arrangements such as work schedules, flexitime and home-based work was behind the 1991 Survey of Work Arrangements – the first national survey covering these issues. An interest in changes in work arrangements, as well as a need for data on other aspects of working conditions, led to the 1995 Survey of Work Arrangements. Both surveys were conducted as supplements to the Labour Force Survey (LFS), and therefore its sample design is closely tied to that of the LFS. The 1995 Survey of Work Arrangements provides information for paid workers on issues also covered by the 1991 survey such as:

- When people work (days of the week, hours of work);
- How much control they have over their schedules (e.g. “on call”, flexible schedule);
- Who usually works some or all the time at home, and why;
- How many people work paid overtime and how they are compensated for it;

[1] Statistics Canada’s homepage is www.statcan.ca.

- Who has a permanent job and who has a temporary one; and
- How many people hold down two jobs and why they do so;

Additionally, the 1995 survey gathered information not collected by the previous survey on: firm size, employee benefits, unpaid overtime, and preference for fewer or more hours of work.

In chapter 4 of the SWA 1995 User Guide several concepts and definitions, which can be useful when working with this survey, are outlined. They define, for example, an employed person as somebody who, during the reference week, did any work or had a job but was not at work due to any reason, such as illness or vacation. The reference week that they use is the week containing the 15th day of November. The interviews were conducted during the following week, called the survey week. The provided information about the occupation attachment of employed persons was based on the 1980 Standard Occupational Classification.

The sample of individuals of the SWA is representative of the civilian, non-institutionalized population 15 to 69 years of age in Canada's ten provinces, who were either paid workers or self employed in their main job and who were civilian, from three selected rotations of the November 1995 LFS sample[2]. Specially excluded from the survey's coverage are residents of the Yukon and Northwest Territories, persons living on Indian reserves, full-time members of the Canadian Armed Forces and inmates of institutions.[3] Almost all Canadian data sets share this restriction.

There are 42,324 records on the SWA file. Of these, 28,607 individuals were eligible for the survey, but for 3,336 respondents they did not obtain or did not keep the data. Thus there are 25,721 records that have SWA information. The remaining records are for respondents who were not eligible for the SWA, but who were members of households with SWA respondents and were 15 to 69 years old. All the SWA variables on those records contain 6's – "valid skip codes".

[2] The LFS employs a panel design whereby the entire monthly sample of dwellings consists of six panels, or rotation groups, of approximately equal size.
[3] These groups together represent an exclusion of approximately 2% of the population aged 15 or over.

Statistics Canada interviewers, who are part-time employees, hired and trained specifically to carry out this kind of interviews, collected the data. Dwellings new to the sample are contacted through a personal visit. But subsequent interviews are conducted by telephone, using computer-assisted telephone interviewing (CATI) techniques. If the selected person was not available, proxy interviews were allowed.

However, the SWA does have its faults. Although well rounded in many economic respects, the short timeframe in which the survey had to be completed due to its telephone interviewing aspect, and the consent of the survey for proxy respondents allows for unrepresentative and misguided information. It is likely that many people do not fully disclose their employment status to the interviewer out of fear or embarrassment. Moreover, the respondent might not have understood or misinterpreted a question and thus given partial non-responses to the survey.

5. Data

The public use microdata files, which I used for my research, differ in a number of important aspects respect from the survey 'master' files held by Statistics Canada. These differences are the result of actions taken to protect the anonymity of individual survey respondents. Unfortunately, this censoring has severely limited my research. For example, the hourly wage rate[4] is only given for wages up to 40 dollars. Hourly wages that exceed this amount are either reported as equal to 40 dollars or are directly suppressed from the records. Moreover, the recoded occupation variables are only provided grouped into 21 and 49 categories, while the 'master' survey files held by Statistics Canada include the Canadian SOC occupational codes (*soc4*), which provide very detailed information, comprising approximately 500 categories. Other restrictions on the public microdata file were the suppression of the economic region and the Census Metropolitan Area. Several variables, such as age, worked hours per day, family size, etc., were only presented by showing grouped values.

To conduct my analysis, the following restrictions are placed on the sample. Firstly, I dropped all the records that were in the SWA file but did not have SWA information. In order to do that, I kept only those individuals who were employed (*lfsstat*), eliminating 16,455 observations. I also kept the individuals that were at work or were not at work but had work in the Labour Force Survey reference week (*lfsactiv*), eliminating no observations. The SWA includes only those individuals who were either paid workers or self-employed in their main job (*cowmain*), eliminating no observation. The second step was to include only wage and salary workers between the ages of 16 and 69, who are not full-time students and are earning more than $1.00 an hour.[5] In the previous set of restrictions the individuals who were paid workers or self-employed in their main job (*cowmain*) were kept so it was not necessary to perform again any restriction in this sense. But I performed restrictions on the age (*ageg*), eliminating 424 observations. Note that in this case the variable for age was grouped in order to mask the data. But this masking did not affect my analysis or my results, as I did not perform tests controlling for age. I eliminated 1,177 observations by dropping those individuals who were full-time students (*f05q8082*). Restricting the data to include only those individuals who earned more than $1 an hour (*hourlys*) eliminated no observations. Finally, the last set of restrictions I imposed was based on detecting missing observations. In this case I dropped 9,302 observations due to the lack of values for income (*hourly*). The lack of values for the wage rate was due to either the fact that it was not stated, the respondent did not know or refused to answer, or due to censoring (valid skip). The sample size was thus reduced to 14,966 observations, of which 49,73% were men and 50,27% were women.

[4] The wages are obtained from the main job at the time of the survey and are the actual hourly wage for workers paid by the hour and the usual hourly earnings for other workers.

[5] This exclusion is made for comparability reasons as Baker et al. (1999) also make this exclusion. They exclude full-time students because they are excluded under most legislation, when they work in connection to their studies.

6. Model

In order to investigate the relationship between the femaleness of occupation and the wage rates, I used the following model:

$$\ln \omega_i = \delta + \gamma PFEM_i + \varepsilon_i \qquad (1)$$

where $\ln \omega_i$ is the natural logarithm of the wage rate, which is measured as the number of Canadian dollars earned per hour, γ represents the expected value of the difference in earnings between occupations caused by their different femaleness rates, and $PFEM_i$ is the proportion of employment which is female in the corresponding occupation. The femaleness rate of occupations, $PFEM_i$, is constructed using the 49 occupation codes (*occup51*) available from the SWA 1995 and is calculated as the percentage of female workers in each occupation. The specified model assumes that different wage ratios ($\ln \omega_i$) between individuals can be explained by three factors. The first explanatory factor is δ, which can be interpreted as the part of the wage rate ($\ln \omega_i$) that is fixed for all the individuals and does not depend on the second factor ($\gamma PFEM_i$). As anticipated, the second factor is $\gamma PFEM_i$, which can be interpreted as the part of the wage rate ($\ln \omega_i$) that varies across the different individuals due to the different femaleness rate of their jobs. The last part is ε_i, which is an individual specific error term.

The reason for choosing this model is based on the view that occupational segregation is a major cause of the earnings disparity between women and men. This approach stress that certain jobs or occupations receive lower pay simply because the occupations are identified as female jobs. In order for this approach to be correct, the γ coefficient should be negative, i.e. a negative relationship between wages and *PFEM*.

It is important to remark that I am assuming that the intercept coefficient, δ, is fixed for all individuals. However, it would have been more proper to allow for a variable intercept, which reflected personal and/or job characteristics and region. For example, Baker et al. (1999) control the intercept by including variables, such as age, education level, dummies for province, metropolitan area, industry, union status, tenure, firm size, etc. There are two main reasons why I just estimated the simpler model and did not include a variable intercept. First of all, including a variable intercept would have meant making a more extensive analysis[6], which I am not capable of doing, given both my theoretical and statistical knowledge. Although the statistical data program I used[7] is very easy to use, I did not want to do anything I had incomplete control and knowledge of. Secondly, although the SWA include many of the additional needed variables, many of them are either masked or censored, and thus improvement in the model would not have been possible[8]. For example, the age variable and the industry variable were grouped, the dummies for province, metropolitan area and firm size were not available.

The consequence of omitting these variable intercepts is that the model I estimate is mis-specified. This can be clearly seen if we consider that by omitting these variables we are forcing the disturbance term, ε, to include both the omitted variables as well as any purely random factors, thus $\varepsilon = \delta_i X_i + \nu$, where $\delta_i X_i$ are the omitted variables and ν is the purely random factor. There are mainly three consequences for this specification error. Firstly, the OLS estimator of the coefficients of the remaining variables becomes biased and inconsistent. Secondly, the variance-covariance matrix of the OLS parameters becomes smaller. Finally, the estimator of the variance-covariance matrix of the OLS parameters is biased upward, as the estimator of the variance of the error term is biased upward. Thus, all the inferences concerning these parameters become inaccurate.

[6] Baker et al. (1999) estimates the model with variable intercept by a two-step procedure using a generalized least squares (GLS) strategy and by what they call an unweighted least squares (UWLS) strategy.
[7] I used the statistical data program Stata 6.0. Their homepage is www.stata.com.
[8] By using Baker et al. (1999) two-step procedure, the independent variable PFEM's unit of measurement turns from individuals into occupation categories. This change in the unit of measurement would have represented a further limitation in my study as I only have 49 occupational categories and thus would have had just 49 observations.

7. Results

Table 1 shows the gender composition of occupations and its consequences for wages in Canada for 1988 and 1995. The values for 1988 were obtained from Baker et al. (1999) and the values for 1995 were estimated using the SWA data set. The table presents the sample size, the average wage rate, the average PFEM, the estimated γ and its standard deviation, and the female/male wage ratio. The results for each year are divided by gender and are presented for the whole sample (all jobs) as well as for sub-samples. The sub-samples are divided in female jobs, mixed jobs and male jobs.

It is important to stress that the comparison between the values of 1995 and 1988 is limited by the fact that Baker et al. (1999) had access to more detailed data than me. While they had access to data comprising approximately 500 occupation categories, I used only 49 occupation categories (occup51) for my research. The limitation in the data I used was discussed in section 5 and is a consequence of the censoring in the public use file of the SWA 1995. The consequence of having fewer occupational categories is that many occupations, which have different characteristics in terms of gender composition, average wage rate and number of individuals pertaining to the occupation group, are aggregated. For example, it could be the case that within the broad occupation group "Management and administration related" (see Table 3) there were some small sub occupations that were mainly male dominated with a very high wage rate, which pushed the broader group's average wage rate up. Thus the femaleness rate and the average wage rate for this broad occupation group would be misleading and would be hiding information about wages and the gender composition of occupations. This aggregation of the occupational categories affects all the estimated values in Table 1 but the average wage rate of both women and men for all jobs and thus the female/male wage ratio for all the jobs. Despite of this limitation in my results, I continue the analysis by interpreting and comparing the estimated values.

Across all jobs, the femaleness rate, PFEM, is about 70.1 percent for women, while 30.2 percent for men in 1995. This represents an increase in the PFEM for both women and men in comparison to 1988, when it was 66.8 percent and 25.1 percent respectively. The increase in the average femaleness rate for women would be showing that women have further been moving into

occupations dominated by women. Men have also been moving into occupations where more women are present. Again it is important to remember that this comparison may be wrong given the limitation in the used data. But if the pattern were correct it would be showing both a bad and a good development. The bad thing is that women would have moved further into predominantly female jobs and thus it could be showing a worsening of the equality of opportunity in the labor market for women, which pushes them into predominantly female jobs. The good thing would be that men are working in jobs which have a larger presence of women. The average PFEM is also reported for female, mixed and male jobs. Predominantly female jobs are defined as those with a femaleness rate of 60 percent or higher. In 1995, they represented 76.23 percent of female employment and 19.88 percent of male employment in Canada. Occupations related to nursing and bookkeeping are typical female jobs (see Table 3). In 1995, the average PFEM for female jobs was 81.1 percent for women and 73.1 percent for men. Predominantly male jobs are those with a femaleness rate of at most 30 percent. In 1995, they represented 7.84 percent of female employment and 58.36 percent of male employment in Canada. Occupations related to electrical power and mechanics are typical male jobs (see Table 5). Other jobs are mixed. In 1995, they represented 15.92 percent of female employment and 21.75 percent male employment in Canada. Occupations related to university and artistic are typical mixed jobs (see Table 4).

I also report average wages for all jobs and average wages by job type. A positive aspect of the average wage development is that the average wage rate has improved for all the job categories for both women and men from 1988 to 1995. However, analyzing the improvement in the average wage rate uncover some interesting patterns. For 1995, women in male jobs were the lowest paid on average ($12.42) while women in mixed jobs were the highest paid ($14.68). This pattern represents a change in comparison to 1988 when women in mixed jobs were the worst paid ($10.62) and women in male jobs were the best paid (11.79). This change in the pattern might be explained by the implementation of comparable worth. This could be especially true if we consider that most of the mixed jobs for 1995 correspond to the public sector, where most of the comparable worth legislation has been implemented. By analyzing Table 4, it can be observed that mixed jobs include “officials and administrators of the government”, “maths, stats, systems analysis and related”, “university and related”, “health diagnosing and treating”, which certainly are predominately public sector occupations. For 1995, men were best paid in mixed jobs ($17.66) and were worst paid in

female jobs ($16.44). This represents also a change in the pattern in comparison to 1988 when men were best paid in male jobs ($14.41) and worst paid in mixed jobs ($13.89). Note that in 1995 both men and women were best paid in mixed jobs. In contrast mixed jobs were the worst paid jobs for women in 1988. This change can be seen as an improvement in the equality between women and men.

The corresponding unadjusted female/male wage ratio is also reported in the last column of Table 1. This ratio was constructed by dividing women's wage by men's wage. In 1995 the ratio averaged 80.8 percent for all the jobs, while it was 76.5 percent for 1988. This represents a very visible improvement in the gender discrimination issue. Women's wages have become more equal to men's wages. Note that this ratio has improved in 1995 respect to 1988 for all the job categories but male jobs, where the ratio has decreased from 81.8 percent to 0.748 percent. A change in the pattern can also be seen here. While the worst ratio was for mixed job in 1988 with 62.8 percent, it was the best ratio for 1995 with 83.1 percent. This is an incredible improvement of more than 30 percent of increase in the ratio in just 7 years. This observation reinforces my assertion that the comparable worth legislation might have been effective in increasing women's wages in mixed jobs, which are in a large extent public sector occupation. But the legislation might have been less effective in female jobs where the difference between male and female wages was not so accentuated, with a 78.3 percent. Moreover, the fact that the ratio has worsened for male jobs could be indicating that the comparable worth legislation has not been very effective in reducing the differences between male and female wages in predominantly male jobs. Nevertheless, it is worth remarking that this worsening is not a consequence of a reduction in the average wage rate for women but that the average wage rate for women has grown at a slower rate than the average wage rate for men.

The estimated coefficients $\hat{\gamma}$ from regression (1) are also reported in Table 1. These coefficients were estimated by weighted least-squares, using SWA sample weights (*finwt*). The importance of using sample weights when estimating coefficients from a probability sample, such as the SWA, is a consequence that each person in the sample “represents”, besides himself or herself, several other persons not in the sample. For example, in a simple random 2% sample of the

population, each person in the sample represents 50 persons in the population. If the proper sample weights are not used, the estimates will be somewhat biased and will not be representative of the whole population. Given that the SWA used a sub-sample of the LFS sample, the principle behind the calculation of the weights for the SWA are identical to those for the LFS. In the LFS, the final weight attached to each record is the product of the following factors: the basic weight, the cluster sub-weight, the balancing factor for non-response, and the province-age-sex ratio adjustment factor. However, further adjustments are made to the LFS weights in order to derive a final weight for the individual records on the SWA microdata file (*finwt*). These further adjustments are to account for the use of a three-sixth sub-sample, instead of the full LFS sample, and to account for the additional non-response to the supplementary survey. Recall from section 4 that there were 3,336 eligible respondents who did not respond to supplementary SWA survey (Statistics Canada, 1995).

With respect to the estimate of γ it is not worth comparing my results with the paper by Baker et al. (1999) due to the lower quality of my data caused by the limited number of occupation categories[9]. To prove how the limitation in my data affects the results I decided to estimate the relationship between wages and gender composition using the recoded occupational variables for both 21 and 49 categories. These estimates are presented in Table 6. It can be seen that the estimated γ for women differ markedly whether the occupational categories are aggregated in 24 or 49 categories. Thus it is clear that estimates of the correlation of wages with the gender composition of employment are very sensitive to the aggregation of the occupational categories. Baker et al. (1993) find similar results. Accordingly, I will just analyze the results of the estimated $\hat{\gamma}$ for 1995 in Canada.

A value of $\hat{\gamma} < 0$ implies that wages decrease with respect to proportion female. If in contrast $\hat{\gamma} > 0$, wages increase with respect to proportion female. If $\hat{\gamma} = 0$ the gender composition of the occupations has no relationship with wages and thus the PFEM wage penalty is insignificant. The exact interpretation of $\hat{\gamma}$ depends on the causes of occupational segregation

[9] Note although that the reported values of $\hat{\gamma}$ for 1988 taken from Baker et al. (1999) were estimated using the same simple model without a variable intercept that I estimated. Thus, the comparison between the $\hat{\gamma}$ values is not affected by the specification error, acknowledged in section 6, but by the aggregation of occupational categories.

and the routes through which *PFEM* and wage rates are related. For example, there is one theoretical explanation for the existence of occupational segregation called the crowding hypothesis (Sorensen, 1990). This model states that women may be crowded into particular occupations due to preferences or to past or present discriminatory barriers to alternative occupations. Accordingly, the increased supply of women in these occupations lowers its equilibrium wage to a level below that for similarly skilled workers in other occupations. This model concludes that women and men are segregated into different occupations due to discrimination and that those working in predominantly female jobs earn less than those working in male-dominated jobs even though all workers are equally well qualified for both jobs. This hypothesis can be useful in disclosing why $\hat{\gamma} < 0$ for females but less so in explaining $\hat{\gamma} < 0$ for males. It is difficult to understand why men would accept the lower wages in predominantly female jobs when they can get a higher wage rate in predominantly male jobs. A possible explanations for this outcome is that these men accept working in predominantly female jobs either because they have tastes for these jobs or because they are low-quality male workers (Macpherson et al., 1995).

As it can be seen in Table 1, the estimated $\hat{\gamma}$ for women for all the jobs is -0.033 and the standard deviation is 0.028. The estimated $\hat{\gamma}$ for men for all the jobs is -0.047 and the standard deviation is also 0.028. Although both $\hat{\gamma}$ values are negative, the hypothesis that $\hat{\gamma}$ is equal to zero can not be rejected for both women and men when taking account all the jobs. These results imply that the penalty in the wage rate caused by the occupational gender composition is insignificant for both women and men. Thus individuals that are employed in predominantly female occupations rather than predominantly male ones do not necessary earn less. These results can also be analyzed by looking at Figure 1 and 2, where I have plotted the regression line of log wages on the femaleness rate of occupation for both men and women. These graphs clearly show that both regression lines are quite flat. With these results we can conclude that although there is evidence, especially if looking at the female/male wage ratio, that there are differences in the wages women earn in comparison to what men earn, these differences are not caused by the occupational gender composition. Furthermore, these results would be supporting the fact that the crowding hypothesis can not be used for explaining the wage gap between women and men in Canada 1995.

The estimate of γ is also presented in Table 1 for different sub-samples. These sub-samples are the three kinds of jobs discussed above: female jobs, mixed jobs and male jobs. For women in female jobs, the estimated γ is –0.089 with a standard deviation of 0.070 and thus the null hypothesis can not be rejected (see Figure 3). The results are completely different for women in mixed jobs where the estimated γ is 2.964 with a standard deviation of 0.346 (see Figure 4). Here we see that there is a positive and significant relationship between the wage rate and the PFEM. This result shows that women working in mixed jobs receive higher average wage rates as the PFEM increase. Thus, mitigating the discrimination issue, at least, for those women working in mixed jobs. For women in male jobs, the estimated γ is –0.036 with a standard deviation of 0.271 (see Figure 5). In this case, the null hypothesis can not be rejected and thus the penalty in the wage rate caused by the occupational gender composition is insignificant for women in male jobs.

For men in female jobs, the estimated γ is –0.560 with a standard deviation of 0.171 (see Figure 6). The null hypothesis is rejected in this case showing that men, who work in female jobs, are paid less as the PFEM increase. For men in mixed jobs, the estimated γ is 4.191 with a standard deviation of 0.255 (see Figure 7). Thus men that work in mixed jobs earn more as the PFEM increase. This conclusion is quite similar to the one analyzed for women in the same kind of jobs. The similarity of the results for both women and men working in mixed jobs might be a consequence of the comparable worth legislation implemented in Canada. As discussed above in this section, it is quite probable that the implementation of the comparable worth legislation has been most successful in mixed jobs. Thus it is probable that the legislation has benefited, in terms of wage rate, those mixed jobs that have a higher PFEM. Therefore, within mixed jobs, both women and men earn more as the PFEM increases. The result for men in female jobs is quite similar to the one obtained for men in female jobs. The estimated γ is –0.560 with a standard deviation of 0.171 (see Figure 8). Thus the null hypothesis is also rejected in this case but, as the estimated γ is negative, the average wage rate for men, who work in female jobs, decreases as the PFEM increase.

Table 2 presents the estimated parameters $\hat{\delta}$ and $\hat{\gamma}$ from regression (1) for Canada 1995. As I have already analyzed the results for $\hat{\gamma}$, I will just mention the results for $\hat{\delta}$, which is the intercept variable. In fact, the interpretation of this estimate is of no interest for this research project. Thus just the numerical result will be presented without any further interpretation. For women in all jobs, the estimated δ is 2.562 with a standard deviation of 0.021. In the case of women in female jobs, the estimated δ is 2.599 and the standard deviation is 0.059. In mixed jobs the estimated δ is 1.337 and the standard deviation is 0.153. For woman in predominantly male jobs, the estimated δ is 2.486 with a standard deviation of 0.054. The estimated δ is 2.753 with a standard deviation of 0.010 for men in all jobs. For those in female jobs, the estimated δ is 3.102 and the standard deviation is 0.127. In the case of men in mixed jobs, the estimated δ is 1.019 with a standard deviation of 0.108. Finally, for men in male jobs, the estimated δ is 2.797 and the standard deviation is 0.013.

8. Conclusion

This paper has examined the relationship between wages and the gender composition of occupations in order to assess the consequences of the Canadian comparable worth legislation. To do so the SWA 1995 data set has been used and the results have been compared with the investigation done by Baker et al. (1999). The results indicate that women's average wage rate has improved for all the three job categories after the implementation of the comparable worth legislation. But this improvement in the average wage rate has been more important for women in mixed jobs, where the female/male wage ratio has improved by more than 30 percent. Thus it could be concluded that the comparable worth legislation has been more successful in improving the discrimination issue in mixed jobs. On the other hand, it might have been less successful in improving the discrimination issue in male jobs, where the female/male wage ratio has decreased to 0.748.

I have also estimated the relationship between wages and the PFEM by the simple regression $\ln \omega_i = \delta + \gamma PFEM_i + \varepsilon_i$. Here, although there is some heterogeneity across subgroups, the

PFEM wage penalty is statistically insignificant for both women and men, i.e. an occupation's gender composition is not a statistically important determinant of earnings for Canada 1995. This result, for example, is showing that the crowding hypothesis can not be used to characterize the Canadian labor market.

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TABLE 1
Mean Wages, Gender Composition, Wage-Composition Relationship and Wage Gap by Job Types for Canada 1995 and 1988.

	Women					Men					
Sample	N	Wage	PFEM	$\hat{\gamma}$		N	Wage	PFEM	$\hat{\gamma}$		Female/Male Wage Ratio
Canada: 1995											
All jobs	7523	13.58	0.701	-0.033	(0.028)	7443	16.80	0.302	-0.047	(0.028)	0.808
Female jobs	5735	13.48	0.811	-0.089	(0.070)	1480	16.44	0.731	-0.560*	(0.171)	0.820
Mixed jobs	1198	14.68	0.432	2.964*	(0.346)	1619	17.66	0.420	4.191*	(0.255)	0.831
Male jobs	590	12.42	0.180	-0.036	(0.271)	4344	16.61	0.111	-0.521*	(0.100)	0.748
Canada: 1988											
All jobs	14868	10.88	0.668	-0.028	(0.060)	17739	14.23	0.251	-0.145*	(0.052)	0.765
Female jobs	8815	10.91	0.857	-0.082	(0.320)	1324	13.94	0.777	-0.603	(0.399)	0.783
Mixed jobs	4876	10.62	0.465	-0.992*	(0.381)	4963	13.89	0.435	-0.780*	(0.364)	0.764
Male jobs	1177	11.79	0.189	0.913*	(0.156)	11452	14.41	0.099	0.175	(0.156)	0.818

Note: The values for 1988 are from Baker et al. (1999). The values for 1995 are from Survey of Work Arrangements 1995, Statistics Canada and own calculations. The estimation of γ was made by WLS, using sample weights. The estimated standard errors are in parentheses. The $\hat{\gamma}$ that are different from zero with a 95% of certainty are marked with *.

TABLE 2
Estimated Parameters $\hat{\delta}$ and $\hat{\gamma}$ from Regression (1) for Canada 1995.

	Women					Men				
Sample	N	$\hat{\delta}$		$\hat{\gamma}$		N	$\hat{\delta}$		$\hat{\gamma}$	
Canada: 1995										
All jobs	7523	2.562	(0.021)	-0.033	(0.028)	7443	2.753	(0.010)	-0.047	(0.028)
Female jobs	5735	2.599	(0.059)	-0.089	(0.070)	1480	3.102	(0.127)	-0.560*	(0.171)
Mixed jobs	1198	1.337	(0.153)	2.964*	(0.346)	1619	1.019	(0.108)	4.191*	(0.255)
Male jobs	590	2.486	(0.054)	-0.036	(0.271)	4344	2.797	(0.013)	-0.521*	(0.100)

Note: The values for 1995 are from Survey of Work Arrangements 1995, Statistics Canada and own calculations. The estimation of δ and γ was made by WLS, using sample weights. The estimated standard errors are in parentheses. The estimated parameters that are different from zero with a 95% of certainty are marked with *.

TABLE 3
Occupations, PFEM and Gender Frequency for Female Jobs.

Occupations	PFEM	Frequency	
		Women	Men
Stenographic and typing	.99198397	495	4
Bookkeeping, account-recording and related	.92015707	703	61
Personal, apparel and furnishing service	.90654206	291	30
Nursing, therapy and related	.90613718	753	78
Textiles, furs and leather goods	.8677686	105	16
Medicine and health related	.84347826	194	36
Library, file., corres., oth clerical and rel.	.83542039	467	92
Reception, info. Mail and message distribution	.80851064	228	54
Office machine and edp operators	.77952756	99	28
Food. Bev. Preparation, rel. Lodging & accom.	.74824191	532	179
Elementary, secondary and related	.73071719	540	199
Social science and related	.70710059	239	99
Sales, services and other sales	.67320261	103	50
Other teaching and related	.66326531	128	64
Sales, commodities	.64237517	476	265
Management and administration related	.63018242	380	223
Total		**5733**	**1478**

Source: Survey of Work Arrangements 1995, Statistics Canada and own calculations.

TABLE 4
Occupations, PFEM and Gender Frequency for Mixed Jobs.

Occupations	PFEM	Frequency	
		Women	Men
University and related	.48453608	47	50
Other managers and administrators	.46283525	604	701
Artistic and recreation	.45049505	91	111
Food, beverage and related	.43984962	117	149
Officials and administrators, gov"t	.41860465	54	75
Maths, stats, systems analysis and related	.36470588	62	108
Other service occupations	.345898	156	295
Other farming, horticulture & animal i-iusbandry	.31791908	55	118
Total		**1186**	**1607**

Source: Survey of Work Arrangements 1995, Statistics Canada and own calculations.

TABLE 5
Occupations, PFEM and Gender Frequency for Male Jobs.

Occupations	PFEM	Frequency	
		Women	Men
Material recording, scheduling and distribution	.28695652	66	164
Physical, life science	.27272727	33	88
Metal products, n.e.c.	.21818182	48	172

TABLE 5 *(Continued)*

Occupations	PFEM	Frequency	
		Women	Men
Other crafts and equipi~ent operators	.21674877	44	159
Protective services	.18481848	56	247
Wood products, rubber, plastics, other related	.18217054	47	211
Material handling	.17317073	71	339
Electrical, electronics & related equipment	.16666667	32	160
Architecture and engineering related	.16	20	105
Fishing, hunting, trapping and related	.13333333	2	13
Architects and engineers	.12162162	18	130
Motor transport operators	.11904762	55	407
Other processing occupations	.10299003	31	270
Metal shaping and forming occupations	.07035176	14	185
Other transportation operators	.06796117	7	96
Other machining occupations	.05797101	8	130
Forestry and logging	.04651163	4	82
Mechanics and repairman, except electiucal	.01953125	10	502
Other construction trades	.01777778	8	442
Excavating. Grading, paving and related	.01351351	2	146
Mining and quarrying-including gas & oil field	.00892857	1	111
Electrical power, lighting & wire communica	.00671141	1	148
Farmers and farm management	0	0	8
Total		**578**	**4315**

Source: Survey of Work Arrangements 1995, Statistics Canada and own calculations.

TABLE 6
Wages and gender composition using the recoded occupational variables for both 21 and 49 categories

	Women		Men	
	$\hat{\gamma}$		$\hat{\gamma}$	
24 occupational categories	0.267*	(0.032)	-0.014	(0.027)
49 occupational categories	-0.033	(0.028)	-0.047	(0.028)

Note: The values are from Survey of Work Arrangements 1995, Statistics Canada and own calculations. The estimation of γ was made by WLS, using sample weights. The estimated standard errors are in parentheses. The $\hat{\gamma}$ that are different from zero with a 95% of certainty are marked with *.

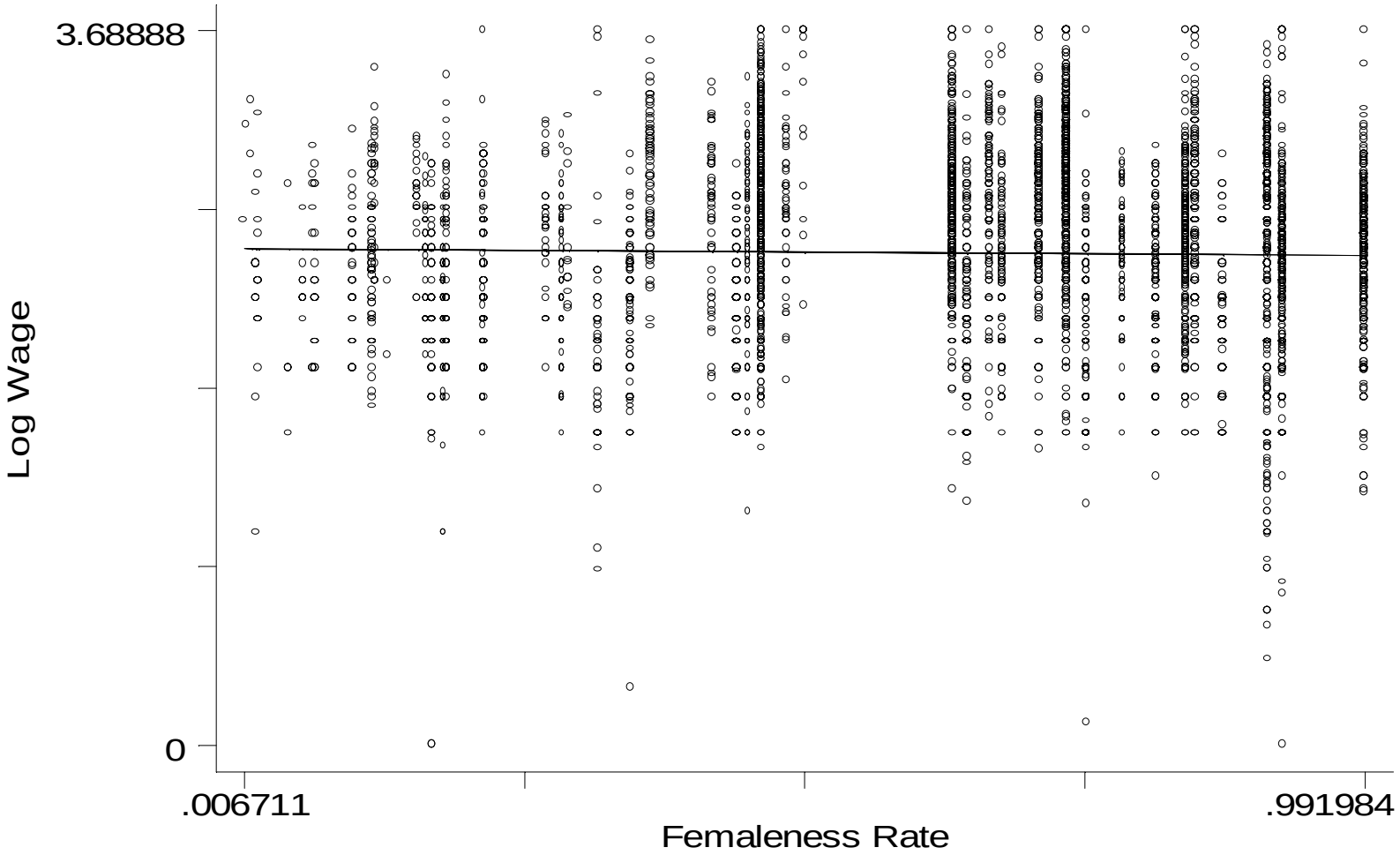

Figure 1. Female Wages in Canada 1995

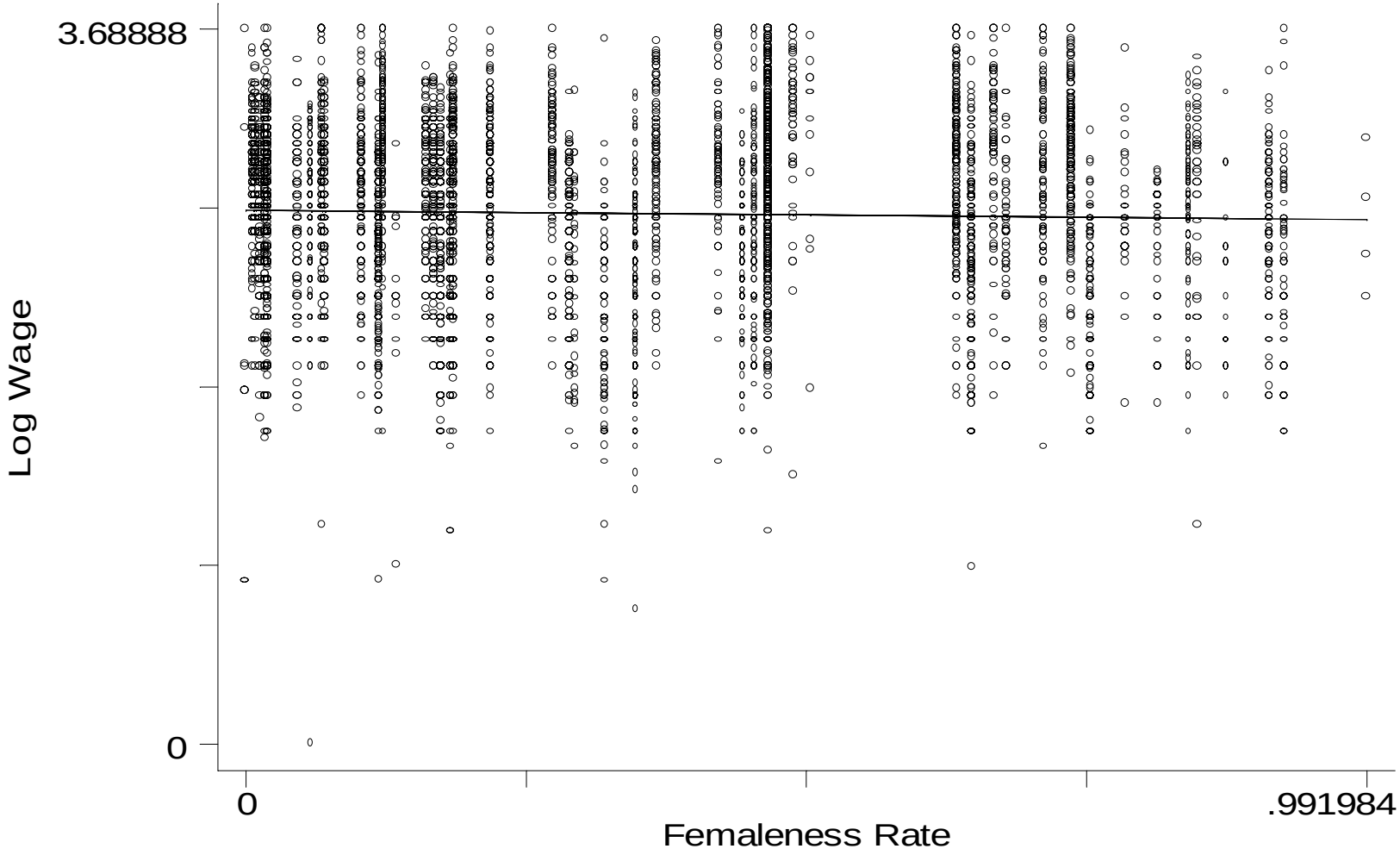

Figure 2. Male Wages in Canada 1995

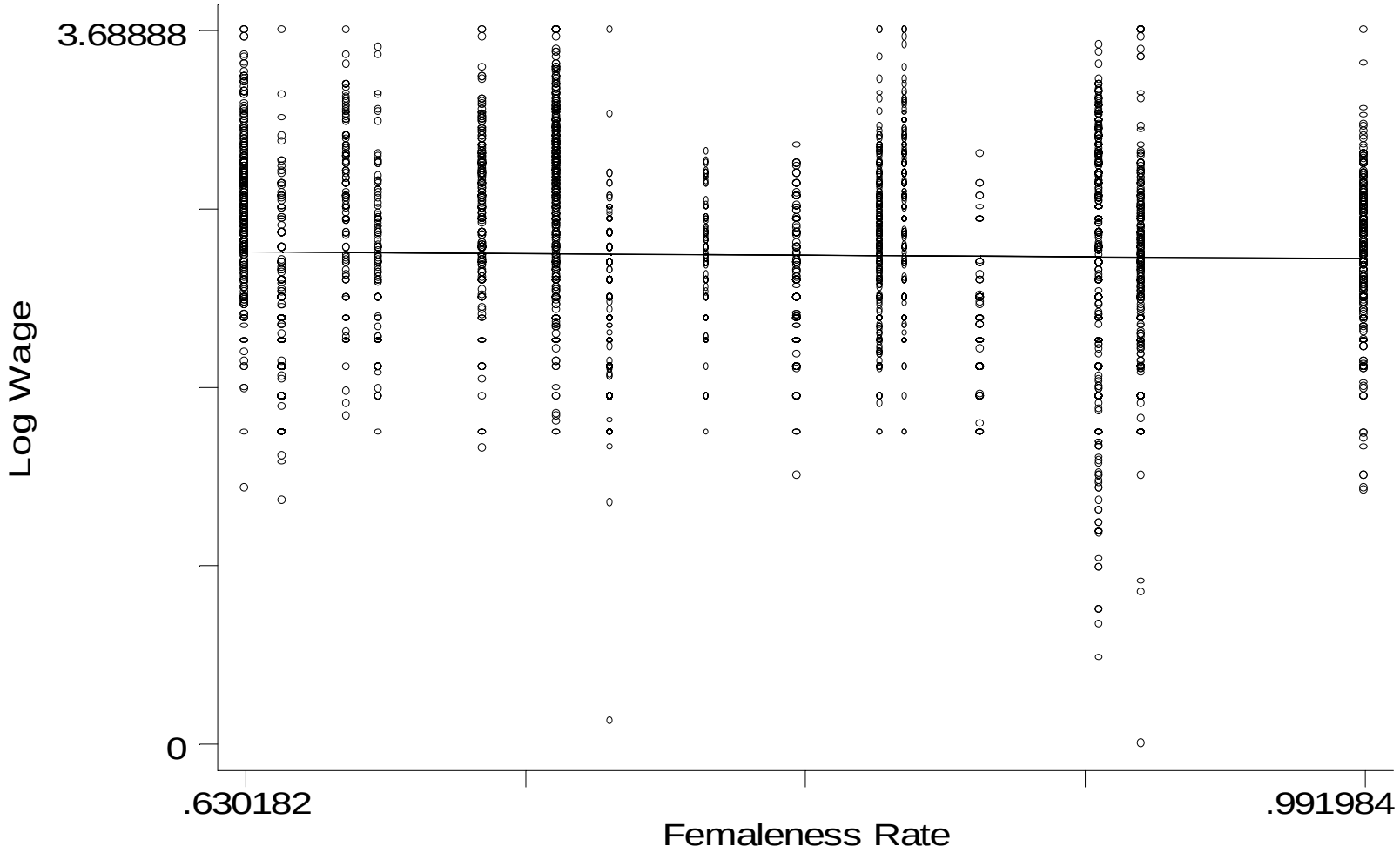

Figure 3. Female Wages in female jobs in Canada 1995

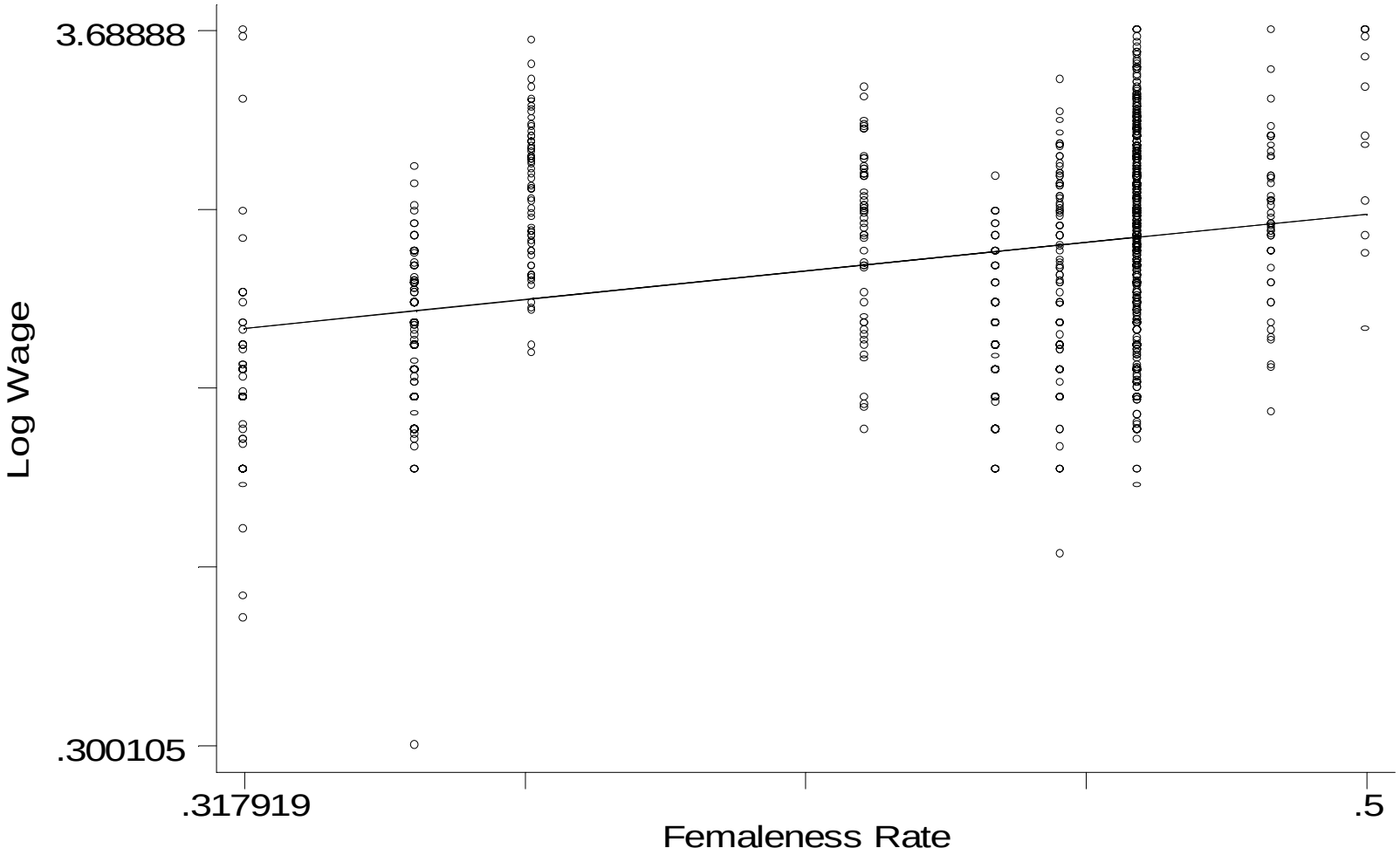

Figure 4. Female Wages in mixed jobs in Canada 1995

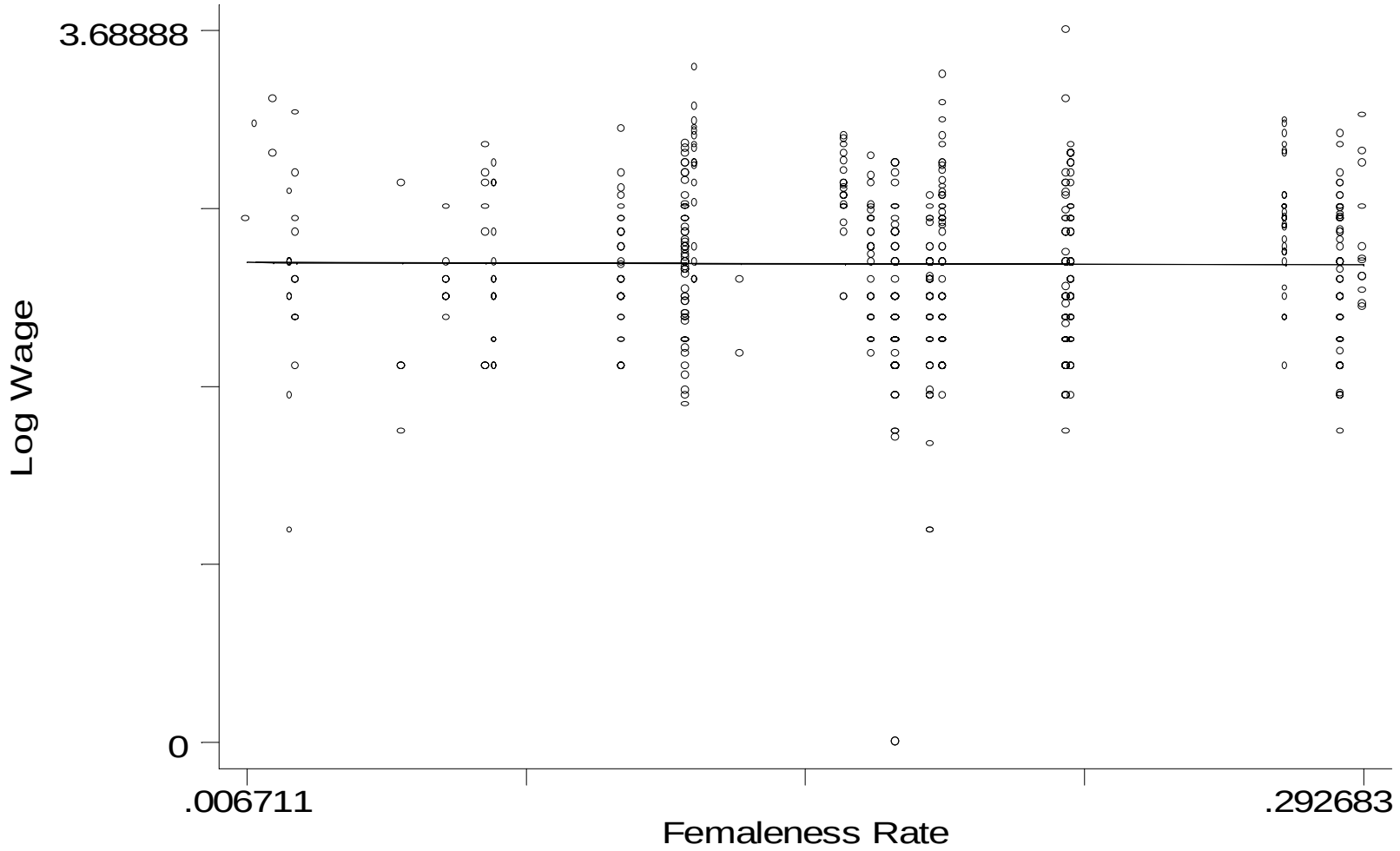

Figure 5. Female Wages in male jobs in Canada 1995

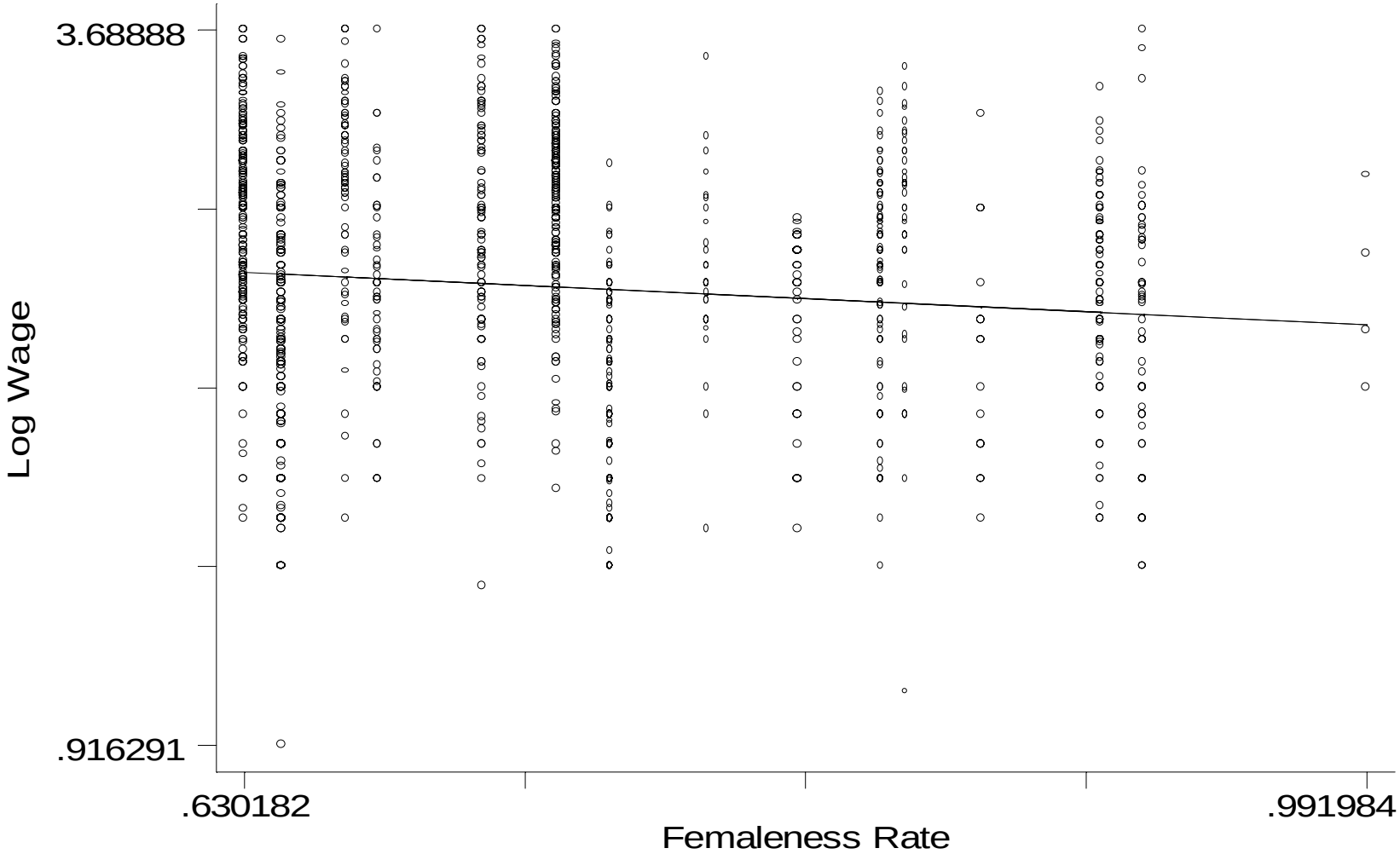

Figure 6. Male Wages in female jobs in Canada 1995

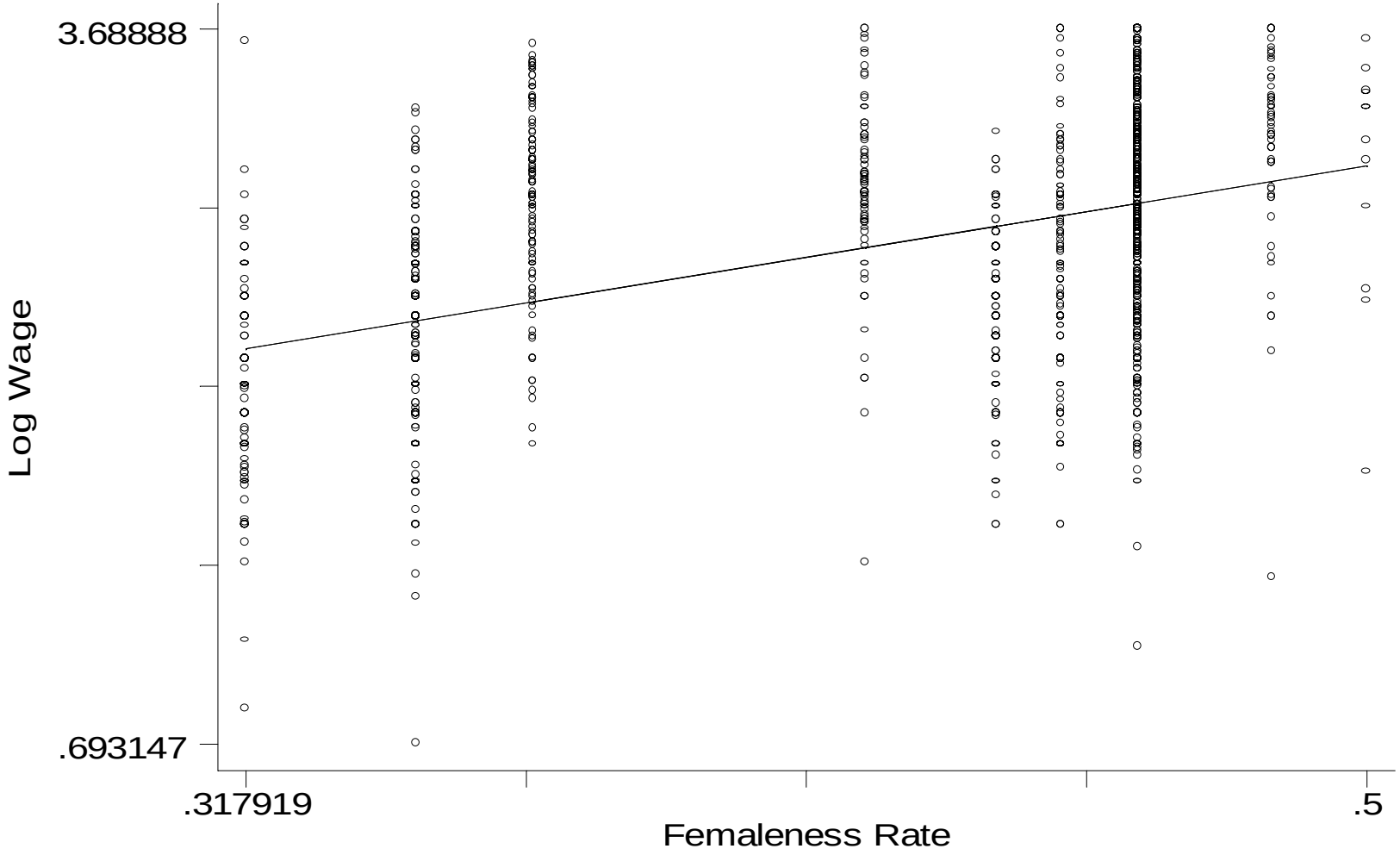

Figure 7. Male Wages in mixed jobs in Canada 1995

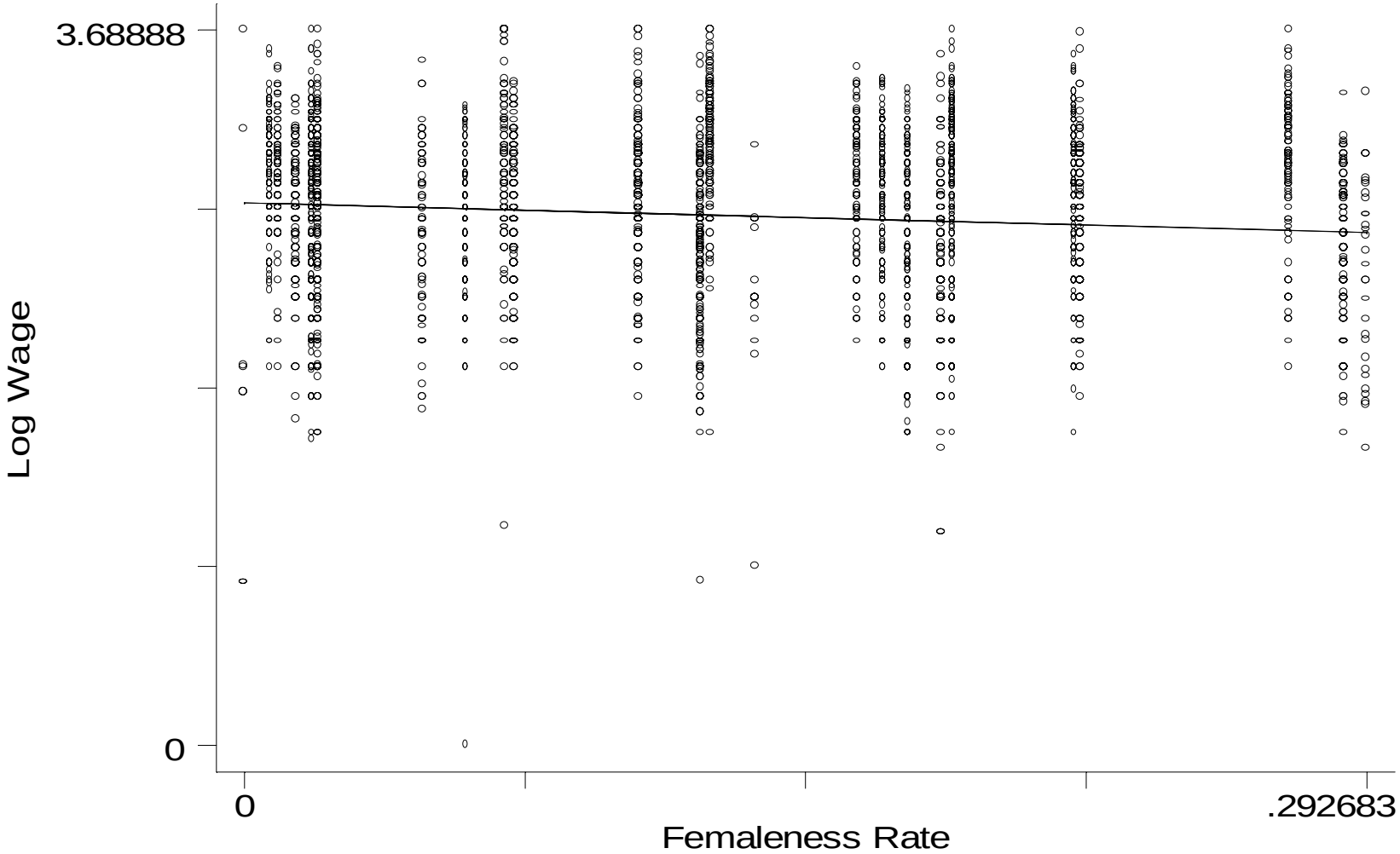

Figure 8. Male Wages in male jobs in Canada 1995