ESSAYS IN EMPIRICAL LABOR ECONOMICS AND THE ECONOMICS OF GENDER

(COMPUTER-USE, WORKGROUP'S GENDER COMPOSITION AND MOTHERHOOD)

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ESSAYS IN EMPIRICAL LABOR ECONOMICS AND THE ECONOMICS OF GENDER

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Three chapters exploring different topics of empirical labor economics and the economics of gender compose this work. Each chapter looks at some specific question and answers it using the most appropriate econometric technique.

The first chapter is an attempt to determine if more intensive computer use by women is an explanation for the decrease in the gender wage gap. It uses the Current Population Survey to investigate the relationship between the gender wage gap and computer-use at work. Since literature on the gender wage gap has shown that it is decreasing over the last two decades, this paper examines whether the computer-use wage premium is an explanation for the decreasing gender wage gap. The results suggest that less than ¼ of the wage gap is explained by differences in observable skills between men and women, and that the computer use differential does not substantially help to explain the gender wage gap.

The second chapter explores a new explanation for the unexplained gap: the gender composition of the individual's co-workers. This study is the first to focus on the relationship between the proportion of female co-workers and wages for both males and females. I use the National Longitudinal Survey of Youth (NLSY79) and personnel records from a single firm to investigate the relationship between the proportion of female co-workers and wages. I find that increasing the number of female co-workers lowers wages for both female and male workers. I also find that male wages are negatively related to having a female supervisor. A second part of the empirical research investigates non-linear effects in this relationship. The results suggest that the penalization for working with a higher proportion of females is non-linear.

Studies in developed countries regularly observe a wage penalty for working mothers. The third chapter explores the effects of motherhood on wages and labor force participation for four Latin American countries. Conversely from the evidence found in the developed countries, Latin American results do not show a homogeneous impact of being a mother on wages. I find that wage penalties and premiums are not borne equally among all mothers.

To my family

To Matías

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CHAPTER 1 INTRODUCTION

This thesis contains three main chapters exploring different topics of empirical labor economics and the economics of gender. Each chapter looks at a specific question using a different econometric technique.

Chapter 2 is an attempt to determine if more intensive computer use by women is an explanation for the decrease in the gender wage gap. It uses the Current Population Survey to investigate the relationship between the gender wage gap and computer use at work. Krueger (1993) shows that computer use at work is associated with 10 to 15 percent higher wages. He also notes that women are more likely to use computers at work. The first part of this paper replicates Krueger (1993) and documents that the computer-use wage premium increased in 1993 but decreased after 1993 as would be expected if the supply of computer literate workers had increased relative to demand. Since the literature on the gender wage gap has shown that this gap is decreasing over the last two decades, this paper examines whether the computer-use wage premium is an explanation for the decreasing gender wage gap. The results suggest that less than ¼ of the wage gap is explained by differences in observable skills between men and women, and that the computer use differential does not substantially help to explain the gender wage gap.

Chapter 3 examines a new reason for the unexplained gender wage gap: the gender composition of the individual's co-workers. Previous research has focused on firms, organizations and establishments. This study is the first to focus on the relationship between the proportion of female co-workers and wages for both males and females. Benefits of this research are implications of the findings for economic policy. I use the National Longitudinal Survey of Youth (NLSY79) and personnel records from a single firm to investigate this relationship. I present several theoretical arguments for the existence of a relationship between proportion of female co-workers and wages, including sorting; co-workers' discrimination; economic competition and crowding; demographic-group power; group interaction; institutionalization and harassment. I first concentrate on an empirical model using a continuous variable that represents the proportion of female co-workers. I find that increasing the number of female co-workers generally lowers wages for both female and male workers. I also find that male wages are negatively related to having a female supervisor. A second part of the empirical research investigates non-linear effects in this relationship, including several indicators for the proportion of female co-workers (having less than 20% female co-workers, 20-40%, 40-60%, 60-80%, or more than 80%) in the regression analysis, instead of a continuous variable. The results suggest that the relationship between the proportion of female co-workers and wages is non-linear.

Studies in developed countries regularly observe a wage penalty for working mothers. The third chapter explores the effects of motherhood on wages and labor force participation for four Latin American countries. The motivation for this study is the importance of this question for its relevance for larger issues of gender inequality. Most women are mothers, and a main aspect of intra-household gender division is assigning most child-rearing responsibilities to women. Therefore, child-rearing will affect most women and contribute to gender inequality. The results of this paper show that mothers with children less than 6 years old participate less in the labor market than those with no children, except for single mothers. Conversely from evidence found in the United States, United Kingdom, Australia and Germany, the results for Latin America do not show a homogeneous impact of being a mother on wages. While for Peru there exists a penalty for mothers of children less than 6 years old, for Bolivia and Brazil there is a premium for being a mother. For Ecuador there are no significant effects. These very heterogeneous effects are further investigated by examining samples divided by public and private sector, by educational level and by age groups. I find that wage penalties and premiums are not borne equally among all mothers.

CHAPTER 2 HOW COMPUTERS HAVE CHANGED THE GENDER WAGE GAP: EVIDENCE FROM MICRODATA 1984-2001

2.1. Introduction

This chapter determines if more intensive computer-use by women is an explanation for the decreasing gender wage gap. According to Blau (1998), women have made *substantial progress toward gender equality* over the period 1969-1994 in a number of dimensions. Women's real wages increased substantially over this period, while men's real wages stagnated. Similarly, women upgraded their major occupations absolutely between 1979 and 1988, in that they moved into higher occupational categories, while, on net, men's occupational shifts left their real wages unchanged. This does not necessarily mean that discrimination and other gender-related issues affecting women have disappeared. There is still a considerable, although reduced, gender wage gap after controlling for observable characteristics. This paper will add information about a new source of explanation for the gender wage gap; computer use at work.

Krueger (1993) uses Current Population Survey data to examine whether workers who use a computer at work earn a higher wage rate than otherwise similar workers who do not use a computer at work. A variety of models are estimated to try to correct for unobserved variables that might be correlated with job-related computer-use and earnings. Estimates suggest that workers who use computers on their job earn 10 to 15 percent higher wages. Furthermore, because highly educated workers are more likely to use computers on the job, the estimates imply that the proliferation of computers can account for between one third and one half of the increase in the rate of return to education observed between 1984 and 1989. Although it is unlikely that a single explanation can adequately account for all the wage structure changes, these results provide support for the view that technological change (in particular, the proliferation of computers at work) significantly contributed to the changes in the wage structure that occurred in the 1980s.

DiNardo and Pischke (1997) replicated Krueger's paper using data from German workers. Their data set contains much more detailed information on the tools[1] used by workers on their jobs. Their findings

[1] The "tools" used here were telephone, calculators, pencils and sitting on the job.

confirm that the estimated wage differential associated with computer-use in Germany is very similar to the U.S. differential. Since they also measure the differentials for other tools' use, they find that there are also large differentials for on-the-job use of calculators, telephones, pencils, or those who work while sitting down. These findings question the literal interpretation of the computer-use wage differential as reflecting true returns to computer-use or skills. In other words, their results seem to suggest that computer users possess unobserved skills which might have little to do with computers but which are rewarded in the labor market, or that computers were first introduced in higher paying occupations or jobs. Krueger (1993) recognized some of these issues in his original paper and went to considerable lengths to consider unobserved heterogeneity. However, DiNardo and Pischke (1997) critique does not necessarily apply to the second part of this paper: the impact of what these computer-use (or heterogeneity) premiums might have on the gender wage gap. Even if they are capturing unobserved heterogeneity, the fact that they might differentially affect men and women is interesting.

Some research has been done regarding the technology explanation for wage inequality growth by investigating the relationship between computers and wages. Handel (1999) uses the January 1991 supplement to the Current Population Survey, which includes eight indicators of the tasks performed on the job, including computer use, to analyze the effect of computer-use on wage inequality. His estimates are basically consistent with Krueger's; returns to computer-use are in the range of 10 to 15%. The main difference is that infrequent users receive a return below this range. He also uses the 1984 and 1989 October CPS supplements to decompose the changes in wage inequality into portions attributable to changes in computer-use and other variables. His results show that the spread of computer use at work between 1984 and 1989 had a slightly equalizing effect on the overall wage distribution.

Krueger (1993) asserts that "women, Caucasians and highly educated workers are more likely to use computers at work than men, African-Americans and less educated workers". The fact that women are more likely to use computers at work than men begs the question: Could the higher probability of using a computer by women be an explanation for the decreasing gender wage gap?[2]

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[2] This question is relevant assuming that there is a true wage premium for computer-use and that there is a decreasing gender wage gap in the last two decades.

To examine this question, the basic information will be the October Current Population Survey (Education and School Enrollment Supplement) for 1984, 1989, 1993, 1997 and 2001. In these years, the CPS asked several questions about computer-use. The remainder of the paper is organized as follows. Section 2.2 extends Krueger's results until 2001. Section 2.3 analyzes gender differences regarding computer-use at work. Finally, Section 2.4 concludes.

2.2. Computer-use and Wages

The objective of this section is to extend Krueger's results[3] for 1993, 1997 and 2001. He uses only the 1984 and 1989 surveys.

2.2.1. Descriptive Analysis

Table 2.1 is an extension of Table I in Krueger (1993) for three additional years: 1993, 1997 and 2001.[4] The results regarding differences in means between men and women go in the same direction as Krueger's. That is, women are more likely to use a computer "directly" at work.[5] The table also presents the percentage gap between men and women for these five years. This percentage gap in computer-use at work is increasing from 1984 to 1993 and it stays at almost the same level in the last three years of the data.

It is interesting to see the growth rate in the percentage of workers who use a computer at work for different demographic groups. Table 2.2 shows that the growth rate in the percentage of workers that use computers at work is greater for the groups with an initial lower percentage of workers who use a computer at work. This is some kind of catching-up behavior by these groups. For example, for those groups divided by educational attainment, we can see that the highest growth rate is the one of the group of workers with less than high school. For these workers, the growth rate in the percentage of workers who use a computer at work is 253.2% between 1984 and 2001. On the other hand, the growth rate of

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[3] I have only calculated the results coming from the use of the Current Population Survey, not from other sources used by Krueger (1993) because the CPS is the largest source of information for this topic and it has been updated in the last few years.

[4] An update of Table I in Krueger (1993) for 1993 was also done by Autor, Katz and Krueger (1998).

[5] Using a computer at work refers only to the case where the respondent answers "direct" or "hands on" use of a computer with typewriter like keyboards. The computer may be a personal computer, a minicomputer or a mainframe computer (CPS Field Representative Memorandum #89-20, Section II, October 1989).

the group of workers with more than college is only 99.5%. The same pattern is seen for men versus women, whites versus African-Americans, different age-groups, blue-collar versus white-collar, union members versus non-members, and part-time versus full-time workers.

2.2.2. Computer-use and Wages: a Regression Analysis

Krueger estimated a variety of statistical models to try to answer the question: Do employees who use a computer at work receive a higher wage rate as a result of their computer skills? The first part of this paper will concentrate on extending Krueger's results through 2001. My analysis is based on data from the October CPS for 1984, 1989, 1993, 1997 and 2001. These are the five years for which there is available information about computer-use in the CPS. The sample consists of workers aged 18 to 65 (see Appendix A for further details about the sample).

The initial approach in Krueger (1993) is to augment a standard cross-sectional earnings function to include an indicator variable for whether an individual uses a computer at work. Let C_i represent an indicator variable that equals one if the i^{th} individual uses a computer at work, and zero otherwise. Observation i's wage rate W_i is assumed to depend on C_i, a vector of observed characteristics X_i and an error ε_i. Adopting a log-linear specification,

$$(1) \qquad \ln W_i = \alpha + \beta\, C_i + \delta\, X_i + \varepsilon_i.$$

where α, β and δ are parameters to be estimated. Later on we will consider possible problems of correlation between C_i and ε_i.

Table 2.3 reports the results of fitting (1) by OLS, with varying sets of covariates (X). In Model 1 of Table 2.3, an indicator variable for computer use is the only explanatory variable. In this model, the (raw) differential in hourly pay between workers who use computers on the job and those who do not is 31.3% for 1984 (exp(0.268) – 1), 38.9% for 1989 (exp(0.327) – 1), 43.6% for 1993 (exp(0.362) – 1), 42.9% for 1997 (exp(0.347) – 1) and 44.9% for 2001 (exp(0.371) – 1). If we control for a set of covariates including years of education, experience, experience squared, race, part-time, lives in SMSA, veteran, gender, marital status and union membership, the differential changes. In this case, the conditional differentials are reduced to 20.2% for 1984, 22.8% for 1989, 24.2% for 1993, 21.6% for 1997 and 20.5% for 2001. These results are shown in Model 2 of Table 2.3. In this specification, the indicator representing computer-use at work has a positive and statistically significant coefficient in each year.

As Krueger notes, it is not clear whether occupation indicators are appropriate variables to include in these wage regressions because computer skills may enable workers to qualify for jobs in higher paying occupations and industries. Nevertheless, Model 3 in Table 2.3 shows the results of the wage regressions controlling for all the variables included in Model 2, as well as for eight one-digit occupation indicators. In this case, the differentials have only a slight difference compared to the results of Model 2 (20.0%, 22.6%, 23.7%, 21.6% and 15.9% respectively). But controlling for 44 two-digit occupation indicators (Model 4), the differentials are much smaller. They are 12.36%, 14.51%, 14.88%, 12.85% and 9.9% respectively, and the coefficients are still statistically different from zero.

From these results, we can conclude that the returns to computer-use increased up to 1993 but then declined to 2001.[6] Another important result is that the premiums for using a computer decline when we control for detailed occupation indicators.

2.2.3. Employer Characteristics

It can be the case that there is some correlation between employer characteristics and computer use at work. Such relationship can exist in a rent-sharing model, in which employees are able to capture some of the return to the employer's capital stock. As a proxy of employer characteristics and using the available information in the CPS, we can include 48 two-digit industry indicators (Model 5). If these industry indicators are included in a model which includes two-digit occupation indicators and the other

[6] In the conclusion of Krueger (1993), he states, "it seems reasonable to speculate that the supply of workers who are proficient at operating computers is likely to increase in the future. At the same time, it would seem *unlikely* that the demand for computer-literate workers will continue to expand as rapidly as it has in the past decade. If these conjectures hold, one would expect that the wage differential for using a computer at work will fall in the future".

explanatory variables included in the second set of specifications, the computer-use wage differential is 10.57%, 11.87%, 12.27%, 10.75% and 8.2% for these five years, respectively.

Another dimension interesting to explore in this particular analysis is union membership. In this sense, if we analyze the premium for computer use for union workers separately from non-union workers (using the covariates used in Model 2), we can see that there are large differences regarding computer-use premiums for these two sub-samples. The premium for computer-use for non-union members is 22.58%, 25.11%, 27.27%, 24.09% and 22.5% for these five years, respectively. The t-statistics for these coefficients are very large (ranging from 21.68 to 26.26). However, for union members, the (raw) differentials are equal to 7.02%, 8.45%, 8.28%, 7.94% and 8.38%. The t-statistics for the union sector show that these coefficients are statistically significant and range from 3.21 to 4.42.[7]

2.2.4. Changes in the Computer Premium over Time

As noted previously, the results shown in Table 2.3 reflect that the returns to computer use have increased from 1984 through 1993 but they have decreased slightly in 1997 and 2001. This finding is interesting for two reasons.

First, given the continuous expansion in the number of workers with computer skills between 1984 and 2001, one might expect a continuous decline in the wage differential associated with computer-use at work. If we divide the period 1984-2001 into two sub-periods: 1984-1993 and 1997-2001, we observe that in the first sub-period the demand for workers with computer skills may have shifted out as fast as, or faster than, the outward shift in the supply of computer-literate workers. But in the second sub-period, Krueger's expected decline in wage differentials has taken place.

A second reason why the slight increase in the wage differential associated with computer-use is of interest concerns the fact that there is a possibility of non-random selection of workers who use a computer at work. Companies are more likely to provide training to those whose productivity is likely to increase more because of the training. This would pose a problem for the interpretation of OLS if these workers would have earned higher wages even in the absence of computers. The increase in the number

[7] These results are not shown in the tables.

of workers using a computer at work between 1984 and 2001 is likely to have reduced the average quality of workers using a computer at work, which would be expected to drive down the wage differential associated with computer use. But this was true only for 1997 and 2001. In the previous period, there was an increase in the wage differential suggesting that nonrandom selection of workers who use a computer at work is not a dominant factor behind the relationship between computer-use and wages.

2.2.5. Specific Computer Tasks

Since 1989, the October CPS asked workers for which tasks they use their computers at work. Respondents were allowed to indicate multiple tasks. Krueger (1993) uses 1989 data to investigate which tasks are the most highly rewarded. The results from 1997 and 2001 are presented in Table 2.4.[8]

Table 2.4 shows that, for 1997, there is a positive reward for using a computer at work for word processing or for sales. A below-average reward to computer-use occurs when the worker uses the computer at work for bookkeeping, for inventory control or for desktop publishing. On the other hand, for 2001, it is the use of a computer at work to access the Internet or E-mail, for using a calendar or scheduling, or for programming what has a positive effect on wages. By 2001, the use of a computer for word processing or desktop publishing or for graphics or design has a below-average effect on wages. Finally, for both 1997 and 2001, there exists a positive reward for the use of spreadsheets at work. Of course, each of these returns could be proxies for omitted variables, along the lines of DiNardo and Pischke (1997).

2.2.6. The Omitted-Variables Problem

As explained before, a main concern in the interpretation of the OLS estimates is that workers who use a computer at work may have higher average ability. Therefore, they may have earned higher wages even in the absence of computer use at work. The attenuated effect of computer use at work on wages when

[8] The sample sizes for previous years are very small, which imposes a problem for wage regression analysis. Therefore, the results presented are only for 1997 and 2001.

we introduce covariates suggests that the omitted-variables problem may be quite important. The next strategies will investigate whether the computer wage differential is real or not.

2.2.7. Computer-use at Home and at Work

Since workers who possess unobserved characteristics that are associated with computer use at home may be selected by employers to use computers at work on the basis of the same characteristics, Krueger includes an indicator for computer use at home in the wage regression. He also includes an interaction term that represents the use of a computer at home and at work.

In the October CPS, for the five years analyzed in this paper, there are three questions about computer use, depending on the place where computers are used. The survey asks about computer-use at work, at school, and at home. This enables a more general specification of the earnings equation originally presented in equation (1), including computer-use at home and computer-use at work for our sample of wage earners.

The log-wage equation including computer use at work as well as the indicator representing computer-use at home is as follows:

$$(2) \qquad \ln W_i = \alpha + \beta_1 C^w_i + \beta_2 C^h_i + \beta_3 C^w_i . C^h_i + \delta X_i + \varepsilon_i$$

where C^w_i is an indicator variable that equals one if the worker uses a computer at work and zero otherwise, C^h_i is an indicator variable that equals one if the worker uses a computer at home and zero otherwise, and $C^w_i . C^h_i$ is an interaction term between computer-use at home and at work.

Table 2.5 presents OLS estimates of equation (2) using CPS data for 1984, 1989, 1993, 1997 and 2001.[9] In 1989, individuals who use a computer only at work earned approximately 12% more per hour than those who do not use a computer at all. Individuals who use a computer at home earn 0.2% more than

[9] Excluding the missing values for both computer-use at home and at work, the sample size is 1,491 observations for 1984 and 2,731 for 1989. These sample sizes differ from Krueger (1993), therefore, the results reported in this paper would differ from his results.

those who do not use a computer at all. In addition, individuals who use a computer at home and at work earn 5% more than individuals who use a computer at work only. But the last two coefficients are not statistically significant. The results indicate that computer use at home has no significant premium in terms of wages and even though the interaction term between using a computer at work and at home has a positive sign, the coefficient is not statistically significant. The coefficient that represents computer-use at home is statistically different from zero only for 1993 and 1997. In these two years the fact that the individual uses a computer at home has premiums of 9% and 5%, respectively, in term of wages. The interaction term is statistically different from zero only for 1993 and 2001, in which case it has a negative sign for 1993 and a positive sign for 2001 (-11% and 5.4% respectively). This suggests that individuals who use a computer at home and at work earned 11% less than individuals who do not use a computer at home or at work for 1993, and 5% more for 2001.

The results for the five years analyzed show that the coefficient for computer use at work when we include computer use at home increases over time (and this coefficient is always statistically different from zero).

2.2.8. Estimates for Narrow Occupations

As a second approach, Krueger estimates Model 2 for a more homogeneous group of workers. Since the largest narrowly defined occupational group in the CPS is secretaries, he shows the results for this group. Table 2.6 shows the results for the five years studied here.

For the sample of secretaries, we can see that the computer wage premium is 7.8%, 10.2%, 9.1%, 9.4% and 8.68% for 1984, 1989, 1993, 1997 and 2001, respectively. The coefficients of the indicators for computer-use at work are not longer statistically significant at 95% confidence level for 1993, 1997 nor in 2001. One explanation is that the percentage of secretaries that use a computer at work is equal to 86% in 1993, 90% in 1997 and 84% in 2001, relative to the smaller values of 47% in 1984 and 75% in 1989. Therefore, it is just not really that important to have computer skills for secretaries in recent years, but it made a difference a few years ago.

The estimates of wage differentials due to computer-use for other occupations are shown in Table 2.7. This table also shows the proportion of the sample using a computer at work and the sample size. Wage differentials for managers are statistically significant for all the years except 1997. These wage differentials are in the range of 10 to 18%. For registered nurses, they are statistically significant for the first three years (1984, 1989 and 1993) and around 13%. Wage differentials for the group of bookkeepers are only statistically significant for the first two years (1984 and 1989) and these wage differentials are in the range of 10% to 16%. In the case of sales supervisors, the wage differentials are statistically significant for all years except 1993 with differentials from 11% to 22%. Sales representatives have statistically significant differentials only for 2001 (44.9%). Finally, teachers do not have statistically significant wage differentials due to computer-use at work.

Even within specific groups of workers, for most of them there still are positive rewards for computer-use at work and these wage differentials are significantly different from zero in many of these groups of workers.

2.3. Analysis of Gender Differences regarding Computer-use at Work

Previous sections have shown an updated version of Krueger (1993) in order to document the existence of premiums in terms of computer-use. Using the October CPS from 1984 to 2001, there is evidence supporting that there is a premium for using a computer. This section will try to answer the question: Could the higher probability of using a computer by women be an explanation for the decreasing gender wage gap?

2.3.1. Descriptive Analysis

Table 2.8 provides sample means and standard errors for variables which are considered important for this study. This table also provides the values of two-sample t-tests for mean differences among men and women.[10]

[10] This two-sample t-test has the following null and alternative hypothesis: H_o: mean (given characteristic for men) – mean (given characteristic for women) = difference = 0
H_a: difference ~= 0

Regarding characteristics such as age, race and marital status, there are some differences. Men, on average, are older than women in the sample. Men are more likely to be white in most of the years, and more likely to be married. The variable years of education has different means for men and women, but this pattern has changed over time.

Regarding labor market characteristics, men work more weeks on average and more hours per week. Women are more likely to work part-time. The average potential experience[11] is statistically different for men and women for all years except 1997.

The October CPS asks three separate questions regarding computer use: directly at home, at school and at work. Table 2.8 shows that, regarding computer use at school, men are more likely to use a computer at school than women. The t-statistic for the difference in means for the variable computer-use at home is not significantly different from zero.

Regarding computer-use at work, women are more likely to use a computer at work. The variable computer-use at work has an increasing mean for men and women from 1983 to 2001. And the difference in means between women and men is also increasing from 7% in 1984 to 13% in 2001. This supports in part the assumptions made to the main question of this paper since the difference in means between women and men in terms of computer-use at work is not only positive but also increasing over time.

2.3.2. Oaxaca Decomposition

One way to analyze wage differentials between men and women is described in Oaxaca (1973). Using his method, the overall difference in wages between men and women into a portion explained by observable characteristics and a portion that is left unexplained. This is easily done by running separate regressions for men and women and then rewriting the overall gap in various ways. Tables B.1 and B.2 in Appendix B show the regression results for women and men respectively. In both cases, the returns to computer-use are positive and statistically significant for these five years. The other explanatory

[11] Potential experience is defined as: (age – education – 6).

variables maintain similar coefficients. If we compare the effects of computer-use at work for men and women, we can see that the return is larger for men for all years. For example, in 1993, the coefficients for the three models are almost twice as large for men than for women.

Expanding Oaxaca's method, the overall difference in wages between men and women can be decomposed into a portion explained by computer skills, a portion explained by other observable characteristics and a portion that is still unexplained.

First, define α_f, β_f (a vector) and $\beta^C{}_f$ as coefficient estimates from a regression of log compensation on a constant, a set of covariates and a computer-use indicator variable for women only.[12] Also define $X^a{}_f$ (a vector) and $C^a{}_f$ as the mean characteristics of the covariates and of the computer indicator variable for women. α_m, β_m, $\beta^C{}_m$, $X^a{}_m$ and $C^a{}_m$ are defined for men. The male and female wage regressions are as follows:

$$(3)\ w_m = \alpha_m + \beta_m X^a{}_m + \beta^C{}_m C^a{}_m$$

and

$$(4)\ w_f = \alpha_f + \beta_f X^a{}_f + \beta^C{}_f C^a{}_f$$

Therefore, the overall gap between men and women is:

$$(5)\ \Delta w = \alpha_m + \beta_m X^a{}_m + \beta^C{}_m C^a{}_m - \alpha_f - \beta_f X^a{}_f - \beta^C{}_f C^a{}_f$$

There are two ways to rewrite this equation. The first is based on adding and subtracting $\beta_m X^a{}_f$ and $\beta^c{}_m C^a{}_f$ which yields:

$$(6)\ \Delta w = (\alpha_m - \alpha_f) + (\beta_m - \beta_f)\, X^a{}_f + (\beta^c{}_m - \beta^c{}_f)\, C^a{}_f + \beta_m\ (X^a{}_m - X^a{}_f) + \beta^c{}_m\ (C^a{}_m - C^a{}_f)$$

---

[12] My explanation of the Oaxaca decomposition is taken from Bertrand and Hallock (2001). I have added the discrimination between computer-use and other skills.

In this case, we are assuming that the returns to male characteristics, β_m and $\beta^c{}_m$ are the baseline. The second common decomposition is found by adding and subtracting $\beta_f X^a{}_m$ and $\beta^c{}_f C^a{}_m$ which yields:

$$(7)\ \Delta w = (\alpha_m - \alpha_f) + (\beta_m - \beta_f)\, X^a{}_m + (\beta^c{}_m - \beta^c{}_f)\, C^a{}_m + \beta_f\, (X^a{}_m - X^a{}_f) + \beta^c{}_f\, (C^a{}_m - C^a{}_f)$$

where the returns to female characteristics, β_f and $\beta^c{}_f$, are the baseline. In both (4) and (5), the first three terms refer to the unexplained portion and the two last terms refer to the part of the gap explained by differences in skills (in computer skills and other observable skills, separately).

The results of the Oaxaca decomposition are shown in Table 2.9, using the coefficients that have been obtained in Model 3 of Tables B.1 and B.2 in Appendix B. As noted earlier, the gap is decomposed in two ways. In Oaxaca Decomposition I (equation (6)), I assume that the male wage structure is the true wage structure, and in Oaxaca Decomposition II (equation (7)), I assume that the female wage structure is the true one. Of course, we could also assume an infinite number of linear combinations in between.[13]

The last column of Table 2.10 suggests that most of the total gap is unexplained, and this result holds across all the years analyzed. In other words, most of the total gender gap is due to unobservable differences between men and women (the range of the unexplained part is from 80% to 100%). This means that the differences in the β's (the returns to certain characteristics) among men and women are explaining a big part of the gender wage gap.

In the part that is explained by observable skills, we notice that computer skills add a negative term to the portion of the gender gap explained by skills. Although this seems odd, it is because the mean of the indicator for computer-use at work is higher for women. Therefore, $(C^a{}_m - C^a{}_f)$ is smaller than zero and this drives to a negative term added to the explained portion of the total gap.

[13] Refer to Oaxaca and Ransom (1994) for a deep analysis of other decompositions.

2.3.3. Interaction Term between Gender and Computer-use at Work

As described above, Table 2.3 documents the wage differential associated with computer-use at work, but this wage differential is constrained to an intercept shift. Table 2.10 presents an estimate of the same specification adding an interaction term that is the product of the indicator that represents computer-use at work and the indicator that represents being female. The regression results are calculated for Models 2, 3, 4 and 5.

This interaction term is not statistically different from zero in any of the models or for any of the five years analyzed. However, introducing this term slightly diminishes the coefficient of the indicator variable that represents the use of a computer at work (compared to the results shown in Table 2.3).[14] This implies that controlling for gender and computer-use at work at the same time, the effect of computer-use at work has a smaller effect on wages.

If I introduce an interaction term among the female indicator variable, the computer-use at work and occupation indicators (results not reported), I do not have significant changes in our results. There are no significant changes either when we analyze the relationship between the degree of computer-use in different industries and female participation in such industries.

2.3.4. Percentage of Workers who use a Computer at Work by Gender, Occupation and Industry

To give more intuition about the origin of differences between men and women regarding computer-use at work, it is interesting to see the differences across occupations and across industries.

In Appendix C, we can see the percentage of men and women using a computer at work by industry (using two-digit industry indicators). In Appendix D, we can observe these percentages by occupation (using two-digit occupation indicators). Comparing these two tables, we can see that there are more statistically significant differences in the percentage of workers who use a computer at work between men and women at the industry level.

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[14] However, the indicator variable that represents the computer-use at work remains statistically significant all the time.

When we look at Appendix C (Industry), we can see that, in 1984, the number of industries with statistically significant mean-differences between men and women were 28, but this number was decreasing in the following years, having only 11 industries with a statistically significant difference in means in 1997. This means that there are fewer differences between men and women regarding computer-use at work across industries.[15]

Among the 28 industries that have statistically significant differences, only two (Electrical Machinery, Equipment and Supplies; and Tobacco Manufactures) in 1984 and only one from 11 (Electrical Machinery, Equipment and Supplies) in 1997 are reflecting a greater percentage of men who use a computer at work compared to women. All the others reflect a greater percentage of women using a computer at work. Even though the differences are statistically significant from the results of the two-sample t-test, it must be noticed that, for some industries, female sample sizes are very small.[16]

Regarding differences across occupations, we can see (from Appendix D) that there are only seven to eight occupations with statistically significant differences between men and women for 1984 to 1993 and only four occupations with statistical differences in 1997. Some occupations with a greater percentage of women using a computer at work are Management and Related Occupations; Engineers, Mechanics and Repairers; and Other Administrative Support Occupations. Occupations with a statistically significant (positive) mean difference for men are Teachers, College and University; Machine Operators and Tenders; and Health Assessment and Treating Occupations.[17]

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[15] This number is just the result of counting how many industries have a probability-value smaller than 0.01 once we calculate the two-sample test for the difference in means. The total number of industries is equal to 50.

[16] See for example, the sample sizes for *Agriculture Services* is equal to 72 for women and 243 for men; for *Construction*, 359 women and 3,789 men; for *Mining*, 89 women and 591 men.

[17] Again, it must be noticed that the sample sizes are very small for some particular cases such as *Engineers* were there are 60 women and 897 men.

2.4. Conclusions

This paper had two objectives. The first objective was to add more information about the relationship between wages and computer-use at work to the early work of Krueger (1993). He used CPS data for 1984 and 1989 and concluded that computer-use at work is associated with 10 to 15 percent higher wages. The results using data for 1993, 1997 and 2001 show that this is still true for these three years. However, the computer-use premium in term of wages continued to increase in 1993 but it decreased in 1997 and 2001. Perhaps this was due to an increase in supply relative to demand of computer-able workers.

Krueger (1993) mentions that women are more likely to use computers at work. Since the literature on the gender wage gap has shown that the gender wage gap is decreasing over the last two decades, the second objective of this paper was to analyze if the computer-use wage premium is an explanation for the decreasing gender wage gap.

The results of this paper are not conclusive on this issue. From the separate regressions for men and women, we can see that the returns for using a computer at work are almost the same by gender (slightly more positive for men). From the Oaxaca decomposition analysis, most of the total gender gap is due to unobservable differences between men and women. The differences in βs between men and women account for more than 80% of the gender wage gap. In the part that is explained by observable skills, we notice that computer skills slightly add to the portion of the gap explained by skills.

Finally, including an interaction term between the female indicator and computer-use at work changes the effect of computer-use at work on wages, making it slightly smaller. However, the coefficient of this interaction term is not statistically different from zero.

If one of the objectives in terms of public policy is to reach gender equality, one of the ways of reducing this gap is to upgrade skills for women. In this sense, since computer-use seems to alleviate the differences in wages among men and women, training programs for women to use computers would be helpful in reaching the objective of gender equality. Private firms as well as public programs which

which concentrate on female programs would help women to enter the labor force with higher skills which allow them to increase their wages and therefore decrease the gender wage gap.

In this sense, because computer skills are needed more and more and since a very young age, encouraging young women to increment their human capital by training them to be able to use computers since high school would help them equalize their opportunities in the job market later on.

This paper shows that computer-use is not very important in reducing gender inequalities. However, computer skills so place a role in wage differences and this role should be acknowledged in terms of public policies.

2.5. References

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2.6. Tables

Table 2.1. Percent of workers in various categories who directly use a computer at work

Group	1984	1989	1993	1997	2001
All workers	24.5	37.3	46.4	51.1	55.7
Gender					
Men	21.1	32.2	40.7	45.4	49.9
Women	28.9	43.3	52.9	57.4	62.2
Percentage gap (men – women)	-7.8	-11.1	-12.2	-12.0	-12.3
Education					
Less than High School	4.7	7.1	10.4	12.7	16.6
High School	18.2	27.7	34.4	37.5	40.2
Some College	29.6	44.1	50.1	54	56.9
College	39.8	56.7	65.4	69.9	74.6
Post College	43.1	59.5	71.6	78.2	86.0
Race					
White	25.2	38.4	47.7	52.3	57.0
Black	19.3	27.6	36.6	40.8	44.8
Age					
18-24	19.7	29.4	34.5	37.4	38.4
25-39	29.2	41.5	49.8	53.6	58.3
40-54	23.6	39.1	49.6	54.8	59.5
55-65	16.6	25.8	36.9	43.8	53.1
Occupation					
Blue Collar	18.5	31.2	40.1	44.1	?
White Collar	26.0	38.6	47.6	52.3	?
Union status					
Union member	16.1	32.5	40.5	46.0	51.0
Not Union member	24.9	41.1	48.6	53.7	56.1
Hours					
Part time	14.2	24.3	30.1	38.0	43.2
Full time	24.9	37.8	47.0	53.2	58.0
Region					
Northeast	25.4	37.9	47.2	51.3	56.3
Midwest	23.3	35.8	46.1	51.5	56.6
South	23.1	36.4	44.6	49.7	54.3
North	26.9	39.8	48.5	52.2	55.9 [B]
Observations	62014	63085	60156	56480	66811

Source: October CPS (Education and School Enrollment Supplement).
Notes:
1. The sample considers only workers 18 and 65 years old.
2. In 2001, the four regions were Northeast, Midwest, South and West. Therefore, the last percentage corresponds to West for 2001.

Table 2.2. Percentage of workers in various categories who directly use a computer at work

	1984	2001	Growth Rate between 1984 and 2001
All workers	24.5	51.1	127.3%
Gender			
Men	21.1	45.4	136.5%
Women	28.9	57.4	115.2%
Education			
Less than High School	4.7	12.7	253.2%
High School	18.2	37.5	120.9%
Some College	29.6	54	92.2%
College	39.8	69.9	87.4%
Post College	43.1	78.2	99.5%
Race			
White	25.2	52.3	126.2%
Black	19.3	40.8	132.1%
Age			
18-24	19.7	37.4	94.9%
25-39	29.2	53.6	99.7%
40-54	23.6	54.8	152.1%
55-65	16.6	43.8	219.9%
Occupation			
Blue Collar	18.5	44.1	
White Collar	26	52.3	
Union status			
Union member	16.1	46	216.8%
Not Union member	24.9	53.7	125.3%
Hours			
Part time	14.2	38	204.2%
Full time	24.9	53.2	132.9%
Region			
Northeast	25.4	51.3	121.7%
Midwest	23.3	51.5	142.9%
South	23.1	49.7	135.1%
North	26.9	52.2	107.8%

Source: October CPS (Education and School Enrollment Supplement).

Notes:

1. The sample considers only workers 18 and 65 years old.
2. In 2001, the four regions were Northeast, Midwest, South and West. Therefore, the last percentage corresponds to West for 2001.

Table 2.3. OLS Regression Estimates of the Effect of Computer-use on Pay
Dependent variable: ln (hourly wage)

	1984					1989				
Independent variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 1	Model 2	Model 3	Model 4	Model 5
Uses computer at	0.268	0.184	0.183	0.117	0.101	0.327	0.206	0.204	0.136	0.112
work (yes=1)	(0.01)	(0.008)	(0.008)	(0.009)	(0.008)	(0.009)	(0.008)	(0.008)	(0.009)	(0.009)
Years of		0.066	0.067	0.041	0.04		0.078	0.080	0.052	0.051
Education		(0.001)	(0.002)	(0.002)	(0.002)		(0.002)	(0.002)	(0.002)	(0.002)
Experience		0.025	0.025	0.022	0.02		0.026	0.026	0.022	0.022
		(0.001)	(0.001)	(0.001)	(0.001)		(0.001)	(0.001)	(0.001)	(0.001)
Experience		-0.039	-0.039	-0.034	-0.032		-0.039	-0.039	-0.035	-0.033
Squared / 100		(0.002)	(0.002)	(0.002)	(0.002)		(0.003)	(0.003)	(0.002)	(0.002)
Black (yes=1)		-0.102	-0.103	-0.062	-0.057		-0.118	-0.117	-0.089	-0.094
		(0.012)	(0.012)	(0.012)	(0.011)		(0.013)	(0.013)	(0.012)	(0.012)
Other race (yes=1)		-0.047	-0.051	-0.022	-0.017		-0.006	-0.008	-0.003	0.003
		(0.02)	(0.02)	(0.018)	(0.018)		(0.021)	(0.021)	(0.02)	(0.019)
Part-time (yes=1)		-0.256	-0.255	-0.17	-0.155		-0.215	-0.213	-0.14	-0.123
		(0.01)	(0.01)	(0.01)	(0.01)		(0.011)	(0.011)	(0.011)	(0.011)
SMSA (yes=1)		0.064	0.063	0.045	0.04		0.079	0.069	0.051	0.052
		(0.01)	(0.01)	(0.009)	(0.009)		(0.026)	(0.026)	(0.024)	(0.024)
Veteran (yes=1)		0.034	0.027	0.027	0.018		0.020	0.013	0.023	0.014
		(0.011)	(0.011)	(0.01)	(0.01)		(0.012)	(0.012)	(0.011)	(0.011)
Female (yes=1)		-0.167	-0.169	-0.117	-0.105		-0.183	-0.180	-0.14	-0.128
		(0.012)	(0.012)	(0.012)	(0.012)		(0.012)	(0.012)	(0.012)	(0.012)
Married (yes=1)		0.140	0.139	0.11	0.104		0.145	0.144	0.113	0.102
		(0.011)	(0.011)	(0.01)	(0.01)		(0.011)	(0.011)	(0.011)	(0.011)
Married * Female		-0.146	-0.141	-0.136	-0.123		-0.137	-0.134	-0.123	-0.109
		(0.015)	(0.015)	(0.014)	(0.014)		(0.016)	(0.016)	(0.015)	(0.014)
Union member		0.211	0.218	0.233	0.208		0.201	0.218	0.231	0.207
		(0.009)	(0.009)	(0.009)	(0.009)		(0.010)	(0.011)	(0.01)	(0.01)
Occupation Indicators	NONE	NONE	1-DIGIT	2-DIGITS	2-DIGITS	NONE	NONE	1-DIGIT	2-DIGITS	2-DIGITS
Industry Indicators	NO	NO	NO	NO	YES	NO	NO	NO	NO	YES
Intercept	2.359	1.232	1.220	1.816	1.577	2.342	1.141	1.125	1.682	1.067
	(0.005)	(0.024)	(0.0.34)	(0.05)	(0.234)	(0.006)	(0.035)	(0.035)	(0.055)	(0.182)
R^2	0.05	0.41	0.41	0.49	0.52	0.08	0.41	0.41	0.49	0.52

Source: October CPS (Education and School Enrollment Supplement).
Notes:
1. The sample considers only workers 18 and 65 years old. Standard errors are between parentheses.
2. Sample sizes are 13,217 for 1984, 13,178 for 1989, 13,345 for 1993, 11,564 for 1997 and 13,712 for 2001.

Table 2.3., cont. OLS Regression Estimates of the Effect of Computer-use on Pay
Dependent variable: ln (hourly wage)

	1993					1997				
Independent variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 1	Model 2	Model 3	Model 4	Model 5
Uses computer at work (yes=1)	0.362 (0.009)	0.217 (0.008)	0.213 (0.008)	0.139 (0.009)	0.116 (0.009)	0.357 (0.010)	0.196 (0.009)	0.196 (0.009)	0.121 (0.01)	0.102 (0.01)
Years of education		0.080 (0.002)	0.082 (0.002)	0.054 (0.002)	0.053 (0.002)		0.083 (0.002)	0.085 (0.002)	0.06 (0.002)	0.06 (0.002)
Experience		0.026 (0.001)	0.026 (0.001)	0.023 (0.001)	0.022 (0.001)		0.028 (0.001)	0.028 (0.001)	0.024 (0.001)	0.023 (0.001)
Experience Squared / 100		-0.039 (0.003)	-0.040 (0.003)	-0.036 (0.002)	-0.034 (0.002)		-0.046 (0.003)	-0.046 (0.003)	-0.04 (0.003)	-0.037 (0.003)
Black (yes=1)		-0.088 (0.013)	-0.089 (0.013)	-0.061 (0.012)	-0.063 (0.012)		-0.116 (0.014)	-0.113 (0.014)	-0.085 (0.013)	-0.084 (0.013)
Other race (yes=1)		0.017 (0.018)	0.015 (0.018)	0.016 (0.017)	0.017 (0.017)		0.009 (0.019)	0.005 (0.019)	0.006 (0.018)	0.009 (0.018)
Part-time (yes=1)		-0.182 (0.011)	-0.178 (0.011)	-0.12 (0.01)	-0.103 (0.01)		-0.188 (0.012)	-0.184 (0.012)	-0.129 (0.012)	-0.114 (0.012)
SMSA (yes=1)		0.048 (0.027)	0.046 (0.027)	0.031 (0.025)	0.035 (0.024)		-0.093 (0.089)	-0.096 (0.089)	-0.062 (0.084)	-0.06 (0.083)
Veteran (yes=1)		-0.011 (0.012)	-0.019 (0.012)	-0.01 (0.012)	-0.019 (0.011)		-0.014 (0.015)	-0.021 (0.015)	-0.02 (0.014)	-0.027 (0.014)
Female (yes=1)		-0.144 (0.012)	-0.143 (0.012)	-0.1 (0.012)	-0.096 (0.012)		-0.170 (0.013)	-0.165 (0.013)	-0.135 (0.013)	-0.124 (0.013)
Married (yes=1)		0.137 (0.011)	0.137 (0.011)	0.115 (0.011)	0.098 (0.01)		0.140 (0.013)	0.139 (0.013)	0.108 (0.012)	0.102 (0.012)
Married * Female		-0.131 (0.015)	-0.127 (0.015)	-0.125 (0.014)	-0.110 (0.014)		-0.107 (0.017)	-0.104 (0.017)	-0.09 (0.016)	-0.082 (0.016)
Union member		0.200 (0.010)	0.216 (0.011)	0.240 (0.01)	0.221 (0.01)		0.170 (0.012)	0.187 (0.013)	0.201 (0.012)	0.193 (0.012)
Occupation Indicators	NONE	NONE	1-DIGIT	2-DIGITS	2-DIGITS	NONE	NONE	1-DIGIT	2-DIGITS	2-DIGITS
Industry Indicators	NO	NO	NO	NO	YES	NO	NO	NO	NO	YES
Intercept	2.273 (0.006)	0.972 (0.036)	0.950 (0.036)	1.602 (0.053)	1.586 (0.254)	2.256 (0.007)	1.073 (0.094)	1.148 (0.097)	1.627 (0.103)	1.354 (0.209)
R^2	0.10	0.39	0.40	0.48	0.51	0.09	0.38	0.38	0.44	0.46

Source: October CPS (Education and School Enrollment Supplement).

Notes:

1. The sample considers only workers 18 and 65 years old. Standard errors are between parentheses.
2. Sample sizes are 13,217 for 1984, 13,178 for 1989, 13,345 for 1993, 11,564 for 1997 and 13,712 for 2001.

Table 2.3., cont. OLS Regression Estimates of the Effect of Computer-Use on Pay
Dependent variable: ln (hourly wage)

	2001				
Independent variable	Model 1	Model 2	Model 3	Model 4	Model 5
Uses computer at work (yes=1)	0.371	0.187	0.148	0.095	0.079
	(0.009)	(0.009)	(0.009)	(0.010)	(0.01)
Years of education		0.081	0.076	0.059	0.058
		(0.002)	(0.002)	(0.002)	(0.002)
Experience		0.021	0.021	0.018	0.018
		(0.001)	(0.001)	(0.001)	(0.001)
Experience Squared / 100		-0.034	-0.034	-0.027	-0.027
		(0.003)	(0.003)	(0.003)	(0.003)
Black (yes=1)		-0.086	-0.077	-0.052	-0.052
		(0.014)	(0.013)	(0.013)	(0.013)
Other race (yes=1)		-0.028	-0.018	-0.001	-0.006
		(0.017)	(0.016)	(0.016)	(0.016)
Part-time (yes=1)		-0.192	-0.176	-0.122	-0.107
		(0.012)	(0.012)	(0.012)	(0.012)
SMSA (yes=1)		0.145	0.141	0.117	0.109
		(0.009)	(0.009)	(0.009)	(0.009)
Veteran (yes=1)		0.001	0.004	-0.008	-0.011
		(0.014)	(0.014)	(0.014)	(0.014)
Female (yes=1)		-0.168	-0.170	-0.105	-0.103
		(0.012)	(0.012)	(0.013)	(0.013)
Married (yes=1)		0.129	0.123	0.083	0.077
		(0.012)	(0.012)	(0.011)	(0.011)
Married * Female		-0.099	-0.099	-0.072	-0.066
		(0.016)	(0.016)	(0.015)	(0.015)
Union member		0.114	0.115	0.148	0.140
		(0.011)	(0.011)	(0.012)	(0.012)
Occupation Indicators	NONE	NONE	1-DIGIT	3-DIGIT	3-DIGIT
Industry Indicators	NO	NO	NO	NO	YES
Intercept	2.432	1.148	1.281	1.888	1.228
	(0.006)	(0.026)	(0.030)	(0.300)	(0.632)
R^2	0.10	0.36	0.37	0.46	0.48

Source: October CPS (Education and School Enrollment Supplement).
Notes:
1. The sample considers only workers 18 and 65 years old. Standard errors are between parentheses.
2. Sample sizes are 13,217 for 1984, 13,178 for 1989, 13,345 for 1993, 11,564 for 1997 and 13,712 for 2001.
3. Note that for 2001, the occupation indicators are 3-digit occupation indicators.

Table 2.4. The return to various uses of computers.
Dependent variable: ln (hourly wage)

Uses computer at work	1997	2001
Specific Task		
Word Processing	0.065	-
	(0.016)	
Bookkeeping	-0.018	-
	(0.013)	
Inventory control	-0.08	-
	(0.013)	
Desktop Publishing or newsletters	-0.014	-
	(0.016)	
Spread Sheets	0.115	0.054
	(0.012)	(0.012)
Sales	0.008	-
	(0.014)	
Word Processing / Desktop Publishing	-	-0.002
		(0.012)
Use Internet / e-mail	-	0.104
		(0.013)
Calendar / Scheduling	-	0.049
		(0.011)
Programming	-	0.014
		(0.005)
Graphics / Design	-	-0.007
		(0.012)
Sample size	6,190	7,713
R^2	0.369	0.3524

Source: October CPS (Education and School Enrollment Supplement).
Notes:
1. The sample considers only workers 18 and 65 years old. Standard errors are between parentheses.
2. The explanatory variables are the same as Model 3 in Table 2.3.
3. The missing coefficients are because the questions abut specific tasks were different fir these two years. The only task that was asked both years was the use of Spread Sheets.

Table 2.5. The returns to computer at work, home, and work and home
Dependent variable: ln (hourly wage)

Type of computer use	1984	1989	1993	1997	2001
Computer-use at work	0.119	0.118	0.165	0.184	0.111
	(0.036)	(0.028)	(0.025)	(0.025)	(0.024)
Computer-use at home	0.038	0.002	0.090	0.045	0.022
	(0.029)	(0.027)	(0.021)	(0.022)	(0.017)
Computer-use at home and at work	0.051	0.053	-0.109	-0.030	0.053
	(0.046)	(0.037)	(0.027)	(0.029)	(0.026)
Sample size	1446	2640	4055	5452	9665

Source: October CPS (Education and School Enrollment Supplement).
Notes:
1. The other explanatory variables are the same as in Model 2 in Table 2.3.
2. The sample considers only workers 18 and 65 years old. Standard errors are between parentheses.

Table 2.6. OLS Regression Estimates for Secretaries
Dependent variable: ln (hourly wage)

Independent variable	1984	1989	1993	1997	2001
Uses computer at work (yes=1)	0.076	0.097	0.087	0.090	0.083
	(0.025)	(0.032)	(0.048)	(0.064)	(0.046)
Years of education	0.020	0.038	0.034	0.045	0.070
	(0.008)	(0.009)	(0.013)	(0.013)	(0.012)
Experience	0.007	0.022	0.019]	0.017	0.024
	(0.004)	(0.004)	(0.005)	(0.006)	(0.005)
Experience Squared / 100	-0.001	-0.04	-0.027	-0.026	-0.035
	(0.084)	(0.09)	(0.01)	(0.012)	(0.012)
Black (yes=1)	-0.075	0.081	0.028	0.035	0.186
	(0.049)	(0.056)	(0.06)	(0.067)	(0.057)
Other race (yes=1)	-0.048	0.068	0.171	0.147	0.177
	(0.085)	(0.077)	(0.093)	(0.101)	(0.093)
Part-time (yes=1)	-0.317	-0.153	-0.173	-0.217	-0.106
	(0.035)	(0.037)	(0.041)	(0.046)	(0.048)
SMSA (yes=1)	0.089	0.061	0.113	0.104	0.125
	(0.035)	(0.078)	(0.102)	(0.374)	(0.041)
Veteran (yes=1)	-0.166	0.794	0.222	-0.148	0.316
	(0.226)	(0.325)	(0.123)	(0.227)	(0.251)
Female (yes=1)	0.067	0.1	0.136	-0.523	0.312
	(0.176)	(0.135)	(0.14)	(0.265)	(0.252)
Married (yes=1)	0.331	-0.039	0.147	-0.375	0.680
	(0.232)	(0.029)	(0.203)	(0.349)	(0.341)
Married * Female	-0.311	---	-0.150	0.481	-0.683
	(0.233)		(0.206)	(0.35)	(0.343)
Union member	0.034	0.075	0.072	0.15	0.106
	(0.042)	(0.048)	(0.048)	(0.067)	(0.058)
Intercept	1.785	1.420	1.338	1.775	0.694
	(0.206)	(0.208)	(0.242)	(0.488)	(0.305)
Sample size	734	616	494	495	347
R^2	0.17	0.14	0.14	0.18	0.27

Source: October CPS (Education and School Enrollment Supplement).
Note:
1. The sample considers only workers 18 and 65 years old. Standard errors are between parentheses.

Table 2.7. Computer-use at work for different groups of workers. Dependent variable: ln (hourly wage)

	1984			1989			1993			1997			2001		
Sample	Wage (raw) Diff. (%)	Proportion of sample using computer at work	n	Wage (raw) Diff. (%)	Proportion of sample using computer at work	n	Wage (raw) Diff. (%)	Proportion of sample using computer at work	n	Wage (raw) Diff. (%)	Proportion of sample using computer at work	n	Wage (raw) Diff. (%)	Proportion of sample using computer at work	n
Secretaries	7.92 (**)	0.47	734	10.23 (**)	0.75	616	9.03	0.86	495	9.56	0.90	396	8.6	0.84	347
Managers	10.4 (**)	0.36	631	17.91 (**)	0.51	726	15.3 (**)	0.68	509	4.61	0.86	521	13.5 (**)	0.80	717
Registered Nurses	14.7 (**)	0.26	202	13.01 (**)	0.45	253	12.90 (**)	0.61	250	1.78	0.71	228	-1.4	0.71	249
Teachers	2.56	0.33	443	4.98	0.44	445	7.99	0.56	481	2.51	0.67	412	-1.8	0.81	480
Sales Supervisors	11.15 (**)	0.26	273	20.32 (**)	0.40	328	9.72	0.60	340	11.48 (**)	0.71	372	21.53 (**)	0.70	461
Sales Representatives	1.67	0.28	189	-5.39	0.40	181	4.65	0.57	164	13.92	0.66	136	44.9 (**)	0.75	148
Bookkeepers	10.04 (**)	0.42	242	15.93 (**)	0.65	232	-6.97	0.82	182	-0.8	0.87	138	-6.9	0.81	185

Source: October CPS (Education and School Enrollment Supplement).

Notes:

1. The sample considers only workers 18 and 65 years old. Standard errors are between parentheses.
2. Significance of the coefficient of the indicator variable representing use of computer at work: (**) means significant at 95% confidence level.
3. COC means Census Occupation Code. It is the number assigned to each group of workers when the workers are divided in three-digit occupation indicators. The Census Occupation Codes are: a) Secretaries (COC=313-315); b) Managers (COC=19 in 1989 and 1993; COC=22 in 1993 and 1997); c) Registered Nurses (COC=95); d) Teachers (COC= 156-158); e) Sales Supervisors (COC= 243); f) Sales Representatives (COC= 259); and g) Bookkeepers (COC= 337).

Table 2.8. Descriptive Statistics by Gender

	1984			1989			1993		
Variable	Men	Women	Two-sample t-test	Men	Women	Two-sample t-test	Men	Women	Two-sample t-test
Age	37.63	36.69	-9.72	38.0	37.5	-5.8	38.72	38.34	-4.34
	(0.06)	(0.06)	(***)	(0.06)	(0.06)	(***)	(0.06)	(0.06)	(***)
Married	0.67	0.58	-24.2	0.65	0.58	-20.54	0.64	0.58	-17.02
(yes=1)	(0.002)	(0.002)	(***)	(0.002)	(0.002)	(***)	(0.02)	(0.02)	(***)
White	0.89	0.86	-11.56	0.88	0.85	-11.58	0.87	0.84	-9.18
(white=1)	(.001)	(0.001)	(***)	(0.001)	(0.001)	(***)	(0.001)	(0.002)	(***)
Years of education	13.13	13.09	-1.87	13.31	13.34	1.70	13.25	13.31	3.16
	(0.014)	(0.014)	(*)	(0.01)	(0.01)	(*)	(0.014)	(0.013)	(***)
Usual hourly wage	15.13	10.64	-37.65	17.63	12.77	-31.0	15.01	11.80	-23.24
	(0.091)	(0.072)	(***)	(0.12)	(0.09)	(***)	(0.106)	(0.086)	(***)
Part-time (yes=1)	0.01	0.06	30.30	0.015	0.056	28.8	0.019	0.057	25.1
	(0.001)	(0.001)	(***)	(0.001)	(0.001)	(***)	(0.001)	(0.001)	(***)
Average weekly hours of	42.36	34.52	-72.55	43.29	35.65	-70.56	42.93	38.81	-64.79
work	(0.07)	(0.07)	(***)	(0.07)	(0.07)	(***)	(0.07)	(0.07)	(***)
Experience	18.77	18.02	-7.39	18.99	18.59	-4.21	19.52	19.1	-4.41
	(0.067)	(0.075)	(***)	(0.064)	(0.069)	(***)	(0.063)	(0.068)	(***)
Computer used directly at	0.65	0.46	-15.18	0.65	0.55	-12.1	0.71	0.65	-8.22
home (yes=1)	(0.007)	(0.009)	(***)	(0.005)	(0.006)	(***)	(0.004)	(0.005)	(***)
Computer used directly at	0.34	0.25	-6.43	0.43	0.37	-3.78	0.51	0.47	-2.74
school (yes=1)	(0.01)	(0.008)	(***)	(0.011)	(0.009)	(**)	(0.011)	(0.01)	(***)
Computer directly used at	0.21	0.28	22.48	0.32	0.43	28.95	0.40	0.52	30.09
work (yes=1)	(0.002)	(0.002)	(***)	(0.002)	(0.002)	(***)	(0.002)	(0.002)	(***)
Sample Size	29,058	36,437		30,838	35,640		33,095	29,885	

Source: October CPS (Education and School Enrollment Supplement).

Notes:

1. The sample considers only workers 18 and 65 years old. Standard errors are between parentheses.
2. The variable usual hourly wage is the ratio of usual weekly earnings and usual weekly hours of work, and the five years are in 1997 dollars (deflated using the CPI for urban areas).
3. Significance of two-sample t-test: (***) means significant at 99% confidence level, (**) means significant at 95% confidence level, (*) means significant at 90% confidence level.

This two-sample t-test has the following null and alternative hypotheses:

Ho: mean (given characteristic for men) – mean (given characteristic for women) = difference = 0

Ha: difference ~= 0

Table 2.8., cont. Means and Standard Errors for men and women separately 1997-2001

	1997			2001		
Variable	Men	Women	Two-sample t-test	Men	Women	Two-sample t-test
Age	39.23	39.08	-1.56	40.15	39.86	-3.24
	(0.06)	(0.07)	(*)	(0.06)	(0.07)	(***)
Married	0.63	0.58	-12.1	0.62	0.56	-13.60
(yes=1)	(0.002)	(0.003)	(***)	(0.002)	(0.002)	(***)
White	0.87	0.84	-10.84	0.87	0.84	-11.77
(white=1)	(0.001)	(0.002)	(***)	(0.001)	(0.002)	(***)
Years of education	13.33	13.42	4.3	13.38	13.55	8.48
	(0.015)	(0.013)	(***)	(0.013)	(0.012)	(***)
Usual hourly wage	15.21	11.87	-21.7	16.01	12.80	-20.26
	(0.117)	(0.09)	(***)	(0.106)	(0.086)	(***)
Part-time (yes=1)	0.072	0.228	53.55	0.07	0.23	58.89
	(0.001)	(0.001)	(***)	(0.001)	(0.001)	(***)
Average weekly hours of work	43.09	35.91	-60.68	42.71	36.81	-69.14
	(0.08)	(0.08)	(***)	(0.091)	(0.090)	(***)
Experience	19.1	19.13	0.123	20.8	20.37	-4.74
	(0.15)	(0.15)		(0.16)	(0.17)	(***)
Computer used directly at home	0.73	0.74	1.34	0.82	0.85	10.66
(yes=1)	(0.003)	(0.003)		(0.003)	(0.003)	(***)
Computer used directly at school	0.60	0.54	-3.51	0.75	0.73	-1.82
(yes=1)	(0.011)	(0.006)	(***)	(0.012)	(0.009)	(*)
Computer directly used at work	0.45	0.57	28.66	0.49	0.62	32.04
(yes=1)	(0.003)	(0.003)	(***)	(0.003)	(0.003)	(***)
Sample Size	29,672	26,808		35,135	31,675	

Source: October CPS (Education and School Enrollment Supplement).

Notes:

1. The sample considers only workers 18 and 65 years old. Standard errors are between parentheses.
2. The variable usual hourly wage is the ratio of usual weekly earnings and usual weekly hours of work, and the five years are in 1997 dollars using the CPI-Urban areas.
3. Significance of two-sample t-test: (***) means significant at 99% confidence level, (**) means significant at 95% confidence level, (*) means significant at 90% confidence level.
4. This two-sample t-test has the following null and alternative hypotheses:

Ho: mean (given characteristic for men) – mean (given characteristic for women) = difference = 0

Ha: difference ~= 0

Table 2.9. Oaxaca Decomposition

Year	Type of Decomposition	Total Gap	Computer Skills	Explained Gap (other observable characteristics)	Total Explained Gap	Unexplained Gap	Percentage Unexplained Gap
1984	Oaxaca Decomposition I (returns to male are baseline)	0.333	-0.0017	0.027	0.0253	0.307	92.4%
	Oaxaca Decomposition II (returns to female are baseline)	0.333	-0.002	0.02	0.018	0.313	94.2%
1989	Oaxaca Decomposition I (returns to male are baseline)	0.312	-0.026	0.009	-0.017	0.305	97.92%
	Oaxaca Decomposition II (returns to female are baseline)	0.312	-0.025	0.027	0.002	0.311	99.91%
1993	Oaxaca Decomposition I (returns to male are baseline)	0.235	-0.003	0.004	0.001	0.234	99.56%
	Oaxaca Decomposition II (returns to female are baseline)	0.235	-0.003	0.003	0.000	0.235	100%
1997	Oaxaca Decomposition I (returns to male are baseline)	0.226	-0.026	0.05	0.024	0.202	89.19%
	Oaxaca Decomposition II (returns to female are baseline)	0.253	-0.024	0.036	0.012	0.216	85.47%
2001	Oaxaca Decomposition I (returns to male are baseline)	0.239	-0.019	0.030	0.011	0.229	95.8%
	Oaxaca Decomposition II (returns to female are baseline)	0.146	-0.019	0.006	-0.013	0.160	100%

Source: October CPS (Education and School Enrollment Supplement).
Note:
1. Separate regressions for men and women were used in this analysis. The results for this table use Model 3 in Tables B.1 and B.2 in Appendix B.

Table 2.10. OLS Regression Estimates of the Effect of Computer-use on Pay including interaction term between gender and computer-use at work.
Dependent variable: ln (hourly wage)

	1984				1989			
Independent Variable	Model 2	Model 3	Model 4	Model 5	Model 2	Model 3	Model 4	Model 5
Uses computer at work	0.169	0.167	0.102	0.095	0.200	0.197	0.124	0.105
	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)	(0.011)
Female (yes=1)	-0.175	-0.177	-0.125	-0.108	-0.186	-0.183	-0.149	-0.134
	(0.013)	(0.013)	(0.013)	(0.013)	(0.014)	(0.014)	(0.014)	(0.014)
Female * Computer-Use at Work	0.029	0.030	0.028	0.011	0.010	0.011	0.023	0.014
	(0.016)	(0.016)	(0.016)	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)
Years of education	0.066	0.068	0.041	0.040	0.079	0.081	0.052	0.051
	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Experience	0.025	0.025	0.022	0.020	0.026	0.026	0.022	0.022
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Experience Squared / 100	-0.039	-0.039	-0.034	-0.032	-0.039	-0.039	-0.035	-0.033
	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)	(0.002)	(0.002)
Black (yes=1)	-0.102	-0.103	-0.062	-0.057	-0.118	-0.118	-0.089	-0.094
	(0.012)	(0.012)	(0.012)	(0.011)	(0.013)	(0.013)	(0.012)	(0.012)
Other race (yes=1)	-0.047	-0.051	-0.023	-0.017	-0.006	-0.008	-0.003	0.003
	(0.020)	(0.020)	(0.018)	(0.018)	(0.021)	(0.021)	(0.020)	(0.019)
Part-time (yes=1)	-0.255	-0.253	-0.169	-0.154	-0.213	-0.211	-0.139	-0.122
	(0.010)	(0.010)	(0.010)	(0.010)	(0.011)	(0.011)	(0.011)	(0.011)
SMSA (yes=1)	0.063	0.063	0.045	0.040	0.080	0.070	0.051	0.052
	(0.010)	(0.010)	(0.009)	(0.009)	(0.026)	(0.026)	(0.024)	(0.024)
Veteran (yes=1)	0.034	0.027	0.027	0.018	0.021	0.014	0.022	0.013
	(0.011)	(0.011)	(0.010)	(0.010)	(0.012)	(0.012)	(0.011)	(0.011)
Married (yes=1)	0.141	0.140	0.111	0.104	0.146	0.145	0.114	0.102
	(0.011)	(0.011)	(0.010)	(0.010)	(0.011)	(0.011)	(0.011)	(0.011)
Married * Female	-0.146	-0.141	-0.137	-0.123	-0.140	-0.137	-0.124	-0.110
	(0.015)	(0.015)	(0.014)	(0.014)	(0.016)	(0.016)	(0.015)	(0.014)
Union member	0.210	0.217	0.232	0.208	0.201	0.217	0.231	0.207
	(0.009)	(0.009)	(0.009)	(0.009)	(0.010)	(0.011)	(0.010)	(0.010)
Occupation Indicators	NONE	1-DIGIT	2-DIGITS	2-DIGITS	NONE	1-DIGIT	2-DIGITS	2-DIGITS
Industry Indicators	NO	NO	NO	YES	NO	NO	NO	YES
Intercept	1.231	1.218	1.568	1.581	1.031	1.015	1.429	1.070
	(0.024)	(0.024)	(0.170)	(0.234)	(0.035)	(0.035)	(0.145)	(0.182)
R^2	0.41	0.42	0.50	0.52	0.41	0.41	0.49	0.52

Source: October CPS (Education and School Enrollment Supplement).

Notes:

1. The sample considers only workers 18 and 65 years old. Standard errors are between parentheses.
2. Sample sizes are 13,217 for 1984, 13,178 for 1989, 13,345 for 1993, 11,564 for 1997 and 13,712 for 2001.

Table 2.10., cont. OLS Regression Estimates of the Effect of Computer-use on Pay including interaction term between gender and computer-use at work. Dependent variable: ln (hourly wage)

	1993				1997				2001			
	Model (2)	Model (3)	Model (4)	Model (5)	Model (2)	Model (3)	Model (4)	Model (5)	Model (2)	Model (3)	Model (4)	Model (5)
Intercept	0.972	0.949	0.692	1.586	1.075	1.151	1.220	1.302	1.148	1.281	1.355	1.354
	(0.036)	(0.036)	(0.181)	(0.254)	(0.094)	(0.097)	(0.208)	(0.293)	(0.026)	(0.03)	(0.154)	(0.212)
Uses computer at work	0.209	0.203	0.132	0.112	0.190	0.187	0.120	0.104	0.179	0.152	0.124	0.117
	(0.011)	(0.011)	(0.012)	(0.012)	(0.013)	(0.013)	(0.013)	(0.013)	(0.012)	(0.012)	(0.012)	(0.012)
Female (yes=1)	-0.151	-0.151	-0.106	-0.099	-0.176	-0.173	-0.136	-0.122	-0.176	-0.166	-0.121	-0.109
	(0.014)	(0.014)	(0.014)	(0.014)	(0.016)	(0.016)	(0.016)	(0.016)	(0.015)	(0.015)	(0.015)	(0.015)
Female *	0.016	0.019	0.013	0.008	0.013	0.017	0.003	-0.004	0.016	-0.008	-0.013	-0.018
Computer-Use at Work	(0.015)	(0.015)	(0.015)	(0.015)	(0.017)	(0.017)	(0.017)	(0.017)	(0.016)	(0.016)	(0.016)	(0.016)
Years of education	0.080	0.082	0.054	0.053	0.083	0.085	0.060	0.060	0.081	0.076	0.063	0.062
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Experience	0.026	0.026	0.023	0.022	0.028	0.028	0.024	0.023	0.021	0.021	0.019	0.018
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Experience	-0.039	-0.040	-0.036	-0.034	-0.046	-0.046	-0.040	-0.037	-0.034	-0.034	-0.029	-0.028
Squared / 100	(0.003)	(0.003)	(0.002)	(0.002)	(0.003)	(0.003)	(0.003)	(0.003)	0.003	0.003	0.003	0.003
Black (yes=1)	-0.087	-0.088	-0.061	-0.063	-0.115	-0.113	-0.085	-0.084	-0.086	-0.077	-0.062	-0.061
	(0.013)	(0.013)	(0.012)	(0.012)	(0.014)	(0.014)	(0.013)	(0.013)	(0.014)	(0.013)	(0.013)	(0.013)
Other race (yes=1)	0.017	0.015	0.016	0.017	0.009	0.005	0.006	0.009	-0.028	-0.018	-0.018	-0.018
	(0.018)	(0.018)	(0.017)	(0.017)	(0.019)	(0.019)	(0.018)	(0.018)	(0.017)	(0.016)	(0.016)	(0.016)
Part-time (yes=1)	-0.181	-0.177	-0.120	-0.103	-0.187	-0.183	-0.128	-0.114	-0.191	-0.176	-0.137	-0.122
	(0.011)	(0.011)	(0.010)	(0.010)	(0.013)	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)
SMSA (yes=1)	0.048	0.045	0.031	0.034	-0.095	-0.098	-0.063	-0.060	0.145	0.141	0.123	0.115
	(0.027)	(0.027)	(0.025)	(0.024)	(0.089)	(0.089)	(0.084)	(0.083)	(0.009)	(0.009)	(0.009)	(0.009)
Veteran (yes=1)	-0.011	-0.020	-0.010	-0.019	-0.014	-0.022	-0.020	-0.027	0.001	0.004	-0.005	-0.012
	(0.012)	(0.012)	(0.012)	(0.011)	(0.015)	(0.015)	(0.014)	(0.014)	(0.014)	(0.014)	(0.013)	(0.013)
Married (yes=1)	0.138	0.139	0.116	0.099	0.140	0.140	0.108	0.102	0.13	0.122	0.094	0.084
	(0.011)	(0.011)	(0.011)	(0.010)	(0.013)	(0.013)	(0.012)	(0.012)	(0.012)	(0.012)	(0.011)	(0.011)
Married * Female	-0.133	-0.129	-0.126	-0.110	-0.109	-0.106	-0.090	-0.082	-0.101	-0.098	-0.079	-0.069
	(0.016)	(0.015)	(0.014)	(0.014)	(0.017)	(0.017)	(0.016)	(0.016)	(0.016)	(0.016)	(0.015)	(0.015)
Union member	0.199	0.215	0.240	0.221	0.169	0.186	0.201	0.193	0.113	0.116	0.147	0.139
	(0.010)	(0.011)	(0.010)	(0.010)	(0.012)	(0.013)	(0.012)	(0.012)	(0.011)	(0.011)	(0.011)	(0.011)
Occupation Indicators	NONE	1-DIGIT	2-DIGITS	2-DIGITS	NONE	1-DIGIT	2-DIGITS	2-DIGITS	NONE	1-DIGIT	2-DIGITS	2-DIGITS
Industry Indicators	NO	NO	NO	YES	NO	NO	NO	YES	NO	NO	NO	YES
R^2	0.40	0.40	0.49	0.51	0.38	0.39	0.45	0.46	0.36	0.37	0.43	0.44

Source: October CPS (Education and School Enrollment Supplement).

Notes:

1. The sample considers only workers 18 and 65 years old. Standard errors are between parentheses.
2. Sample sizes are 13,217 for 1984, 13,178 for 1989, 13,345 for 1993, 11,564 for 1997 and 13,712 for 2001.

CHAPTER 3 CO-WORKERS' GENDER COMPOSITION AND WAGES: DOES IT HURT TO WORK WITH WOMEN?

3.1. Introduction

The narrowing of the gender wage gap in the US in the last decades has been empirically documented by Blau and Kahn (2000) and others, who find that this narrowing effect decelerated in the 1990s, but the gap seems unlikely to vanish. Even in the past decade, there exist sources of the remaining pay gap that need to be investigated. The purpose of this paper is to explore a new dimension of the gap, the gender composition of the individual's co-workers. The motivation for this study is twofold. First is the curiosity that the existence of a remaining gender wage differential has in the media and policy circles. This paper will study this remaining wage differential from the new perspective of co-workers' gender composition. Second, there is deep interest in the study of workplace diversity on several labor and productivity outcomes. This will be the first study that identifies the proportion of female co-workers as a measure of workplace diversity and shows its relationship with wages for both men and women.

Most effort in the literature has concentrated on the explanation of the gender wage gap due to differences in education, motivation and experience. Recent literature has begun to incorporate differences in employment characteristics to understand gender wage differentials. These studies have focused on occupational segregation (e.g., Macpherson and Hirsch, 1995; Baron and Newman, 1989; England, 1992; Kilbourne et al 1994), industry segregation (e.g., Fields and Wolff, 1995), establishment segregation (e.g. Reilly and Wirjanto, 1999; Reskin, McBrier and Kmec, 1999, and Bayard, Hellerstein, Neumark and Troske, 1999) and other sources such as gender segregation into different employers.

According to Reskin, McBrier and Kmec (1999), the devaluation of activities that are associated with lower-status groups might lead the sex or race composition of establishments to affect the pay of workers. Devaluation should occur at the establishment level only if either most of the jobs in the establishment involve activities that are sex-typed and typical of just one sex or a single entity sets pay for all workers in an establishment based on an establishment's sex composition. Several studies show establishment-level effects of demographic composition on one or both sexes. Groshen (1991) shows that the greater the proportion of female workers by establishment, the less all workers earn. Shevan and

Haberfeld (1992) find that establishments with less than 12% of female workers show a positive relationship between the proportion of female workers and earnings; but those with more than 12% of females show a negative relationship. According to Carrington and Troske (1998), the earnings of manufacturing workers (especially women) are negatively related to women's share of plant work. Reilly and Wirjanto (1999) show that the proportion of females in the establishment accounts for 26 percent of the gender log wage gap. Bayard et al. (1999) find that a sizable fraction of the gender gap in wages is accounted for by the segregation of women into lower-paying occupations, industries, establishments and occupations within establishments. Pfeffer and Davis-Blake (1987)[1] find an inverse relationship between the proportion of female administrators and wages of both men and women in administrative positions in colleges and universities. On the other hand, Huffman et al. (1996) find that an establishment's sex composition did not significantly affect workers' earnings. From these studies we can conclude that the socioeconomic literature about the relationship between the proportion of females at the establishment level and wages shows a negative association for female workers and sometimes for male workers. Recent studies investigated workplace diversity issues other than earnings. For example, some of these studies show how diversity in background can improve organizational performance (Williams and O'Reilly, 1998 and Reskin et al., 1999), and lower turnover (Levine et. al., 2002).

This paper is the first attempt to investigate the impact of gender workgroup diversity on wages using a national household survey as well as a firm's data set.[2] This research differs from the previously described studies in several aspects. First is the unit of study. Previous studies have focused on occupations, industries, firms, establishments and organizations. I will construct the proportion of female co-workers; therefore the unit of study is the workgroup. One of the advantages of working with this unit of study is that we have a set of workers who have more social interaction than those sharing the same establishment. Pfeffer (1983) wrote that: "the relative proportions of (groups) condition the form and nature of

[1] They identify four theoretical approaches that make predictions about the impact of the proportion of female workers on wages. These theories are going to be explained later in this paper in terms of workgroup composition instead of establishment gender composition.

[2] Other authors studied specific markets. For example, Bodvarsson and Partridge (2001) concentrated on basketball players; Sass and Troyer (1999) on municipal police departments and Shehata (1999) on universities. None linked co-workers' discrimination with gender wage differentials.

social interaction and group processes" that in turn affect workers' "psychological well-being, attitudes and even job performance." Even though it is true that demography of organizations matters, workgroups are the units in which workers should be most closely related. This study will add new evidence on the relationship between workgroup demography and wages.

My main hypothesis for the negative relationship between the proportion of female co-workers and wages is the existence of sorting of male and female workers in different kinds of workgroups, according to their gender composition. Male workers in female-dominated workgroups might be lower-skilled on some unmeasured dimension. On the other hand, it is possible that women select themselves in workgroups with higher flexibility, higher number of sick days, or other non-pecuniary benefits which make them more likely to share their workgroups with other women.

Other explanations can be found in the literature about discrimination by gender in the labor market, as well as in the literature about the relationship between establishment gender composition and wages. These explanations are co-workers' gender composition (Becker, 1957), four theories related to the relationship between establishment gender composition and wages (Pfeffer and Davis-Blake, 1987) and harassment (new explanation). These six other explanations are going to be explained more in detail later.

The empirical part of this paper will use a simple Ordinary Least Squares (OLS) regression of hourly wages on the usual set of independent variables, but including the proportion of female co-workers. The introduction of the supervisor's gender will also be an interesting factor to investigate because there is an increasing number of female workers in managerial positions in the last decade (Bertrand and Hallock, 2001) which may have had a considerable effect on the gender wage gap.[3] I use the 1996 wave of the National Longitudinal Survey of Youth (NLSY79) and computerized personnel records from a single firm to examine the relationship between the proportion of female co-workers and wages for both male and female workers.

The remainder of the paper is organized as follows. Section 3.2 shows seven theoretical perspectives that make predictions about the effect of the proportion of female co-workers on

[3] Bertrand and Hallock (2001) show that between 1992 and 1997 women nearly tripled their participation in the top executive ranks.

wages for both men and women. Section 3.3 seeks to answer the question 'Does it hurt to work with women?' by looking at the empirical relationship between co-workers' gender composition and wages. Finally, Section 3.4 concludes.

3.2. Theoretical Approaches

A standard theoretical framework for the relationship between the proportion of female co-workers and wages is not outlined in the literature on gender wage differentials. Therefore, this paper is going to give potential explanations for the relationship between workgroup gender composition and wages. To summarize the potential approaches, a table will present the predictions for the sign and functional form of each of these theories.

- Sorting

The main hypothesis of this paper suggests that sorting of workers in certain types of workgroups leads to a negative relationship between the proportion of female co-workers and wages for both men and women. In this sense, male workers who work in highly segregated female workgroups might share some unobserved characteristics which made them choose these workgroups (certain lower-skill characteristics). Sorting could also be understood from the female perspective as following: female workers choose certain workgroups because these workgroups have non-pecuniary benefits rather than wages which are offered to workers in these workgroups. Female workers prefer workgroups with these non-pecuniary benefits (such as flexible hours, more sick days, better health insurance, etc) because they allow female workers to combine household work with outside work. The prediction for this hypothesis is a negative and nonlinear relationship for both men and women.

I will offer six alternative theories to explain why the proportion of female co-workers might have an impact on wages as well as predictions on this relationship.

- Co-workers' discrimination

In Becker's (1957) model, discrimination is due to tastes of employers, co-workers, or customers.[4] Arrow (1985b) presents a generalization of Becker's model to allow for co-

[4] For an interesting study testing for employer and customer discrimination, see Szymanski (2000). Goldin and Rouse (2000) use data from symphony orchestras actual auditions to test for sex-biased hiring. They find that the use of a screen (blind auditions where there is a screen to conceal the candidate's identity from the jury) increases the probability a woman

workers' racial discrimination. One prediction of this model, adapted for co-workers' discrimination by gender, is that there exists a positive relationship between the proportion of female co-workers and male wages, because employers have to compensate males for their dislike of working with female co-workers. If there are discriminatory attitudes of female workers against men, this will lead to a negative relationship between the proportion of female co-workers and female wages. In spite of the theoretical relevance of co-workers' discrimination, far fewer studies have examined its empirical relevance than have examined employer or customer discrimination. The predictions of this model (in terms of wages) are a positive (and linear) relationship between the proportion of female co-workers and male wages, and a negative (and linear) relationship between the proportion of female co-workers and female wages.

The next four theoretical approaches adapt Pfeffer and Davis-Blake (1987)'s arguments to the impact of the proportion of female co-workers on wages for both men and women. I am going to briefly explain each of these theoretical explanations (economic competition and crowding; demographic-group power; group interaction; and institutionalization), and give a brief summary of the predictions for each of these approaches. These predictions are not only about the sign of the relationship between the co-workers' gender composition and wages for both men and women (negative or positive) but also about its functional form (linear or non-linear).

- Economic Competition and Crowding

The economic competition and crowding explanation just studies the effect of demand and supply of labor on wages. Holding demand constant, any factor reducing (increasing) the supply of labor will result in higher (smaller) wages. In this sense, the exclusion of women from jobs, occupations or workgroups may be to obtain the benefits of a reduced labor supply (higher wages), and not the result of discriminatory attitudes towards women. In general, the crowding argument has been presented asymmetrically in the literature, looking at the effect of reduced female labor demand on male wages. However, one can argue that there are

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will be advanced and hired. Another example of employers' discrimination can be seen in Neumark, Bank and Van Nort (1996). The authors suggest that high price restaurants discriminate against women in hiring. Additional evidence suggests that customer discrimination partly underlies the hiring discrimination. Nardinelli and Simon (1990) examine the baseball card market to test the existence of customer racial discrimination. Their evidence supports the existence of customer's racial discrimination in this market.

segregated female workgroups from which men have been excluded as well, increasing female wages for these workgroups. According to this theory, the integrated workgroups are those which suffer from the lowest wages. The fact that this is not empirically shown in the literature on occupational segregation (and other levels of segregation) suggests that the symmetric argument may be incorrect, and there are other factors behind the wage determination process.

The crowding theory has been examined thoroughly at the occupational level of analysis, and there are some studies at the establishment level. Pfeffer and Davis-Blake (1987) say that, "if gender segregation occurs within establishments, then it seems reasonable to suggest that the crowding argument can be examined in labor markets defined at the organizational level of analysis." They argue that the degree of openness of organizations can be indexed by the percentage of women (the higher the percentages of women, the more open the organization, regarding labor policies). Therefore, according to the crowding hypothesis, there exists a fairly linear relationship between the openness of an organization (e.g., proportion of females) and wages.

A second form of crowding comes from the existence of organizational tastes for exclusion of women, and the capacity to actually exclude them from the labor force. In this sense, some organizations cannot afford to hire men (i.e., lower-paying organizations are not able to attract men and therefore, they have higher proportions of female workers). Therefore, this second crowding argument is related to the ability of firms to pay high wages to their preferred potential workers.

Therefore, the prediction for this approach is that there exists a negative and linear relationship between the proportion of female co-workers and wages for both men and women.

- Demographic-group Power

The second theoretical perspective given by Pfeffer and Davis-Blake (1987) argues that demographic groups have effects on wages, and the importance of this effect depends upon the proportion of these groups. The first hypothesis is that an increasing number of female workers would increase their power in the organization, leading to a positive and linear effect of the proportion of female workers on wages. A variant of this hypothesis is that, once female wages increase up to a point where the gains made by women start to have a substantial effect on male wages, men can start using their power to diminish female power. This variant implies that the effect is positive and non-linear on female wages. Both arguments predict that male wages will be negatively affected by this process.

- Group Interaction

Kanter (1977) argued that group composition affects group interaction. If members of the minority group (tokens) are not going to be accepted by members of the majority group, this could lead to arduous working conditions, reducing the contact among the members of such groups. The group-interaction approach predicts a positive and non-linear relationship between the proportion of female co-workers and female wages. The prediction for men is that there exists a negative or neutral relationship between the proportion of female co-workers and wages.

- Institutionalization

This approach argues that institutional factors, such as norms, roles, and stereotypes, determine the effect of the proportion of women on wages. Pfeffer and Davis-Blake (1987) present four bases for this to happen. First, many salaries are administratively determined. Second, when salaries are administratively determined, administrators are more likely to use institutionalized norms and practices as a basis for setting salaries. Third, there exists an institutionalized concept of women's work, which includes the idea that work done by women is less valuable and it can be paid less than men's work. Finally, the proportion of women occupying a set of jobs is a signal about the value of these positions.

When a greater proportion of women are employed, wages for both males and females are established at a lower level, because women's work is less valuable, critical, or economically important. Initially, as women enter the workgroups, there should not be a change in salaries, because the signal of this workgroup as a segregated female workgroup has not been established. As the proportion of female workers increases, this signal becomes stronger, wages for both men and women should decrease. Once the workgroup has been identified as predominantly female, there should not be a change in salaries for adding more women to this workgroup. Therefore, the prediction of this theoretical explanation is that the relationship between proportion of female co-workers and wages should be negative and non-linear for both men and women.

Research indicates that the gender of a person influences both reward expectations and reward allocations. Women pay themselves less than men pay themselves when allocating rewards among themselves and others (e.g., Major and Deaux (1982), Callahan-Levy and Messe (1979)). If the general idea is that women's work is worth less than men's, a greater proportion of female workers in certain workgroup is going to be associated to smaller wages for both men and women in those workgroups.

Finally, harassment at the workgroup level will be offered as an example of how a hostile workplace environment can lead to a negative relationship between proportion of female co-workers and wages for both male and female workers.

- Harassment at the Workgroup Level

Another example where gender composition at the workgroup level can affect wages can be the case of "harassment" at the workgroup level in fields that are very demanding or competitive. Assume that these workgroups (with only a few female workers) are potential harassing workgroups (i.e., Wall Street, military, managerial positions, etc).[5] These workgroups offer hostile work environments for women, where a hostile work environment exists when the harasser's conduct either interferes with the employee's ability to perform her job, or creates a work atmosphere which is intimidating, offensive, or hostile. The following simple framework shows how harassment can lead to a negative relationship between wages and the proportion of female co-workers.

Assume that there exist two kinds of workgroups, those which are highly demanding (that is, effort is going to be highly demanded from those workers) and workgroups which are not highly demanding in terms of effort. Assume that in highly demanding workgroups, women are more likely to be harassed by men. This can be because highly demanding workgroups were those traditionally male or because female workers cannot devote all the effort needed to this kind of workgroups. If workers are in demanding workgroups (type 1 workgroups), wages are equal to w_1 (workers are paid according to their marginal productivity, therefore $w_1>w_2$) and they exert effort e (where $e>0$). The utility functions for male workers who

[5] Of course, Title VII of the 1964 Civil Rights Act prohibits sexual harassment in the workplace. Traditionally, sexual harassment is defined in one of two ways: (1) "quid pro quo" sexual harassment in which job advancement is conditioned on the grant of sexual favors; and (2) "hostile work environment" sexual harassment in which the workplace is pervaded with sexual intimidation, ridicule and insult.

choose type 1 workgroups are $U_1^m = w_1 - e$. Assume that there is no harassment for male workers.[6] For female workers, the utility function for choosing a type 1 workgroup is $U_1^f = w_1 - e - H$ where H stands for harassment. For type 2 workgroups (less demanding jobs), the utility functions are the same for male and female workers: $U_2 = w_2$. There exists a distribution of effort among male and female workers. If male and female workers choose the kind of workgroup where they want to work according to their effort (we can call it productivity, or some other characteristic), there will exist an e* for both male and females for which they are indifferent between type 1 and type 2 workgroups.

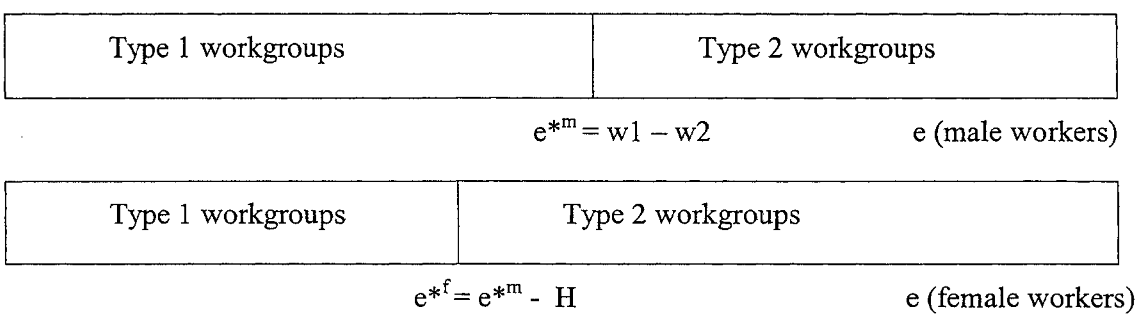
Being indifferent between type 1 and type 2 workgroups ($U_1 = U_2$), we have that for males, e^{*m} comes from:

(1) $w_1 - e = w_2$; therefore: $e^{*m} = w_1 - w_2$.

For females, their e^{*f} comes from:

(2) $w_1 - e - H = w_2$; therefore: $e^{*f} = w_1 - w_2 - H = e^{*m} - H$

The following diagram shows the range of effort for male and female workers, respectively:



From the diagram, we can infer that there will be a higher proportion of female workers in type 2 workgroups. We also know that $w_1 > w_2$. Therefore, the existence of harassment leads to a negative (and possibly non-linear) relationship between the proportion of female co-workers and wages for both males and females.

This last theoretical approach is compatible with the idea that workgroups that are predominantly female offer employment characteristics that female workers value and are willing to trade for wages. In this case, a negative relationship between proportion of females

[6] Actually, studies about workplace sexual harassment establish that there exists evidence of harassment against males, but is much smaller than for women (e.g., Gruber 1998).

and wages is driven by technological characteristics of the workgroup as well as individuals' preferences, not by co-workers' discrimination. Therefore, the proportion of female co-workers' coefficient is capturing self-selection of men and women in different types of workgroups, or contracts which compensate wages by certain benefits for female workers (e.g., maternity leave, flexible hours policies, child care, etc.).[7]

Table 3.1 summarizes the sign and functional form predictions of these seven hypotheses. From this table, we can infer that it is very difficult to test and compare these different hypotheses given the data. This paper is not going to test these hypotheses. However, it is good to have them in mind during the empirical analysis to see which are the factors operating behind the relationship between co-workers' gender composition and wages.

3.3. Empirical Analysis of the Relationship between Co-workers' Gender Composition and Wages

In the previous sections, I proposed several theories about the relationship between wages and co-workers' gender composition. This section of the paper empirically investigates the impact of co-workers' gender composition on male and female wages. I first augment a standard cross-sectional earnings function to include a continuous variable for proportion of female co-workers. Let PF_i represent the proportion of female co-workers for individual i. Observation i's hourly wage rate W_i is assumed to depend on the proportion of female co-workers (PF_i), on an indicator variable F_i equal to one if the worker is female and zero if the worker is male (for the pooled samples), a vector of other observed characteristics X_i, and an error ε_i. Adopting a log-linear specification,

$$(3) \qquad \ln W_i = \alpha + \beta\, PF_i + \gamma\, F_i + \rho\, X_i + \varepsilon_i$$

where α, β, γ and ρ are parameters to be estimated.

It is important to test for non-linearities in the relationship between PF_i and wages in order to understand which theoretical models are driving the results. Therefore, a second approach will replace PF_i by a set of indicators for having less than 20% of female co-workers, 20-40%, 40-60%, 60-80% or more than 80%.

[7] The NLSY79 has information about employer's benefits such as maternity leave, sick days, vacation days, child care, etc. These variables are included in the analysis.

Again, adopting a log-linear specification,

$$(4) \qquad \ln W_i = \alpha + \beta_1 PF^{20\text{-}40\%}{}_i + \beta_2 PF^{40\text{-}60\%}{}_i + \beta_3 PF^{60\text{-}80\%}{}_i + \beta_4 PF^{80\text{-}100\%}{}_i + \gamma F_i + \rho X_i + \varepsilon_i$$

where α, $\beta_1, \beta_2, \beta_3, \beta_4$, γ and ρ are parameters to be estimated.

This approach will test for a non-linear relationship between wages and the proportion of female co-workers. The idea is that, if the relationship is linear, the coefficients of the indicators for the proportion of female co-workers should be proportionally higher and statistically significant as we go from smaller proportions of female co-workers to higher proportions. If they are not, then the results will suggest non-linearities in this relationship.

As usual in applied econometric studies, we must question if there is problem of endogeneity in the relationship between the dependent variable (wages) and the main variable of interest (proportion of female co-workers). For example, we may argue that a potential female employee may choose jointly a highly segregated female occupation and low wages, because she wants to spend more time at home or with her children. The same unobserved characteristics[8] that affect the decision to choose a low-paid occupation also may determine whether or not is selected into a highly-segregated female occupation. However, if we think in the context of workgroups (which is the unit of study in this paper), it is difficult to know the gender composition of your workgroup in advance. Therefore, the decision of wages and proportion of female co-workers does not seem to be jointly determined.

3.3.1. The Proportion of Female Co-workers and Wages using the NLSY79

The 1996 wave of the NLSY79 has information on socio-economic characteristics of individuals as well as information about their employers. 8,636 individuals are interviewed in this wave. Because this is a panel data set that started in 1979 with 14 to 22 years-old individuals, in 1996 they are aged 31 to 39. After non-missing value restrictions are imposed on the individual-level and the establishment-level variables, and further restricting the sample to full-time workers who earn more than one dollar per hour, the sample size falls to 5,140.[9]

[8] Examples of unobserved characteristics that can affect wages as well as the proportion of females in the individual's occupation category are preferences for more flexibility in the job, for more time to share at home with your children, etc.
[9] See Appendix E for more details about the sample selection.

The key variable for this study is the proportion of female co-workers in a workgroup. The 1996 wave of the NLSY79 asks if the respondent has a supervisor, how many people are supervised by this supervisor, and the number of male employees supervised.[10] From these variables, I construct a variable denoting the proportion of female co-workers as the number of supervised employees minus the number of male supervised employees, divided by the number of supervised employees.

Unlike traditional studies, further restrictions are needed to analyze the relationship between proportion of female co-workers and wages. Workgroups with one or two people are too small for the hypothesis tests. Therefore, I restrict my sample to workgroups with three or more workers. I exclude some individuals because they report a firm size that is equal or smaller than the workgroup, suggesting misreporting problems.[11] I also exclude those workgroups that are either fully segregated male or fully segregated female (proportion of female co-workers equal to zero or equal to one). The reason for doing that is that we might think that the proportion of female co-workers in fully segregated workgroups will be capturing self-selection of women in these kind of workgroups for reasons different from the ones I am interested in studying. Fully segregated workgroups might be more likely to be conformed by workers with similar or the same occupation. This paper tries to investigate the relationship between the proportion of female co-workers and wages, and not occupational segregation, that is why those workgroups are going to be excluded from the sample. The final sample consists of 1,871 individuals (1,026 females and 845 males) who were 31 to 39 years old in 1996.

[10] The question that I used to construct the proportion of female co-workers is asked in 1980 and 1996. Attrition, as well as the distance in time between these two samples (16 years), makes difficult the use of a fixed-effect model. I use the 1996 sample because the 1980 sample is composed by workers aged 15 to 23. The job market for these young workers is different from the job market for my sample. Therefore, comparisons between these two samples might be difficult.

[11] The correlation between self-reported firm size and self-reported workgroup size is 0.014, which is not statistically different from zero. This might suggest that there are no major problems with the perception of workgroup size by the individuals in this sample because they are, in general, not confusing firm size with workgroup size.

3.3.1.1. Descriptive Statistics using the NLSY79

Table 3.2 presents descriptive statistics for the NLSY79 sample. The average hourly wage is smaller for female workers ($13.0) than for males ($16.1), leading to a female/male hourly wage ratio of 0.80.[12] Female workers are more likely to work with a higher proportion of female co-workers than men (women work with an average of 62% of female co-workers and men with 37%). Figures 3.1 and 3.2 also show the proportion of female co-workers for female and male workers respectively. The horizontal axis shows the variable proportion of female co-workers divided in deciles. The vertical axis shows the fraction of workers in each decile. There is an increasing fraction of workers as we move from male-dominated workgroups to female-dominated workgroups (from left to right). In the male sample, this picture is not as clear as in the female case. There exists a negative trend, but the highest fraction of male workers is in workgroups with integrated workgroups (around 50% female workers).

Men and women are in workgroups with similar average workgroup size (around 27 workers in each workgroup for women and 33 for men). However, they differ in their probability of being supervised by a female supervisor: males are substantially less likely to have a female supervisor (20% of males have a female supervisor whereas 48% of females have one), and the difference in means is statistically significant. If we argue that having a female supervisor is supposed to strengthen female workers' power to negotiate wages, the prediction would be a positive effect of having a female supervisor on female wages.

The effect of group interaction may be more effective in smaller firms. In this sample, women work for similarly-sized firms than men. Union membership is estimated to boost wages of union members relative to non-union members by 10 to 20 percent (Freeman and Medoff, 1981; Card, 1996). Men have traditionally been more likely to be union members than women, which helped increase the gender pay gap. Therefore, union membership could be considered important in the context of co-workers' discrimination because unions can be seen as discriminatory channels themselves, through bargaining of employment policies that can affect wages differentially among union and non-union members. In this sample, men and women are similarly unionized.

[12] The wage ratio is calculated as exp(ln(13.0)-ln(16.1)). This value is similar to the wage ratio found using a different source (wage ratio of 0.81 for the 1996 October Current Population Survey (CPS) restricted to those in the age group 31-39).

Unlike conventional studies, one of the models in the regression approach is going to include the gender composition of the individual's (3-digit) occupational category.[13] Previous studies show that predominantly female occupations pay less than predominantly male occupations (Beller, 1982; Blau, 1984). In this sample, the gender composition for men and women is very different. The average proportion of females in 3-digit occupation categories is equal to 35% for the male sample and 59% for the female sample.

An interesting characteristic of the NLSY79 is that it includes several measures of individual ability. Including a measure of ability might reduce the problem of omitted variables sometimes found in simple OLS wage equations. The AFQT is a general measure of trainability and a primary criterion of enlistment eligibility for the Armed Forces. The average AFQT[14] is 47% for male workers and 40% for female workers, and the difference is statistically significant. Following the harassment theory, if female workers choose predominantly female workgroups because they are less demanding, and this is correlated with their ability, the inclusion of this variable (AFQT) will control for the possibility of unobserved heterogeneity problems.

Information about employer benefits is also available in the NLSY79. The inclusion of maternity/paternity leave benefits is used to control for self-selection of women into mother-friendly workgroups. In this sample, 86% of female workers work in jobs with maternity/paternity leave benefits, whereas this average is equal to 75% for men.

Table 3.3 shows unconditional correlations between the proportion of female co-workers and certain variables of interest. Hourly wages and the proportion of female co-workers are negatively correlated for the pooled and male samples. The regression approach will continue with the analysis of this relationship, but this first look at the relationship between these two variables shows that working with more women is correlated with having lower wages for the pooled and male samples. We also find that larger workgroups are correlated with larger proportions of female co-workers, at least for the female sample. On the other hand, having a

[13] This variable was constructed using census data on the individual's three-digit occupation.
[14] Two methods of calculating AFQT scores, developed by the U.S. Department of Defense, have been used to create two percentile scores, for each respondent. I am going to consider the AFQT that measures the raw scores from the following four sections summed: Section 2 (arithmetic reasoning), Section 3 (word knowledge), Section 4 (paragraph comprehension), and one half of the score from Section 5 (numerical operations).

female supervisor is positively correlated with the proportion of female co-workers. This result is what we might expect since women are more likely to have a female supervisor, and they are more likely to share their workplace with a higher proportion of women.

Being unionized is negatively correlated with the proportion of female co-workers for the pooled and male samples (i.e., unionized men are expected to be in workgroups with a smaller proportion of female workers). Finally, for men, being better educated is positively correlated with working with higher proportions of women. Regarding ability measures, AFQT is negatively correlated with the proportion of female co-workers for the pooled sample. This is compatible with the idea that there are smaller proportions of female workers in those workgroups with more demanding duties. The variable that represents maternity/paternity leave benefits is positively correlated with the proportion of females for the pooled sample. This can be a signal for the existence of self-selection of women in workgroups that have mother-friendly policies. Finally, the proportion of female workers at the individual's 3-digit occupation is positively correlated with the proportion of female co-workers for the three samples (i.e., working in a female-dominated occupation is highly correlated with working in a female-dominated workgroup). In the regression analysis, I am going to control for both 2-digit occupation indicators and the proportion of female workers in 3-digit occupations.

Table 3.4 compares mean characteristics for two kinds of workgroups: those with less than 33% of female co-workers (defined here as *male-dominated*) with those with a more than 66% of females (*female-dominated*). The middle category (*integrated*), with those workgroups with more than 33% of female workers but less than 66%, is documented as well, but it is not compared with the other two kinds of workgroups in statistical terms.

Male workers are, on average, more educated if they work in female-dominated workgroups. If we consider only returns to education, everything else fixed, this should imply higher wages in female-dominated workgroups. However, female-dominated workgroups are paid less than male-dominated workgroups for men, but not for women. This means that the average hourly wage for females is more homogeneous among workplaces with different proportion of female workers than is for males.

The average firm size for male-dominated workgroups is significantly higher than for female-dominated ones, for the pooled and female samples, but not for the male sample. If we think that the pressure for higher wages from female workers is more effective in smaller firms, firm size will explain part of the gender gap, driving down the proportion of females' coefficient in the log wage regression analysis. Unionized workers are more likely to be present in male-dominated workgroups. If we think of unions as channels of employee discrimination against women (because males are more likely to be unionized, and labor laws regarding pay and other job benefits are sometimes controlled by unions), then the female power to push for greater wages in female-dominated workgroups will be diminished.

As we have said before, having a female supervisor is supposed to strengthen female workers power to negotiate wages. In all samples, female-dominated workgroups are more likely to have a female supervisor. For example, for the female sample, 12% of the female-dominated workgroups are supervised by a woman and 63% of the male-dominated are supervised by a woman. This should increase wages for female workers, decreasing the gender wage gap.

It is interesting to notice that the ability measure (AFQT) is higher in male-dominated workgroups for the pooled sample. This is compatible with the harassment example, where women do not choose male-dominated workgroups because they are more demanding in terms of effort (or ability) and they need to save energy for their housework. This will lead to higher wages for those workgroups that are male-dominated if workers are paid by their marginal productivity. Finally, and in the same line of thoughts, maternity/paternity leave policies are more likely to occur in female-dominated workgroups, with women selecting themselves in workgroups that have mother-friendliness.

3.3.1.2. Regression Results using the NLSY79

Table 3.5 shows the OLS results for the first specification (using a continuous variable to represent the proportion of female co-workers as in equation 3). The results are divided in five models, where each model has a different set of explanatory variables.[15] The dependent variable is the natural logarithm of hourly wages. The first model only includes the proportion of female co-workers, a female indicator (for the pooled sample) and a constant term. Model 2 adds the proportion of female workers at the individual's three-digit occupation. Model 3 adds age, age squared, years of education, marital status (married equal to one and zero otherwise), race (white equal to one and zero otherwise), AFQT, number of

[15] See Appendix B for a full set of results (showing the coefficients for each explanatory variable).

children (including zero) and regional indicators (North-Central, East, West and South). Model 4 adds an indicator for having a female supervisor, union, firm size, global satisfaction at work, maternity/paternity leave benefits, 1-digit occupation indicators and 1-digit industry indicators. Model 5 replaces the 1-digit indicators for occupation and industry by 2-digit indicators.[16]

Table 3.5 shows that the effect of having a higher proportion of female co-workers on wages is negative and statistically significant for almost all the specifications. The only exception is Model 5 for the female sample. Adding the proportion of female workers in the individual's 3-digit occupation makes the proportion of female co-workers not longer statistically different from zero at a 95% confidence level.[17] If we calculate the decrease in wages when we increase the proportion of female co-workers in 10%, we can observe that the penalties are 1.43% smaller wages for the pooled sample and 1.72% smaller wages for the male sample. As we said, the female sample for the last model is not statistically significant. The caveat about this model is that the fact that it is a linear model implies that the penalty for having 10% higher proportion of female co-workers affects wages equally if we go from 10% of female co-workers to 20%, or if we go from 70% to 80%.

In terms of the hypotheses presented before, evidence in Table 3.5 is fully compatible with the sorting, economic competition, institutionalization and harassment approaches, partially compatible with the demographic-group power and group interaction (for the male sample results) and with the co-workers' discrimination approaches (for the female sample).

There is no evidence on the effect of supervisor's gender on wages in previous studies. Even though I am not concentrating on testing the existence of supervisors' discrimination attitudes, it is interesting to see the impact of having a female supervisor on wages. For this sample, having a female supervisor is associated with 5.5% (exp(-0.054) – 1) lower wages for women and with 10.2% (exp(-0.097) – 1) lower wages for men.

It is also interesting to observe changes in the proportion of female co-workers coefficients when we introduce different covariates in the regression. For example, if we observe the

[16] The variable proportion of female co-workers in the individual's 3-digit occupational category is constructed using the 1990 Census, with the 1980 three-digit occupation codes which is a variable that is also included in the NLSY79 for comparison.
[17] The coefficient of proportion of female co-workers for model 5 in the female sample is still statistically significant considering a confidence level of 90%.

change in this coefficient when we go from Model 3 to Model 4, where we add variables related to the individual's job market conditions (female supervisor, firm size, union, maternity/paternity leave benefits, global satisfaction indicators, one-digit occupation and one-digit industry indicators), we observe a big change in the coefficient. For example, for the pooled sample, having a 10% higher proportion of female co-workers in Model 3 lowers wages in 2.6%, whereas this change is 1.7% in Model 4. Similar changes can be observed in the coefficients for the male and female sample if we go from Model 3 to Model 4. This suggests that labor market characteristics are correlated in some way with the proportion of female co-workers, and introducing them as covariates lowers the importance of the individual's co-workers gender composition.

It is also interesting to observe that going from Model 4 to Model 5 (replacing one-digit occupation and industry indicators by two-digit), does not have a big impact for the male sample, but it does for the female sample. For the male sample, this does not mean a significant change in the coefficient of the proportion of female co-workers. On the other hand, this makes the coefficient not longer significant for the female sample.

As it was said before, the first specification shows a linear relationship between the proportion of female co-workers and wages. In order to capture possible non-linearities in the relationship between the proportion of female co-workers and wages, Table 3.6 shows the effect of this proportion using a set of indicators to represent this variable, instead of the continuous variable used in the previous specification. The five indicators are: having less than 20% of female co-workers, 20-40%, 40-60%, 60-80% and more than 80% (represented previously in equation 4). The excluded category is less than 20% female co-workers, which is the most male-dominated set of workgroups.

For the male sample, having 20-40% female co-workers or having 40-60% does not have a significant effect on wages. Having 60-80% female co-workers, as well as having more than 80%, has a significant negative impact on male wages, with a higher impact for the latter. In this sense, having 60-80% female co-workers has a penalty of 13% smaller wages compared to having less than 20% female co-workers; the penalty is 16% for having more than 80% female co-workers.

For the female sample, the highest penalization in term of wages is for those female workers who are in integrated workgroups (40-60% of female co-workers), with a penalty of 13%

smaller wages. The penalty decreases for those working with 60-80% of females (11% smaller wages), staying the same for those in highly female-segregated workgroups (11% smaller wages). These results suggest that there exists a non-linear relationship between the proportion of female co-workers and wages for both males and females, but these non-linear relationships are different for those two groups.

Using the indicators for the proportion of female co-workers, I find that the effect of having a female supervisor is negative and statistically significant for both the male and female samples. However, the penalization for having a female supervisor is greater for male workers. Having a female supervisor diminishes wages by 9.24%. For females, this penalization is 5.26%.

3.3.2. The Proportion of Female Co-workers and Wages using Personnel Records

In the previous sub-section, I used the 1996 wave of the NLSY79 to study the effect of the co-workers' gender composition on wages. In this section, I investigate the same question inside a Fortune's 500 products and services firm. Computerized personnel records for over 80,000 domestic salaried employees of a large U.S. corporation hired from 1989-1994 compose this personnel records data set. The identity of the firm and certain variables must be kept confidential or disguised. The firm was in several related businesses, and vertically integrated. It was based in the Midwest, but with employees in all regions of the U.S. A small percentage of employees worked in other countries. The data used in this paper are only on individuals working in the U.S.

Gibbs and Hendricks (2001) use this data set to analyze the kind of formal salary system used for managerial employees by most large firms. According to their paper, this firm uses centralized policies to set salary levels and ranges for jobs, and to determine how performance ratings are used to award raises and bonuses. Because of this centralization, little of an employee's compensation is at the discretion of the supervisor, except through the awarding of the annual performance rating. In addition, an employee with sufficiently large raises, based on high performance ratings, may eventually end up with a salary near the maximum allowed in the range. Such an employee could potentially end up frustrated by the lack of potential raises and reduce performance. This might result in a negative relationship between performance and tenure in salaries, and ultimately result in turnover. Gibbs and

Hendricks suggest that, since supervisors have little discretion over their employees' pay, behavioral issues such as influence costs and favoritism are real and important.

Since the data come from a single firm, variation in the gender makeup of the workgroup could be measured at the plant or building level. Each has interesting theoretical issues. I will follow Tsui, Egan and O'Reilly (1992) who use the building as the unit of analysis because sample sizes to compute the variable proportion of female co-workers is generally large and there is a substantial variation in this proportion. In many cases, the building will be coincident with the workgroup.

We are going to consider workers who are 18 to 65 years old who have records in the Human Resources files of this firm from 1989 to 1994.[18] During this period, the firm's industry was characterized by some consolidation. The firm completed two acquisitions just before the sample period.

The data set contains information on employee demographics and job characteristics such as compensation and performance measures. Demographics include age, education, race, gender and marital status. There are codes for job and workgroup (organization, building, and unit). Skill, function codes and compensation variables are available. Individuals can have more than one observation within a year. This is because the data are provided in one file with demographic variables which is kept constant and other files with dates and information on specific events (change in job code, job transition, etc). If there is more than one entry in an individual's file, I keep the last observation, which is the most updated one. Also, this person can have information for more than one year. If this is the case, I kept the last year's observation. Therefore, the pooled data will have the most updated information about each person in the sample, with only one observation for each individual.[19]

The variable proportion of female co-workers was constructed by building. I have considered only buildings with 5 or more workers in them. The number of buildings with 5 or more employees is 162. Figures 3.3 and 3.4 show fractions of workers according to their proportion of female co-workers (for men and women, respectively). Unlike the NLSY79,

[18] See Appendix E for more details about the sample selection. Notice that the NLSY79 has a sample that is composed by individuals aged 31 to 39 years old, whereas the personnel records data has individuals aged 18 to 65 years old.
[19] However, it must be noticed that this will lead to a larger weight on more recent years, leading to an imbalanced pooled data set.

the personnel data set shows higher fractions of workers in integrated workgroups (workgroups with similar proportions of men and women) and not so many people in fully-segregated male or female workgroups. This is not surprising since the firm's data set buildings are much larger groups compared to the NLSY79 workgroups.

It is important to understand the differences between the definition of proportion of female co-workers for the personnel data set compared to the definition using the NLSY79. For the personnel records data set, some of the workers are co-workers, so they share the value of the variable proportion of female co-workers. For the NLSY79, the probability that two workers in the sample share the same workplace is very low. This adds more variability to the variable proportion of female co-workers using the NLSY79. The two measures are also different because the NLSY79 takes the proportion of female workers under the same supervisor and the personnel records data set takes the proportion of female workers in the same building.

One of the advantages of having personnel data from a single firm is that it diminishes the probability of selection of women in certain firms that are more flexible, or that have more mother-friendly practices. The coefficient of the variable proportion of female co-workers in this data set is less likely to capture unobserved heterogeneity associated with the selection of women in certain kinds of firms, according to their effort or productivity levels (because this is a single firm).

3.3.2.1. Descriptive Statistics using Personnel Records

Table 3.7 shows descriptive statistics for the personnel records from a single firm. The pooled sample is composed of 5,075 workers, from which 2,577 are female workers. In general, 45% of the workers are married, 66% of them are Caucasians and the average age is 40. Regarding labor variables, the average hourly wage for the pooled sample is $11.55, $12.44 for the male sample and $10.68 for the female sample, leading to a female/male hourly wage ratio of 0.86. A two-sample t-test for the difference in hourly wages between male and female workers with a 95% confidence level was performed. The result shows that hourly wages are not statistically different between men and women.

Table 3.8 shows the correlation of the proportion of female co-workers with some variables of interest that are available in this data set. The unconditional correlation of hourly wages with the proportion of female co-workers is negative and statistically significant for the three samples. A higher proportion of female co-workers is also positively correlated with being younger, not being married and being more educated, at least for the male sample.

Table 3.9 is similar to Table 3.4 but using personnel records from a single firm. It compares mean characteristics for two kinds of workgroups (those with less than 33% of female co-workers with those with a more than 66% of females).[20] From this table, we can see that hourly wages are higher for male-dominated workgroups, at least for the pooled and the female samples. However, female-dominated workgroups are more likely to have more educated employees.

3.3.2.2. Regression Results using Personnel Records

Tables 3.10 and 3.11 show the regression results for the linear and non-linear specifications respectively. Table 3.10 shows the results for three models using the specification of equation (3),[21] using the personnel records. The dependent variable is the logarithm of hourly wages. The first version only includes a continuous variable for the proportion of female co-workers in the building and a female indicator variable (in the case of the pooled sample). Model (2) adds educational indicators, age, age squared, race, part-time status, marital status and US states indicators. Model (3) adds job classifications (Intern, Nonexempt Administrative, Nonexempt Technician, Nonexempt Secretarial, Field Sales, Exempt, Hourly and Supervisor (Exempt)).[22]

The coefficient of the proportion of female co-workers is negative and statistically different from zero for all the models and for the three samples. If we increase the proportion of female co-workers by 10%, the decline in wages for male workers is 3.9% for the pooled sample, 4% for male workers and 3.3% for the female sample. Again, these results are fully compatible with the sorting, economic competition, institutionalization and harassment approaches, and they are partially compatible with the demographic-group power and group interaction (for the male sample results) and with the co-workers' discrimination approaches (for the female sample). Males and females get hurt by a higher proportion of female workers in their workgroups, at least in term of wages. They may have other benefits at workgroups

[20] As before, the integrated category is documented but it is not compared with the other workgroups in statistical terms.

[21] Appendix F shows a full set of results.

[22] Union and female supervisor indicators are not available in this data set. Firm size exists but it is not different for each individual since it is the same firm.

with higher proportions of female co-workers (flexible hours, paternity leave, child care, etc) because, at it was shown before, benefits have a higher average for workgroups that are more female-dominated. They may also have non-pecuniary benefits from the presence of women at their workgroups (benefits of working with a more diverse workgroup), or just enjoy working with women.

Table 3.11 shows the effect of the proportion of female co-workers using a set of indicators for this variable. For the male sample, having 20-40% female co-workers does not have a significant effect on wages. Having 40-60%, 60-80% or more than 80% female co-workers, has a significant negative impact on male wages, with an increasing pattern as we go from less female-dominated workgroups to more female-dominated workgroups (the penalties in terms of wages are 18%, 20% and 25%, respectively). The increments in the coefficients of the indicators for the proportion of female co-workers are not proportional. Therefore, and because the first indicator's coefficient is not statistically significant, the results suggest that there exists a non-linear relationship between the proportion of female co-workers and wages. For the female sample, the results are similar, but a little higher for the coefficients of the three indicators for having 40-60%, 60-80% or more than 80% female co-workers (the penalties are 19%, 22% and 27%). Because the coefficient for the other covariates do not change very much compared to the results of the first specification, the complete set of results for the second specification is not documented in Appendix F.

3.4. Comparison between the Regression Results for the NLSY79 and the Personnel Records

Both data sets show that the effect of having a higher proportion of female co-workers on wages is negative and statistically significant for all the samples. From the theoretical background section, these results are fully compatible with the economic competition, institutionalization and harassment approaches, and they are partially compatible with the demographic-group power and group interaction for the male sample results and with the co-workers' discrimination approaches for the female sample.

The coefficients for the proportion of female co-workers for the personnel data set are much higher than those of the NLSY79. However, it must be noticed that comparing the results using the NLSY79 with the results using the personnel data set has a main problem: the NLSY79 has some individual and establishment characteristics that the personnel data set does not have. The unit of study is also different: workgroups for the NLSY79 are defined as a group of workers sharing the same supervisor, and they are defined as buildings for the personnel records' data set.

Another difference comes from the age range for each data set. The NLSY79 sample has workers aged 31-39, whereas the personnel records data has workers from 18 to 80 years of age, and the sample was restricted to workers 18-65 years old. If we compare the results using the personnel records from a single firm, restricting the sample to 31-39 years old workers, instead of 18-65 years old, we also find that there is a negative impact of the proportion of female co-workers on male and female wages. The NLSY79 results show that increasing the proportion of female co-workers by 10%, wages are 1.43% smaller for male workers, 1.72% for the pooled sample and not statistically significant for female workers when we control for three-digit occupation female composition. Restricting the personnel records' sample to the 31-39 years old group of workers, for workers at the mean of the sample, the implied change in wages when we increase the proportion of female co-workers is still higher for the personnel records data set, but these changes are smaller than before. If we increase the proportion of female co-workers by 10%, the decline in wages for male workers is 3.3% for the pooled sample, 3.7% for male workers and 2.9% for the female sample. In other words, results for the personnel records for a single firm when we restrict to 31-39 year-old workers are more similar to the NLSY79 results but they are still higher than the them.

Regarding the second specification, the differences are that for the male sample, having 40-60% female co-workers has an impact on male wages for the firm's data but not for the NLSY79. For the female sample, the results are a little different. Whereas the results for the NLSY79 shows that the highest penalization in term of wages is for those female workers who are in integrated workgroups (40-60% of female co-workers), the firm's data results show that having 40-60%, 60-80% or more than 80% female co-workers, has a significant impact on female wages, with an increasing pattern as we go from less female-dominated workgroups to more female-dominated workgroups. Both data set results suggest that there exists a non-linear relationship between the proportion of female co-workers and wages.

3.5. Conclusions

After considerable research in the literature about the gender wage gap, there exists a large unexplained gender wage differential. The main goal of this work was to explore a new idea for the unexplained gap: the gender composition of the individual's co-workers. Previous research has focused on occupations, industries, firms, organizations and establishments. This study is the first to focus on the relationship between the proportion of female co-workers and wages for both males and females.

Using both the NLSY79 and personnel records from a single firm, this paper examines the relationship between workgroup gender composition and wages for both male and female workers. My results show that the effect of the proportion of female co-workers on wages is in general negative and statistically significant for both the male and female samples. From the theoretical background section, these results are fully compatible with the economic competition, institutionalization and harassment approaches, and they are partially compatible with the demographic-group power and group interaction for the male sample results and with the co-workers' discrimination approaches for the female sample. A second important result is that having a female supervisor lowers wages for both male and female workers, being the penalization highest for male workers.

A second approach was to include several indicators for having less than 20% female co-workers, 20-40%, 40-60%, 60-80%, or more than 80% to capture possible non-linear effects in the relationship between the proportion of female co-workers and wages. The results suggest that the penalization for working with a higher proportion of females is non-linear, increasing when the workgroups are more segregated-female. These results are shown for both the NLSY79 and the personnel records data sets. In general, men in highly segregated female workgroups are more intensely penalized in terms of wages for being in these workgroups. Women are also more intensely penalized in female-dominated workgroups in the case of the personnel records data set, but the NLSY79 results show that the highest penalization is for those in mixed workgroups (40-60% female co-workers).

The results of this paper imply that not only the individual's gender matters, but also the gender of those working close to you. Certain characteristics that workgroups share, and that differ among workgroups with different gender composition, seem to affect wages for both men and women. Therefore, policy makers as well as firms must take these results into account when they analyze demography of organizations, and demography of workgroups within organizations. They must ask themselves the question: does this affect productivity within specific workgroups depending upon workgroup gender composition? This cannot be answered in the context of this paper, but it seems to be an interesting question for future research. Another interesting question is how workgroup gender composition affects the promotion process, and if it differs among men and women.

3.6. References

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3.7. Tables

Table 3.1. Predictions of the effect of the proportion of female co-workers on wages for both men and women

Hypothesis	Male Wages	Female Wages	Functional Form
Sorting	Negative	Negative	Nonlinear
Co-workers' discrimination	Positive	Negative	Linear
Economic competition and Crowding	Negative	Negative	Linear
Demographic Group Power	Negative or neutral	Positive	Linear or Nonlinear
Group interaction	Negative or neutral	Positive	Nonlinear
Institutionalization	Negative	Negative	Nonlinear
Harassment	Negative	Negative	Nonlinear

Source: Pfeffer and Davis-Blake (1987) for their four perspectives, and own construction for the others.

Table 3.2. Descriptive Statistics. NLSY79

Variable	Pooled	Males	Females
Hourly Wage	14.410	16.126*	12.998*
	(13.222)	(11.051)	(14.628)
Proportion of Female Co-workers	0.507	0.370*	0.620*
	(0.274)	(0.237)	(0.250)
Workgroup Size	29.746	32.956*	27.102*
	(55.136)	(68.768)	(40.456)
Female Supervisor	0.357	0.201*	0.485*
	(0.479)	(0.401)	(0.500)
Firm Size	941.137	1094.564*	814.777*
	(3258.662)	(3642.214)	(2900.758)
Union	0.221	0.237	0.207
	(0.415)	(0.425)	(0.406)
Age	34.752	34.729	34.771
	(2.204)	(2.190)	(2.216)
White	0.605	0.638	0.578
	(0.488)	(0.481)	(0.493)
Married	0.560	0.615*	0.515*
	(0.497)	(0.481)	(0.500)
AFQT	43.126	46.608*	40.255*
	(28.932)	(30.184)	(27.545)
Number of children	1.569	1.553	1.582
	(1.306)	(1.317)	(1.297)
Maternity / paternity leave benefits	0.810	0.751*	0.857*
	(0.009)	(0.014)	(0.011)
Proportion of female in the individual's occupation	0.480	0.349*	0.588*
	(0.280)	(0.237)	(0.267)
Sample size	1,871	845	1,026

Notes:

1. Standard deviations are in parentheses.
2. * indicates a statistically significant difference between male and female means at a 95% confidence level

Table 3.3. Correlation between proportion of female co-workers and some variables of interest. NLSY79.

Variable	Pooled	Males	Females
Hourly Wage	-0.105	-0.108	-0.030
	(0.000)	(0.002)	(0.341)
Workgroup size	0.013	0.016	0.079
	(0.577)	(0.641)	(0.011)
Female supervisor	0.478	0.403	0.407
	(0.000)	(0.000)	(0.000)
Firm size	-0.068	-0.059	-0.055
	(0.000)	(0.112)	(0.077)
Union	-0.088	-0.113	-0.055
	(0.000)	(0.001)	(0.077)
Years of education	0.032	0.109	0.033
	(0.170)	(0.000)	(0.297)
AFQT	-0.079	-0.051	-0.019
	(0.000)	(0.136)	(0.552)
Number of children	-0.010	-0.091	0.042
	(0.653)	(0.008)	(0.180)
Maternity/paternity leave benefits	0.058	0.028	-0.033
	(0.012)	(0.415)	(0.284)
Proportion of females in 3-digit occupation	0.488	0.405	0.340
	(0.000)	(0.000)	(0.000)

Note:
1. Significance levels are in parentheses.

Table 3.4. Means for different sub-groups (defined by the proportion of female workers in the workgroups). NLSY79.

	Pooled			Males			Females		
Variable	Male-Dominated	Integrated	Female-Dominated	Male-Dominated	Integrated	Female-Dominated	Male-Dominated	Integrated	Female-Dominated
Hourly Wage	15.908*	14.653	12.986*	16.544*	16.804	13.103*	14.252	12.454	12.958
	(0.364)	(0.443)	(0.659)	(0.445)	(0.780)	(0.718)	(0.601)	(0.375)	(0.793)
Proportion of Female Co-workers	0.168*	0.477	0.806*	0.163*	0.463	0.782*	0.179*	0.491	0.811*
	(0.004)	(0.004)	(0.003)	(0.004)	(0.005)	(0.008)	(0.006)	(0.812)	(0.004)
Workgroup Size	28.837	31.271	29.068	31.510	35.169	31.914	21.882	27.287	28.423
	(1.894)	(2.838)	(1.707)	(2.444)	(5.030)	(5.370)	(2.166)	(2.535)	(1.705)
Female Supervisor	0.087*	0.316	0.611*	0.072*	0.237	0.512*	0.124*	0.396	0.634*
	(0.012)	(0.018)	(0.018)	(0.013)	(0.024)	(0.044)	(0.027)	(0.027)	(0.020)
Years of Education	13.430	13.681	13.588	13.467*	13.956	14.008*	13.333	13.399	13.492
	(0.101)	(0.0.96)	(0.091)	(0.122)	(0.131)	(0.233)	(0.178)	(0.138)	(0.097)
Firm Size	1252.635*	941.919	690.584*	1,317.256	967.447	716.976	1,084.536*	915.821	684.598*
	(173.451)	(147.303)	(64.537)	(220.359)	(170.824)	(177.112)	(248.740)	(241.621)	(68.312)
Union	0.274*	0.212	0.187*	0.279*	0.221	0.165*	0.261	0.211	0.191
	(0.019)	(0.016)	(0.015)	(0.022)	(0.023)	(0.033)	(0.035)	(0.023)	(0.017)
AFQT	45.862*	42.993	40.693*	47.226	47.094	43.449	42.314	39.584	40.067
	(1.272)	(0.815)	(1.048)	(1.540)	(1.674)	(2.579)	(2.205)	(1.610)	(1.145)
Number of Children	1.624	1.596	1.573	1.686	1.437	1.433	1.464	1.597	1.605
	(0.054)	(0.037)	(0.049)	(0.064)	(0.073)	(0.123)	(0.104)	(0.077)	(0.053)
Maternity/Paternity Benefits	0.780*	0.810	0.832*	0.743	0.759	0.755	0.876	0.862	0.85
	(0.018)	(0.015)	(0.014)	(0.022)	(0.024)	(0.038)	(0.027)	(0.019)	(0.015)
Proportion of females in 3-digit occupation	0.312*	0.461	0.632*	0.262*	0.392	0.509*	0.439*	0.531	0.660*
	(0.101)	(0.010)	(0.010)	(0.010)	(0.012)	(0.023)	(0.022)	(0.014)	(0.010)
Sample size	551	633	687	398	320	127	153	313	560

Notes:
1. Standard errors are in parentheses
2. * indicates a statistically significant difference between male-dominated and female-dominated workgroups' means at a 95% confidence level
3. Male-dominated workgroups are defined as those with less than 33% of female workers and female-dominated workgroups are defined as those with more than 66% of female workers. Integrated: between 33% and 66%.

Table 3.5. Log Wage regressions for the NLSY79 (Dependent variable: log of hourly wages). Continuous variable representing the proportion of female co-workers.

Panel A. Pooled Sample

Variable	Model 0	Model 1	Model 2	Model 3	Model 4	Model 5
Female	-0.217**	-0.146**	-0.112**	-0.047*	-0.089**	-0.082**
	(0.025)	(0.028)	(0.029)	(0.023)	(0.023)	(0.022)
Proportion Female Co-workers		-0.285**	-0.197**	-0.201**	-0.162**	-0.155**
		(0.048)	(0.052)	(0.043)	(0.044)	(0.044)
Proportion of females in 3-digit Occupation			-0.233**	-0.247**	-0.152**	-0.174**
			(0.050)	(0.039)	(0.046)	(0.055)
Female Supervisor					-0.058**	-0.071**
					(0.022)	(0.021)
R-squared	0.04	0.06	0.07	0.42	0.57	0.57
Sample size	1,871	1,871	1,871	1,871	1,871	1,871

Panel B. Male Sample

Variable	Model 0	Model 1	Model 2	Model 3	Model 4	Model 5
Proportion Female Co-workers		-0.397**	-0.317**	-0.274**	-0.186*	-0.189*
		(0.075)	(0.082)	(0.069)	(0.075)	(0.076)
Proportion of females in 3-digit Occupation			-0.196*	-0.253**	-0.215**	-0.270**
			(0.085)	(0.069)	(0.072)	(0.096)
Female Supervisor					-0.099*	-0.103*
					(0.040)	(0.041)
R-squared		0.03	0.04	0.41	0.51	0.58
Sample size		845	845	845	845	845

Panel C. Female Sample

Variable	Model 0	Model 1	Model 2	Model 3	Model 4	Model 5
Proportion Female Co-workers		-0.203**	-0.111	-0.121*	-0.125*	-0.102
		(0.063)	(0.066)	(0.054)	(0.056)	(0.056)
Proportion of females in 3-digit Occupation			-0.252**	-0.226**	-0.098	-0.107
			(0.061)	(0.047)	(0.060)	(0.071)
Female Supervisor					-0.036	-0.055*
					(0.027)	(0.026)
R-squared		0.01	0.02	0.42	0.54	0.59
Sample size		1,026	1,026	1,026	1,026	1,026

Notes:

1. (.) are White-corrected standard errors and * means that the probability value is less than or equal to 0.05 and ** less than or equal to 0.01

2. The first model only includes a female indicator and a constant term. Model 1 adds the proportion of female co-workers. Model 2 adds the proportion of female workers at the individual's three-digit occupation. Model 3 adds a female indicator (for the pooled sample), age, age squared, years of education, married, white, regional indicators, AFQT, and number of children. Model 4 adds an indicator for having a female supervisor, union, firm size, global satisfaction at work, maternity leave benefits at job, 1-digit occupation indicators and 1-digit industry indicators. Model 5 replaces the 1-digit indicators for occupation and industry by 2-digit indicators for occupation and industry.

Table 3.6. Log Wage regressions for the NLSY79 (Dependent variable: log of hourly wages). Set of indicators for proportion of female co-workers.

Panel A. Pooled Sample

Variable	Model 1	Model 2	Model 3	Model 4	Model 5
Proportion Female: 20%-40%	-0.030	-0.011	-0.061	-0.033	-0.022
	(0.039)	(0.039)	(0.031)	(0.029)	(0.029)
Proportion Female: 40%-60%	-0.160**	-0.126**	-0.147**	-0.109**	-0.093**
	(0.041)	(0.041)	(0.032)	(0.030)	(0.030)
Proportion Female: 60%-80%	-0.153**	-0.106*	-0.145**	-0.123**	-0.114**
	(0.041)	(0.042)	(0.034)	(0.033)	(0.033)
Proportion Female: more 80%	-0.224**	-0.155**	-0.166**	-0.125**	-0.115**
	(0.041)	(0.044)	(0.036)	(0.035)	(0.035)
Female	-0.148**	-0.113**	-0.048*	-0.090**	-0.082**
	(0.027)	(0.028)	(0.023)	(0.022)	(0.022)
Proportion of females at 3-digit Occupation		-0.232**	-0.247**	-0.150**	-0.173**
		(0.050)	(0.040)	(0.046)	(0.055)
Female Supervisor			0.023	-0.032	-0.046
			(0.022)	(0.021)	(0.021)
R-squared	0.06	0.07	0.43	0.53	0.57
Sample size	1,871	1,871	1,871	1,871	1,871

Panel B. Male Sample

Variable	Model 1	Model 2	Model 3	Model 4	Model 5
Proportion Female: 20%-40%	0.007	0.024	-0.016	0.008	0.005
	(0.047)	(0.047)	(0.037)	(0.034)	(0.035)
Proportion Female: 40%-60%	-0.102	-0.072	-0.082	-0.037	-0.023
	(0.054)	(0.056)	(0.042)	(0.041)	(0.042)
Proportion Female: 60%-80%	-0.177**	-0.130*	-0.165**	-0.130*	-0.138**
	(0.058)	(0.062)	(0.051)	(0.052)	(0.052)
Proportion Female: more 80%	-0.369**	-0.307**	-0.218**	-0.164*	-0.179*
	(0.075)	(0.079)	(0.073)	(0.073)	(0.070)
Proportion of females at 3-digit Occupation		-0.196*	-0.250**	-0.207**	-0.257**
		(0.085)	(0.069)	(0.073)	(0.096)
Female Supervisor				-0.077	-0.082*
				(0.040)	(0.041)
R-squared	0.04	0.04	0.41	0.51	0.59
Sample size	845	845	845	845	845

Panel C. Female Sample

Variable	Model 1	Model 2	Model 3	Model 4	Model 5
Proportion Female: 20%-40%	-0.111	-0.097	-0.143*	-0.127*	-0.077
	(0.071)	(0.071)	(0.058)	(0.054)	(0.054)
Proportion Female: 40%-60%	-0.242**	-0.211**	-0.207**	-0.205**	-0.142**
	(0.067)	(0.067)	(0.053)	(0.050)	(0.051)
Proportion Female: 60%-80%	-0.174**	-0.132*	-0.160**	-0.160**	-0.115*
	(0.065)	(0.065)	(0.053)	(0.052)	(0.053)
Proportion Female: more 80%	-0.232**	-0.164*	-0.182**	-0.175**	-0.119*
	(0.063)	(0.064)	(0.052)	(0.052)	(0.053)
Proportion of females at 3-digit Occupation		-0.251**	-0.230**	-0.094	-0.106
		(0.061)	(0.047)	(0.060)	(0.072)
Female Supervisor				-0.032	-0.053*
				(0.026)	(0.026)
R-squared	0.02	0.03	0.43	0.55	0.60
Sample size	1,026	1,026	1,026	1,026	1,026

Notes:
1. (.) are White-corrected standard errors and * means that the probability value is less than or equal to 0.05 and ** less than or equal to 0.01
2. The first model only includes the proportion of female co-workers, a female indicator (for the pooled sample) and a constant term. Model 2 adds the proportion of female workers at the individual's three-digit occupation. Model 3 adds age, age squared, years of education, married, white, regional indicators, AFQT, and number of children. Model 4 adds an indicator for having a female supervisor, union, firm size, global satisfaction at work, maternity leave benefits at job, 1-digit occupation indicators and 1-digit industry indicators. Model 5 replaces the 1-digit indicators for occupation and industry by 2-digit indicators for occupation and industry; 3. The excluded category is less than 20% of female co-workers.

Table 3.7. Descriptive Statistics. Personnel records from a single firm.

Variables	Pooled	Male	Female
Hourly Wage	11.550	12.445*	10.682*
	(6.631)	(7.045)	(6.080)
Proportion of Female Co-workers	0.511	0.457*	0.564*
	(0.163)	(0.167)	(0.140)
Female	0.508	-	-
	(0.500)		
Age	39.631	39.187*	40.061*
	(8.538)	(8.025)	(8.649)
White	0.660	0.663	0.657
	(0.474)	(0.473)	(0.475)
Married	0.450	0.446	0.453
	(0.498)	(0.497)	(0.498)
Proportion without less than High School	0.054	0.047*	0.061*
	(0.226)	(0.212)	(0.239)
Proportion with High School degree	0.646	0.647	0.645
	(0.478)	(0.478)	(0.479)
Proportion with Two-year degree	0.029	0.029	0.029
	(0.168)	(0.167)	(0.168)
Proportion with Four-year degree	0.205	0.204	0.206
	(0.404)	(0.403)	(0.405)
Proportion with Graduate degree	0.066	0.073*	0.059*
	(0.248)	(0.261)	(0.236)
Sample size	5,075	2,498	2,577

Notes:
1. Standard deviations are between parentheses.
2. The variable hourly wage is in 1994 dollars.
3. * indicates a statistically significant difference between male and female means at a 95% confidence level.

Table 3.8. Correlation between proportion of female co-workers and some variables of interest. Personnel records from a single firm.

Variable	Pooled	Males	Females
Hourly wage	-0.149	-0.085	-0.130
	(0.000)	(0.000)	(0.000)
Age	-0.032	-0.086	-0.014
	(0.030)	(0.000)	(0.491)
White	0.014	0.049	-0.011
	(0.318)	(0.017)	(0.595)
Married	-0.032	-0.100	0.043
	(0.027)	(0.000)	(0.037)
Less than High School	-0.043	-0.039	-0.063
	(0.003)	(0.060)	(0.002)
Complete High School	-0.047	-0.154	-0.070
	(0.000)	(0.000)	(0.000)
Two-year College degree	0.001	0.028	-0.034
	(0.963)	(0.181)	(0.099)
Four-year College degree	0.062	0.141	-0.023
	(0.000)	(0.000)	(0.264)
Graduate degree	0.047	0.097	0.009
	(0.001)	(0.000)	(0.644)

Note: Significance levels are in parentheses.

Table 3.9. Means for different sub-groups (defined by the proportion of female workers in the workgroups). Personnel records from a single firm.

	Pooled			Males			Females		
Variable	Male-Dominated	Integrated	Female-Dominated	Male-Dominated	Integrated	Female-Dominated	Male-Dominated	Integrated	Female-Dominated
Hourly Wage	12.517* (0.182)	11.652 (0.120)	10.488* (0.211)	12.730 (0.213)	12.318 (0.186)	12.524 (0.480)	11.770* (0.339)	11.022 (0.154)	9.655* (0.216)
Proportion of Female Co-workers	0.230* (0.003)	0.514 (0.001)	0.717* (0.002)	0.224* (0.003)	0.501 (0.002)	0.707* (0.002)	0.252* (0.004)	0.527 (0.002)	0.721* (0.002)
No High School degree	0.044* (0.007)	0.069 (0.004)	0.017* (0.004)	0.045* (0.008)	0.055 (0.006)	0.013* (0.007)	0.040 (0.015)	0.082 (0.007)	0.019 (0.005)
High School degree	0.767* (0.015)	0.614 (0.009)	0.649* (0.015)	0.800* (0.016)	0.606 (0.012)	0.543* (0.029)	0.650 (0.036)	0.623 (0.012)	0.692 (0.017)
Two-year college degree	0.025 (0.006)	0.030 (0.003)	0.028 (0.005)	0.019 (0.006)	0.032 (0.004)	0.030 (0.010)	0.045 (0.016)	0.028 (0.004)	0.027 (0.006)
Four-year college degree	0.123* (0.012)	0.218 (0.007)	0.230* (0.013)	0.095* (0.012)	0.229 (0.011)	0.298* (0.026)	0.220 (0.031)	0.207 (0.010)	0.202 (0.015)
Graduate degree	0.041* (0.007)	0.069 (0.004)	0.076* (0.008)	0.040* (0.008)	0.078 (0.007)	0.116* (0.018)	0.045 (0.016)	0.060 (0.006)	0.060 (0.009)
Sample size	798	3,237	1,040	621	1,575	302	177	1,662	738

Notes: 1. Standard deviations are in parentheses; 2. * indicates a statistically significant difference between male-dominated and female-dominated workgroups' means at a 95% confidence level; 3. Male-dominated workgroups are defined as those with less than 33% of female workers and female-dominated workgroups are defined as those with more than 66% of female workers. Integrated: between 33% and 66%.

Table 3.10. Log Wage regressions for personnel records from a single firm (Dependent variable: log of hourly wages). Continuous variable representing the proportion of female co-workers.

Panel A. Pooled sample

Pooled	Model 1	Model 2	Model 3
Proportion of Female Co-workers	-0.452**	-0.389**	-0.505**
	(0.042)	(0.038)	(0.031)
Female	-0.099**	-0.083**	-0.099**
	(0.015)	(0.010)	(0.008)
R-squared	0.04	0.61	0.75
Sample size	5,075	5,075	5,075

Panel B. Male sample

Proportion of Female Co-workers	-0.377**	-0.378**	-0.502**
	(0.055)	(0.053)	(0.045)
R-squared	0.02	0.60	0.73
Sample size	2,498	2,498	2,498

Panel C. Female sample

Proportion of Female Co-workers	-0.554**	-0.306**	-0.393**
	(0.062)	(0.062)	(0.046)
R-squared	0.02	0.63	0.79
Sample size	2,577	2,577	2,577

Notes: 1. (.) are White-corrected standard error and * means that the probability value is less than or equal to 0.05 and ** less than or equal to 0.01; 2. The completed High School indicator variable is excluded of the regression as a baseline. Model 1 includes the proportion of female co-workers and a female indicator variable (for the pooled sample). Model 2 adds educational indicators, age, age squared, white, married and US states. Model 3 adds Job classifications.

Table 3.11. Log Wage regressions. Personnel records from a single firm (Dependent variable: log of hourly wages). Set of indicators for proportion of female co-workers.

Panel A. Pooled Sample

Variable	Model 1	Model 2	Model 3
Proportion Female: 20%-40%	0.137**	-0.037	-0.036
	(0.030)	(0.033)	(0.027)
Proportion Female: 40%-60%	-0.009	-0.180**	-0.202**
	(0.030)	(0.032)	(0.026)
Proportion Female: 60%-80%	-0.025	-0.161**	-0.226**
	(0.032)	(0.032)	(0.027)
Proportion Female: more 80%	-0.088	-0.222**	-0.290**
	(0.058)	(0.051)	(0.042)
Female	-0.117**	-0.089**	-0.103**
	(0.015)	(0.010)	(0.008)
R-squared	0.03	0.61	0.74
Sample size	5,075	5,075	5,075

Panel B. Male Sample

Proportion Female: 20%-40%	0.149**	-0.012	0.017
	(0.031)	(0.039)	(0.032)
Proportion Female: 40%-60%	-0.018	-0.158**	-0.156**
	(0.031)	(0.038)	(0.032)
Proportion Female: 60%-80%	0.018	-0.123**	-0.175**
	(0.036)	(0.039)	(0.033)
Proportion Female: more 80%	-0.094	-0.240	-0.291*
	(0.203)	(0.157)	(0.130)
R-squared	0.02	0.60	0.73
Sample size	2,498	2,498	2,498

Panel C. Female Sample

Proportion Female: 20%-40%	0.060	-0.142	-0.120
	(0.123)	(0.081)	(0.068)
Proportion Female: 40%-60%	-0.057	-0.244**	-0.213**
	(0.123)	(0.077)	(0.066)
Proportion Female: 60%-80%	-0.107	-0.233**	-0.251**
	(0.123)	(0.076)	(0.065)
Proportion Female: more 80%	-0.151	-0.271**	-0.314**
	(0.131)	(0.089)	(0.074)
R-squared	0.01	0.63	0.79
Sample size	2,577	2,577	2,577

Notes: 1. (.) are White-corrected standard errors and * means that the probability value is less than or equal to 0.05 and ** less than or equal to 0.01; 2. Complete High School is excluded of the regression as a baseline. Model 1 includes the proportion of female co-workers and a female indicator variable (for the pooled sample). Model 2 adds educational indicators, age, age squared, white, married and US states. Model 3 adds Job classifications.

3.8. Figures

Figure 3.1. Proportion of Female Co-Workers. Female sample. NLSY79

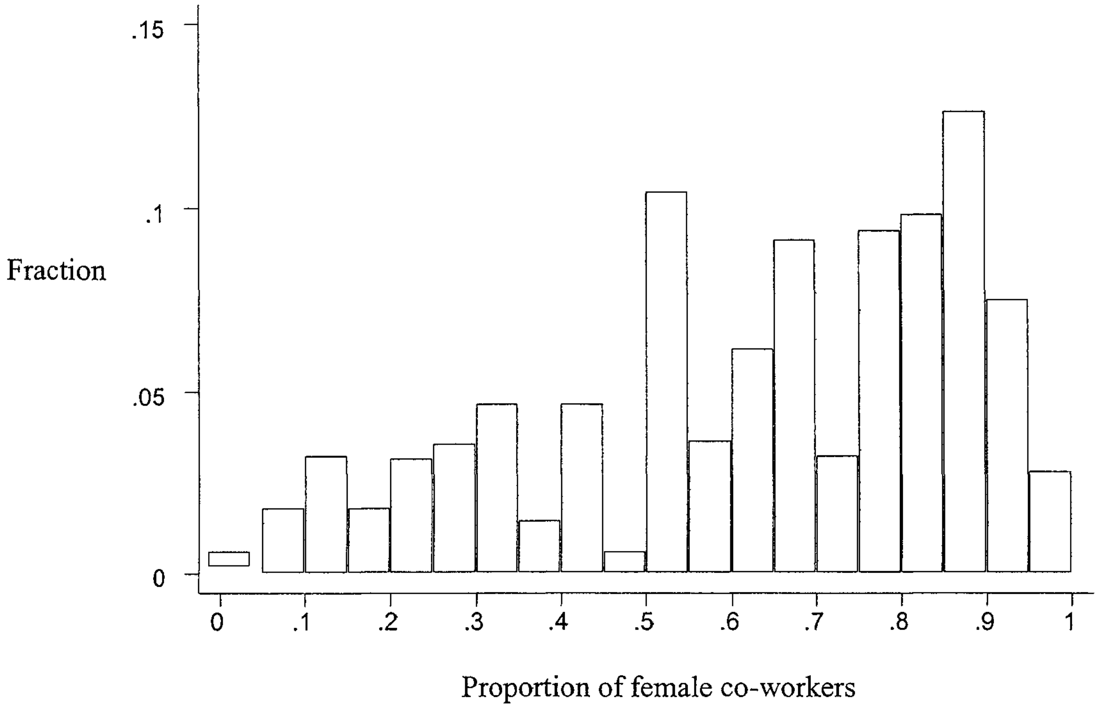


Figure 3.2: Proportion of Female Co-workers, Male sample, NLSY79

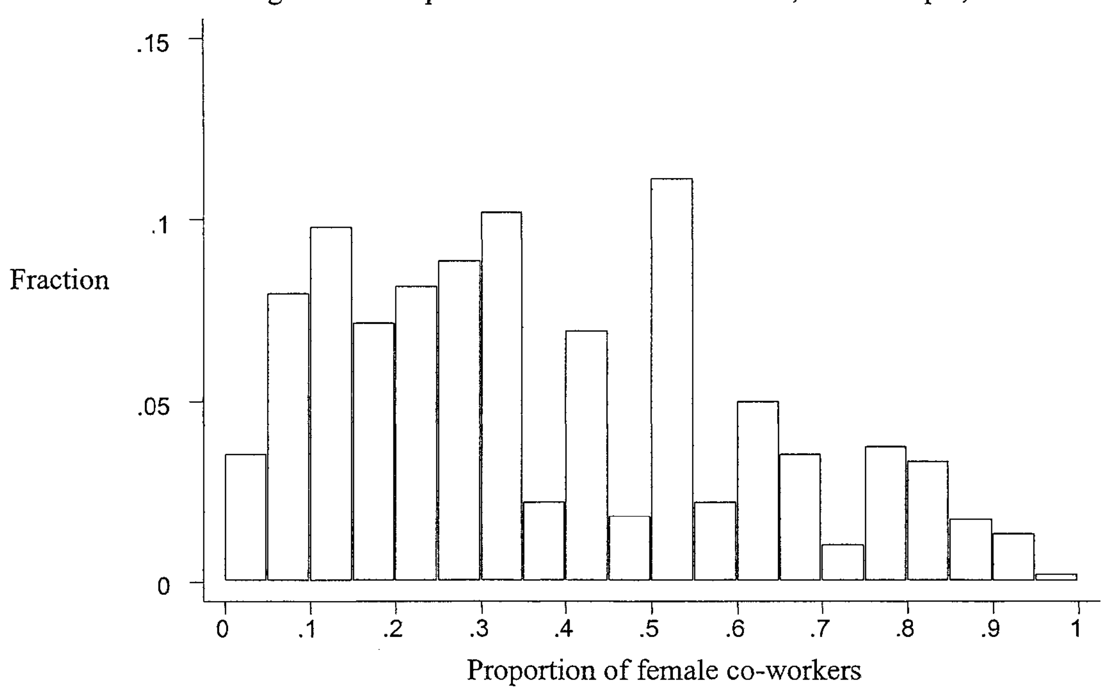


Figure 3.3: Proportion of Female Co-Workers. Female Sample. Firm's data set

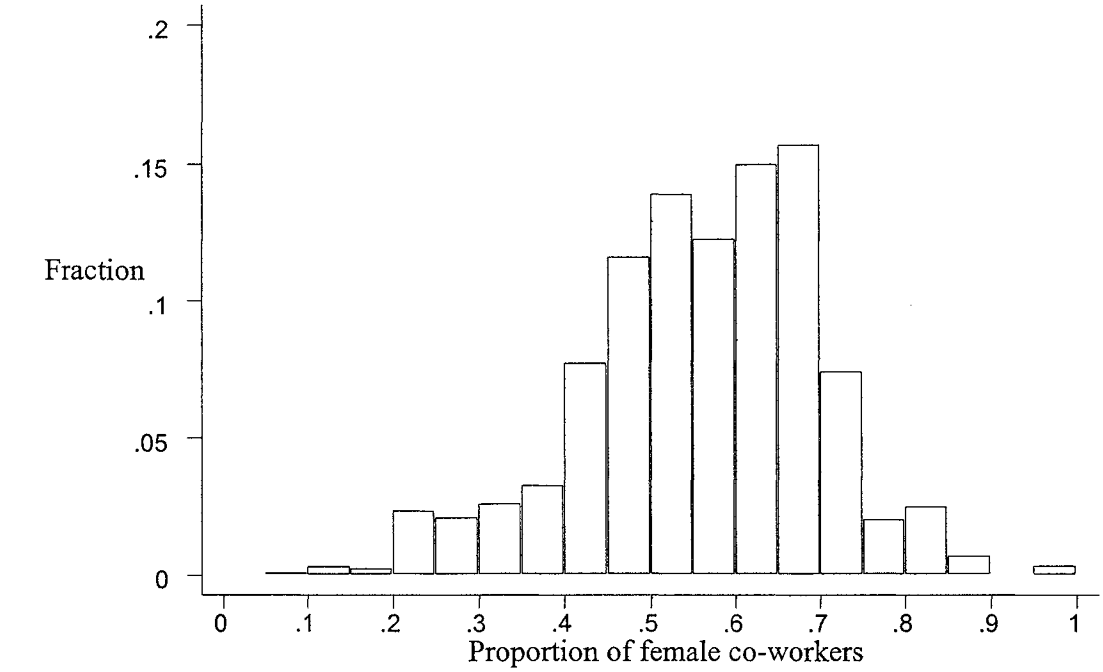
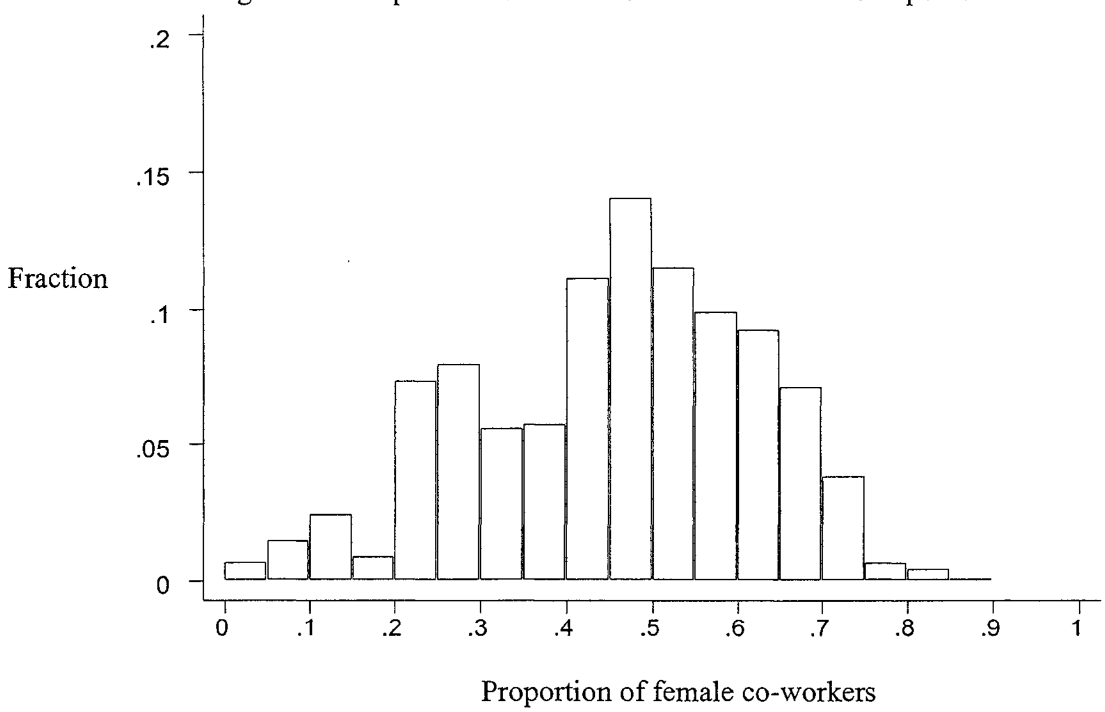


Figure 3.4: Proportion of Female Co-Workers. Male Sample. Firm's data set



CHAPTER 4 THE EFFECTS OF MOTHERHOOD ON WAGES AND LABOR FORCE PARTICIPATION: EVIDENCE FOR BOLIVIA, BRAZIL, ECUADOR AND PERU

4.1. Introduction

Despite the narrowing of the gender wage gap in the last few decades, women still earn less than men, on average (e.g., Blau and Kahn, 2000). In general, women have less labor market experience than men, and this fact has played a major role in explaining gender wage differentials. One of the reasons for having less labor market experience might be the fact that women face more responsibilities than men in terms of childcare and nurturing. Motherhood takes women away from the labor market or it leads to only part-time work. Studies in industrialized countries usually show a negative impact of motherhood on wages and labor force participation. This paper studies a similar question (it calculates costs of motherhood in terms of wages and labor force participation) for a group of Latin American countries. These countries are Peru, Bolivia, Ecuador and Brazil because they have information on the birth mother of each of the children within a household.

American women with children earn lower wages than those who do not have any children, according to a number of studies (Hill, 1979; Korenman and Neumark, 1992, 1994; Waldfogel, 1997, 1998; Lundberg and Rose, 1999; England and Budig, 1999). There also exists a child penalty in the UK (Harkness and Waldfogel, 1997), in Australia (Baxter, 1992), in Canada (Phipps, Burton and Lethbridge, 2001) and in Germany ((Harkness and Waldfogel, 1997). A recent study (Sigle-Rushton and Waldfogel, 2004) analyzes the costs of motherhood in terms of lifetime earnings for nine industrialized countries. In general, these studies agree that mothers earn lower wages than women without children. They have established that at least some portion of this unexplained wage difference was due to females' lack of labor market experience. However, all these studies find that there still remains some wage differential after controlling for experience.

Waldfogel (1997) uses data from the National Longitudinal Survey of Young Women to investigate the lower wages of mothers. She finds that in pooled cross-sectional models, difference models, and fixed-effects models, the negative effect of children on women's wages is not entirely explained by differences in labor market experience. She considers two alternative hypotheses for the residual penalty associated with motherhood: unobserved pay-relevant differences between mothers and non-mothers, which fixed-effects models show do not account for the child penalty; and part-time employment which does account for some child penalty. However, after controlling for these two factors, there still exists a residual child penalty factor. A hypothesis pointed out by Waldfogel (1998) is that employers discriminate against women with children. However, she does not find any evidence strongly supporting this idea.

One interesting fact is that the *family gap* between women with children and women without children as been rising in recent years, according to Waldfogel (1998), whereas the gender gap between men and women has been narrowing. Another factor to take into account is that there is no child penalty for fathers. Indeed, it is well established that married men with children earn more than other men (Korenman and Neumark 1991).

According to England and Lubig (1999), discussions of the child penalty have focused on five mechanisms. First, women may spend time at home caring for children, interrupting their experience and seniority, or at least interrupting full-time employment, which would have enduring effects on wages given returns to experience and seniority. This is the so called human capital or labor supply explanation. Second, mothers may choose jobs that trade off higher wages for some aspect of "mother-friendliness". Third, mothers may exert less effort (per hour) on the job to conserve effort for household production, and this may affect wages through productivity. The assumption is that non-mothers and men spend more of their non-employment hours in leisure rather than childcare, which is presumed to take less energy. Fourth, it is possible that employers discriminate against mothers, treating them worse than other women. Finally, it has been suggested that what appear in analyses to be causal effects of having children may be spurious. In this view, there is heterogeneity in who selects into motherhood on unmeasured variables that also affect earnings. Examples of such factors might be preference for prosperity or career ambition.

The effect of being a mother on wages might differ substantially in Latin American countries compared to industrial countries. The reasons behind these differences arise from different sources. First, there are huge differences in institutional factors regarding labor market practices in industrialized countries compared to developing countries. Second, cultural differences regarding the perception of women in the labor market might also differ in Latin America, which could affect the comparison between mothers and non-mothers in terms of labor force participation and pay.

The objective of this paper is to calculate the costs of motherhood in terms of wages and labor force participation for a group of Latin American countries. The countries analyzed are Peru, Bolivia, Ecuador and Brazil. These four countries have information which allows us to identify the birth mother of each of the children within a household.

The final objective of researching the costs of being a mother in the labor market would ideally be to estimate how much women pay in their lifetime for being mothers. For developed countries, there are three factors that contribute to lower lifetime earnings. First, women with children are less likely to participate in the labor market. Second, they are more likely to work part-time. Third, they have lower wages. In this sense, this paper will try to cover some of these aspects, looking at labor force participation issues as well as pay differentials.

This study is motivated by several reasons. First of all, this is the first study that analyzes the impact of motherhood on wages and labor force participation for Latin American countries. One of the reasons for the importance of this question is in the larger scenario of gender inequality. Most women become mothers while they are participating in the labor market, and a typical aspect of intra-household gender division is the assignment of household responsibilities to women. In this sense, penalties for being a mother may concern most women and add to gender inequality. Therefore, the empirical analysis of labor market differentials between mothers and non-mothers can shed light on the labor market effects of gender-role specialization.[1]

Second, the comparison of these results with the results from industrialized countries will allow us to help on the design of labor market policies that help women reconcile their responsibilities at home and at work. One of the areas where Latin American countries have space to learn from industrialized

[1] On the other hand, if well-raised children are considered public goods, motherhood penalties are of interest because there exists an equity problem since mothers are not paid for their contribution to society.

countries is in the area of family-friendly policies. Family friendly policies have been shown in industrialized countries as one of the main sources of mitigation of the effects of children on women's earnings.

The paper is organized as follows: section 4.2 describes the data sets used in this empirical paper; section 4.3 investigates the effects of being a mother on labor force participation and section 4.4 investigates the effect of motherhood on wages. Finally, section 4.5 concludes.

4.2. Data

For this study, we use household surveys that contain information on socioeconomic characteristics of the individuals like age, gender, education, regional location, job characteristics, etc. The household surveys for each country are the *1999 Pesquisa Nacional para Amostra de Domicilios (PNAD)* for Brazil, the *1998 Encuesta de Condiciones de Vida (ECV)* for Ecuador, the *1999 Encuesta Continua de Hogares (ECH)* for Bolivia and the *2000 Encuesta Nacional de Hogares (ENH)* for Peru. All these surveys are nationwide.

Originally, we thought that it was possible to include more countries in this study. However, because of lack of data sets with information about motherhood in Latin American countries, the number of countries in this study was reduced to four. Household surveys clearly identify the mothers of the children living in the household (i.e., the survey asks if the mother of each one of the household members is living in the household, and identifies her) only in these four countries. Therefore, we have information about the fertility history of women 15 to 49 (or 50, depending on the country) years old, as well as other socioeconomic characteristics.

Sample sizes vary substantially from 13,023 individual observations in Bolivia to 352,229 in Brazil.[2] We restrict our samples to women 14 to 45 year-old[3] living in urban areas. For the analysis of mothers'

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[2] This does not necessarily impose a problem. However, the fact that sample sizes for some countries go down substantially when we divide the sample must be taken into consideration when analyzing the results.

[3] The selection of this age range is arbitrary. The idea is to select an age range that has people willing to be parents at some point and, if they already are, have young children.

labor force participation, we do not impose further restrictions.[4] However, when we look at the effect of motherhood on wages, we restrict the sample to those women earning a salary at their job and working more than 1 hour per day but not more than 16 hours per day. Self-employed workers are not included in this analysis given the difficulties in separating returns to labor and capital.

4.3. The Effects of Motherhood on Labor Force Participation

The effects of being a mother on women's employment are generally explained in a larger model of labor, leisure and home-production allocation. We are interested in looking at the differences in labor force participation between mothers and non-mothers. This section will analyze these differences only at a descriptive level, because a regression analysis should deal with the existence of an endogeneity problem between female labor force participation and motherhood.

For this section, the sample is restricted to female workers 14 to 45 year-old living in urban areas. Table 4.1 shows female labor force participation rates. This table compares mothers and non-mothers in terms of their marital status and educational level. We are interested in comparing female labor force participation among women with different educational levels (horizontal comparison) according to their motherhood status, and also among married and unmarried women (vertical comparison).[5]

In general, we find that mothers of children less than 7 years old participate more than non-mothers. In terms of education, more educated women are more likely to participate in the labor market, and this is generally true for mothers and non-mothers, as we would have imagined. Regarding marital status differences, if we look at the married sample, those who do not have children usually participate more than mothers, following the typical gender division of labor within the household. The reverse is true for the unmarried sample. Single mothers participate more in the labor market than single women with no children.

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[4] To define participation rates we use a question on the employment status in the reference week of the survey. The sum of those who were employed plus those actively seeking employment in the reference week are considered labor force participants. Employment is defined as any market-type activity, paid or unpaid, in any establishment, including home enterprises.

Table 4.2 shows differences in labor force participation between mothers and non-mothers, according to their marital status and age-groups. We analyze three age-groups arbitrarily chosen: 14-25, 26-35 and 36-45 years old. From the general analysis (without distinguishing between married and unmarried – first panel of Tables 4.2 -) we find that the youngest mothers (14-25 years old) participate more than the youngest group of non-mothers. As it can be observed in the panels that are divided in married and unmarried women, this seems to be explained by the necessity of unmarried young women who have to go to work to support their children. For the other two groups (26-35 and 36-45), non-mothers participate more than mothers. For the married sub-sample, non-mothers usually work more than mothers for all groups. For the unmarried sub-sample, the youngest group of mothers usually work more than non-mothers, and the same happens with the middle-aged group (except for Ecuador) and for the 36-45 group (except for Peru). Summarizing, looking at participation rates by age groups and motherhood status shows consistent results to what previous case studies of Latin American countries have found (Psacharopoulos and Tzannatos, 1992). Female participation rates increase with age and decline with family responsibilities.

4.4. The Effects of Being a Mother on Wages

The main focus of this section is to investigate the impact of motherhood on wages for Bolivia, Brazil, Ecuador and Peru.

4.4.1. The Model

The initial approach is to augment a standard cross-sectional earnings function to include indicators for having children in certain age-groups. Different specifications are going to be presented because the literature about costs of motherhood for developed countries has used different approaches and we want to have comparability with those studies.

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[5] Brazil does not have information on marital status. Therefore, the division between married and unmarried is not possible for this country.

The first specification includes indicators denoting having children less than or equal to 6 years old, having children between 7 and 12 years of age and having children between 13 and 18 years of age.[6]

Observation i's wage rate W_i is assumed to depend on these indicators, as well as on a vector of other observed characteristics X_i, and an error term ε_i.

Adopting a log-linear specification,

(1) $\ln W_i = \alpha + \beta_1$ (mother of children less than 7)$_i$ + β_2 (mother of children between 7 and 12)$_i$ + β_3 (mother of children between 13 and 18)$_i + \eta X_i + \varepsilon_i$

where α, β_1, β_2, β_3 and η are parameters to be estimated.

The second specification includes one indicator denoting if the person has one child younger than 18 years old and another indicator equal to one if the person has two or more children younger than 18 years old. Let the variable (one child)$_i$ represent having one child, and the variable (two or more children)$_i$ represent having two or more children for the i^{th} individual.[7]

Adopting a log-linear specification,

(2) $\ln W_i = \alpha + \beta_1$ (one child)$_i$ + β_2 (two or more children)$_i + \eta X_i + \varepsilon_i$

where α, β_1, β_2 and η are parameters to be estimated.

The third specification includes continuous variables denoting the number of children in specific age ranges (0 to 6, 7 to 12 and 13 to 18).

(3) $\ln W_i = \alpha + \beta_1$ (# of children 0- 6)$_i$ + β_2 (# of children 7-12)$_i$ + β_3 (# of children 13-18)$_i + \eta X_i + \varepsilon_i$

where α, β_1, β_2, β_3 and η are parameters to be estimated

[6] These three age ranges are arbitrarily chosen, and they try to represent different needs in the children's lives. The basis of comparison of these three groups is a group composed by non-mothers as well as mothers of children older than 18 years of age. Given that the age range for this study is 14-45 years old, there are not going to be so many mothers of children older than 18.

[7] The base of comparison is the group of non-mothers plus those who have children older than 18 years old.

The dependent variable is the natural logarithm of the hourly wage in the respondent's current job. Other socioeconomic variables included in the first model are age, age squared, years of education, years of education squared, tenure in the current job (in months), tenure squared, marital status, head of household status and ethnicity. The second model adds two job market characteristics: part-time and public sector status. To control for more detailed job market characteristics, the third model includes one-digit industry indicators as well as one-digit occupation indicators.

Ethnicity is equal to one if the person has ethnic origin and zero otherwise. The definition varies with the country. For Peru, this definition is based on the language the person usually speaks (i.e. equal to one if the person does not speak Spanish but Quechua, Aymara, etc), having a similar definition for Bolivia and Ecuador. For Brazil, the definition is based on the skin color (equal to one if the color is different from white). Marital status is divided in three categories: never married, 'divorced or widowed' (the reference category) and married (which includes legally married and domestic partners). Part-time status is defined equal to one if the person works less than 35 hours per week and zero otherwise. Finally, a variable denoting actual experience (tenure) is a measure of tenure in the main current job (in months).

One problem that arises for lack of information in these four Latin American cross-sectional household surveys is that we do not have a good measure of actual lifetime work experience. The only variable available is tenure in the current job. We use this variable in our paper to control in some way for actual experience, but the lack of information on actual lifetime work experience can create biases in our motherhood coefficients. Anderson et al. (2003) show that the gap between potential experience and actual work experience is three years for mothers compared to only around 1.5 years for non-mothers, using a panel data set for the US. This means that mothers and non-mothers may have differences in their actual experience may be due to the fact that they have to get away from their jobs when they have their children, and for other circumstances. Another obvious drawback of the use of cross-sectional analysis is the possibility that mothers are different from non-mothers in ways that are not observed in the data (unobserved heterogeneity).

4.4.2. Descriptive Statistics for Wage Regressions

The samples for these four Latin American countries include female 14 to 45 year-old salaried employees.[8] Self-employed workers are not included. Only urban areas are considered. Finally, we consider women working more than 1 hour per day but not more than 16 hours per day. Appendix G shows the sample restrictions with the number of observations lost in each of these restrictions for the four countries analyzed.

Table 4.3 shows means and standard deviations for the four countries, dividing the sample by motherhood status. We show three columns for each country: the first column shows the means for those who do not have children; the second column shows the means for those who have children aged 0 to 6 years old and the third column for those having children 0 to 18 years old. The distinction between the second and third column is due to a data problem in Peru, where we cannot identify mother with children older than 6 years old. Therefore, we show the second column for all countries to have comparability with Peru's results. For the second and third columns, we show the results of a t-test for differences in means with asterisks. The natural comparisons are between the means shown in the second column and the first column (mothers 0-6 to non-mothers) and between the third and the first column (mothers 0-18 to non-mothers) as well.

First, we are going to compare non-mothers to mothers of children 0 to 18 years old for the three countries that allow us to do so: Bolivia, Ecuador and Brazil.[9] For these countries, mothers are older than non-mothers, with differences of 7 to 8 years. The number of children goes on average from 1.8 to 2.2 children aged less than 18 years old. Since everyone in the sample is a worker, it is natural that they have a fertility rate lower than the national average.[10] The average hourly wage is always higher for mothers and it is expressed in the national money unit.[11] One of the explanations for the significant

[8] The selection of this age range is arbitrary. The idea is to select an age range that has people willing to be parents at some point and, if they already are, they have young children.
[9] Peru does not allow us to compare non-mothers with mothers of children 0 to 18 years old because the survey has information just for mothers of children less than 7 years old.
[10] Fertility rates, according to the World Bank Development Indicators 2002, are equal to 4.02 children per woman for Bolivia, 3.14 for Ecuador, 3.05 for Peru and 2.24 for Brazil, in 1999.
[11] The monetary units are *reales* for Brazil, *sucres* for Ecuador, *bolivianos* for Bolivia and *nuevos soles* for Peru.

differences might be that older women that have more experience and therefore greater wages compose the mothers' samples. Since we are interested in the comparison of hourly wages among mothers and non-mothers, the regression analysis of the next sub-section will concentrate on this relationship in a deeper way.

Regarding levels of education, we did not find statistically significant differences among mothers and non-mothers with the exception of Brazil and Peru, where mothers tend to be less educated than non-mothers on average. Mothers are more likely to be married, as we might have expected.

Potential experience and tenure are always smaller for non-mothers, which might be in part because of the age difference among mothers and non-mothers. Mothers are more likely to work in the public sector. Mothers are also more likely to be heads of household for Bolivia and Ecuador with around 17% of mothers being head of household, except for Brazil, where only 2% are heads of household.

If we look at the differences in occupational segregation by motherhood status, it is interesting that mothers tend to work more as 'professionals and technicians' or 'directors, officials and legislators' than non-mothers. In Brazil and Bolivia, mothers are less likely to work in 'services' than non-mothers and more likely to work as sellers. It is also interesting that there are not many differences in the means of mothers and non-mothers in terms of the industry where they work.

4.4.2. Regression Results

Table 4.4 presents the basic regression results for three models.[12] The first column controls for age, age squared, years of education, years of education squared, marital status,[13] tenure and tenure squared, married,[14] head of household status and ethnicity. Model 2 adds part-time status and public sector status. Model 3 adds one-digit occupation and one-digit industry indicators.

[12] Appendix H shows the complete set of results for the first specification, using Model 3.
[13] Marital status is represented by an indicator equal to one if the person is married or domestic partner, and zero otherwise.
[14] Brazil does not have information about marital status, as well as part-time status. Therefore, these two variables are not included in the Brazilian regressions.

The results are heterogeneous. Table 4.4 shows the results for the three specifications mentioned in the previous sub-section for the three models described above. Because of the heterogeneity in the results, we are going to explain the results by country.

In the case of Bolivia, the results show that there exists a *premium* in term of wages for having children aged 13-18 years old and the (raw) differential in hourly pay is 19.3% (exp(0.177) – 1) more for mothers after controlling for the explanatory variables included in Model 3. We also find that the higher the number of children 13-18 years old the higher the wages (looking at the third specification). This can be because having older children might make it easier for mothers to dedicate energy to their job responsibilities if these older children do housework, compared to non-mothers who do have to do housework when they get home. We tested these results looking at the effect of the number of girls and boys in each age group. The results show that having girls between 13 and 18 years old has a positive effect on wages, whereas having boys in this age range is not statistically significant.[15]

For Ecuador, we did not find any significant results for the general sample, nor dividing the sample by educational levels or age-groups.

For Peru, we find results that are similar to those found in developed countries. In this sense, we find a *penalty* for having children less than 6 years old in terms of wages and the (raw) differential in hourly pay is 10.7% (exp(-0.114) – 1) less for mothers using the third model. There is also a *penalty* for having a higher number of children aged less than 6 years old.

Finally, for Brazil we find that there exists a premium for having children less than 6 years old (6.8% more than non-mothers), a smaller premium for having children 7 to 12 years old (2.6% more than non-mothers) and no rewards for having children 13-18 years old. One of the problems with the Brazilian data set is that it does not have information regarding marital status. The variable representing marital status in our regressions for the other three countries is positive and statistically significant. On top of that, the variables that measure motherhood and the variable married are highly correlated in the three countries that have information about marital status. Therefore, the variables that represent having children in Brazil might be capturing the fact that there exists a marriage premium for women. A next

[15] These results are not reported in this paper.

step is to further investigate the effect of family composition on wages for mothers and non-mothers for our Brazilian data. To see if the problem with this strange result was the lack of information about actual experience instead of lack of information about marital status, we have tested a model with a very restricted age-range (20-22 years old) and very restricted years of education (13 to 15 years of education). With this specification, we continued having positive coefficients for the variables representing motherhood. We interpret this as a signal that the problem is not entirely due to the fact that we do not have actual experience in our data set, but rather that we do not have information about marital status.[16]

Even though our models control for age, a second step to understand better our model can be to divide the samples in three age groups. These three groups, arbitrarily chosen, are the following: 14-25, 26-35 and 36-45 years old. From Table 4.5, we can see that Bolivia's results show that the youngest group of mothers receives a penalty for having children less than 6 years old in terms of wages of 38.6% smaller wages than non-mothers. There is as well a negative impact of having a higher number of children in this age range. For Ecuador, we see a positive effect for the oldest group of mothers if they have children 7 to 12 years old (the hourly wage differential is 28.6% more than non-mothers). In Peru, the penalties appear in the middle-aged group (with penalties of 18.5% smaller wages, almost double of the penalty found for the pooled sample with all the age groups together). Finally, the results for Brazil show that the significant effects disappear for the oldest group of mothers. For the youngest group of women we find that the premium is only for those having children less than 6 years old (the premium is 7.9%). For the middle-aged group there is a premium of 7.0% for those who have children less than 6 years old and 4.8% for those having children between 7 and 12 years of age.

We might think that it is interesting to see the impact of motherhood on wages looking at different sub-samples divided by educational attainment. More educated women might have access to better jobs in terms of child care policies, maternity leave, etc. Therefore, we might expect that, given that the decision of entering the job market has been made for our sample of female workers, better conditions at work might mitigate the costs of being a mother for better educated women.

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[16] The results are not reported in this paper.

Dividing the samples by educational levels (less than high school as the first group and high school or more as the second group, shown in Table 4.6), we can see that for Bolivia, there exists a premium for having children 13 to 18 years old only for educated mothers. This premium is equal to 26.4% more for mothers. For Ecuador, there exists a penalty of 15.1% for having children less than 6 years old for the less educated group of mothers as well as a premium of 17.9% for having children 7 to 12 years old also for this group of more educated women. For Peru, having children less than 6 years old has a negative impact on wages (hourly wage differential of 11% less for mothers) if you have high school or more, but does not have a significant effect if you have less than high school. For Brazil, Table 4.6 shows that having children less than 6 years old has an impact of 4.6% more in terms of wages than non-mothers for less educated women and the premium for having children 7 to 12 years old disappear for the group of less educated mothers. For the more educated ones, having children less than 6 years old has a 7.5% premium and having children 7 to 12 years old has a 3.6% premium.

Latin American countries usually have a higher proportion of the labor market working in the public sector. In general, women are more likely to work in the public sector compared to men. This selection into the public sector might have its reasons in the existence of non-pecuniary benefits associated with public sector jobs which might help women in the reconciliation of housework and outside work.

Dividing the samples in those working in the public and private sectors (Table 4.7), we can see that, for Bolivia, there is a premium for those who have children between 13 and 18 years old is 15.4% whereas there is a penalty of 11.5% less wages for having children 7 to 12 years old for those working in the public sector. No significant results are found for those working in the private sector. Again, there are no significant results for Ecuador. For Peru, there is a negative impact on wages for having two or more children for private sector workers. Having more children less than 6 years old also shows a negative effect on wages for those who work on the private sector. For Brazil, the effects for private and public sector workers are similar in the sense that both public and private sector workers have a premium for having children less than 6 years old as well as for having children 7 to 12 years old. The premiums are greater for those working in the private sector.

4.5. Conclusions

Studies in developed countries regularly observe a wage penalty for working mothers. In this paper we explore the effects of motherhood on wages and labor force participation for four Latin American countries.

This study is motivated by several reasons. First of all, this is the first study which analyzes the impact of motherhood on wages and labor force participation for a group of Latin American countries. In general, one of the reasons for the importance of this question is in the larger scenario of gender inequality. Most women become mothers while they are participating in the labor market, and a typical aspect of intra-household gender division is the assignment of household responsibilities to women. In this sense, penalties for being a mother may concern most women and add to gender inequality. Therefore, the empirical analysis of labor market differentials between mothers and non-mothers can shed light on the labor market effects of gender-role specialization. Second, the comparison of these results with the results from industrialized countries helps on the design of labor market policies for women to be able to reconcile their responsibilities at home and at work.

The results of this paper show that mothers with children less than 6 years old participate less than those with no children, except for single mothers. In general, female labor force participation increases with age and decline with family responsibilities. Conversely from the evidence found in the US, UK, Australia and Germany, our results for Latin America do not show a clear impact of being a mother on wages. While for Peru there exists a penalty for mothers of children less than 6 years old, for Bolivia and Brazil we find premiums for being a mother. For Ecuador there are no significant effects. These very heterogeneous effects are further investigated looking at samples divided by public and private sector, by educational level and by age groups. We find that wage penalties and premiums are not borne equally among all mothers.

4.6. References

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4.7. Tables

Table 4.1.A. Bolivia. Labor force participation by educational level and motherhood status.

All Women	All (n=1941)	Less than High School (n=1108)	High School (n=339)	Some College (n=480)
No children (n=861)	0.32	0.26	0.31	0.44
Children less than 7 (n=658)	0.50	0.50	0.41	0.59

Married Women	All (n=968)	Less than High School (n=576)	High School (n=165)	Some College (n=220)
No children (n=63)	0.46	0.38	0.29	0.70
(n=567)	0.47	0.46	0.36	0.57

Unmarried Women	All (n=973)	Less than High School (n=532)	High School (n=174)	Some College (n=260)
No children (n=798)	0.31	0.26	0.31	0.42
Children less than 7 (n=91)	0.73	0.78	0.70	0.65

Source: Own elaboration using data from the 1999 *Encuesta Continua de Hogares* for Bolivia

Table 4.1.B. Peru. Labor force participation by educational level and motherhood status.

All Women	All (n=3422)	Less than High School (n=1381)	High School (n=1005)	Some College (n=1029)
No children (n=2355)	0.50	0.38	0.51	0.63
Children less than 7 (n=939)	0.49	0.53	0.46	0.59

Married Women	All (n=1535)	Less than High School (n=643)	High School (n=462)	Some College (n=429)
No children (n=696)	0.57	0.56	0.49	0.67
Children less than 7 (n=736)	0.48	0.49	0.39	0.58

Unmarried Women	All (n=1887)	Less than High School (n=738)	High School (n=543)	Some College (n=600)
No children (n=1659)	0.46	0.30	0.52	0.61
Children less than 7 (n=203)	0.68	0.70	0.71	0.63

Source: Own elaboration using data from the 2000 *Encuesta Nacional de Hogares* for Peru.

Table 4.1.C. Ecuador. Labor force participation by educational level and motherhood status.

All Women	All (n=3793)	Less than High School (n=2152)	High School (n=706)	Some College (n=928)
No children (n=1592)	0.50	0.41	0.56	0.65
Children less than 7 (n=1303)	0.57	0.52	0.52	0.72

Married Women	All (n=1969)	Less than High School (n=1093)	High School (n=413)	Some College (n=459)
No children (n=209)	0.54	0.47	0.50	0.67
Children less than 7 (n=1089)	0.53	0.48	0.49	0.70

Unmarried Women	All (n=1824)	Less than High School (n=1059)	High School (n=293)	Some College (n=469)
No children (n=1383)	0.49	0.40	0.57	0.65
Children less than 7 (n=214)	0.74	0.71	0.72	0.85

Source: Own elaboration using data from the 1998 *Encuesta de Condiciones de Vida* for Ecuador.

Table 4.1.D. Brazil. Labor force participation by educational level and motherhood status.

All Women	All (n=80044)	Less than High School (n=55390)	High School (n=16173)	Some College (n=7896)
No children (n=35787)	0.45	0.34	0.64	0.74
Children less than 7 (n=22363)	0.45	0.38	0.56	0.79

Source: Own elaboration using data from the 1999 *Pesquisa Nacional para Amostra de Domicilios* for Brazil

Table 4.2.A. Bolivia. Labor force participation by age-groups and motherhood status.

All Women	14-25 (n=939)	26-35 (n=549)	36-45 (n=453)
No children (n=861)	0.25	0.72	0.84
Children less than 7 (n=658)	0.36	0.51	0.62

Married Women	14-25 (n=199)	26-35 (n=404)	36-45 (n=365)
No children (n=63)	0.22	0.69	1.00
Children less than 7 (n=567)	0.31	0.48	0.58

Unmarried Women	14-25 (n=740)	26-35 (n=145)	36-45 (n=88)
No children (n=798)	0.25	0.72	0.77
Children less than 7 (n=91)	0.58	0.73	0.95

Source: Own elaboration using data from the 1999 *Encuesta Continua de Hogares* for Bolivia

Table 4.2.B. Peru. Labor force participation by age-groups and motherhood status.

All Women	14-25 (n=1559)	26-35 (n=1041)	36-45 (n=822)
No children (n=2355)	0.36	0.66	0.64
Children less than 7 (n=939)	0.44	0.55	0.58

Married Women	14-25 (n=268)	26-35 (n=643)	36-45 (n=624)
No children (n=696)	0.35	0.60	0.59
Children less than 7 (n=736)	0.33	0.51	0.57

Unmarried Women	14-25 (n=1291)	26-35 (n=398)	36-45 (n=198)
No children (n=1659)	0.36	0.71	0.76
Children less than 7 (n=203)	0.63	0.73	0.74

Source: Own elaboration using data from the 2000 *Encuesta Nacional de Hogares* for Peru

Table 4.2.C. Ecuador. Labor force participation by age-groups and motherhood status.

All Women	14-25 (n=1704)	26-35 (n=1155)	36-45 (n=934)
No children (n=1592)	0.43	0.76	0.72
Children less than 7 (n=1303)	0.44	0.59	0.67

Married Women	14-25 (n=452)	26-35 (n=813)	36-45 (n=704)
No children (n=209)	0.43	0.61	0.67
Children less than 7 (n=1089)	0.39	0.56	0.64

Unmarried Women	14-25 (n=1252)	26-35 (n=342)	36-45 (n=230)
No children (n=1383)	0.43	0.82	0.77
Children less than 7 (n=214)	0.62	0.79	0.84

Source: Own elaboration using data from the 1998 *Encuesta de Condiciones de Vida* for Ecuador.

Table 4.2.D. Brazil. Labor force participation by age-groups and motherhood status.

All Women	14-25 (n=34,989)	26-35 (n=24,279)	36-45 (n=20,776)
No children (n=25,880)	0.36	0.71	0.67
Children less than 7 (n=7,203)	0.34	0.49	0.54

Source: Own elaboration using data from the 1999 *Pesquisa Nacional para Amostra de Domicilios* for Brazil

Table 4.3. Descriptive Statistics by Motherhood Status

	BOLIVIA			ECUADOR			PERU			BRAZIL		
	Non Mothers	Mothers 0-6	Mothers 0-18	Non-mothers	Mothers 0-6	Mothers 0-18	Non-mothers	Mothers 0-6	Mothers 0-18	Non-mothers	Mothers 0-6	Mothers 0-18
Number of children	0.000	1.284*	2.019*	0.000	1.343*	2.041*	0.000	1.172*	-	0.000	1.262*	1.844*
	(0.000)	(0.495)	(1.053)	(0.000)	(0.563)	(1.031)	(0.000)	(0.392)		(0.000)	(0.523)	(0.988)
Age (in years)	26.067	30.833*	33.857*	25.151	31.107*	33.333*	29.178	30.328	-	26.344	29.828*	33.466*
	(7.702)	(6.841)	(7.097)	(7.612)	(6.459)	(6.778)	(7.964)	(6.366)		(8.086)	(6.373)	(6.912)
Wage (in country's monetary unit)	5.621	7.598*	9.070*	5573.312	7064.528*	7734.721*	3.453	3.166	-	2.340	2.645*	2.819*
	(5.477)	(9.681)	(11.080)	(6221.57)	(6708.05)	(7719.772)	(3.087)	(2.851)		(3.295)	(3.892)	(4.023)
Years of education	11.085	11.088	11.610	11.273	11.449	11.389	12.485	11.581*	-	9.320	8.351*	8.169*
	(4.770)	(5.297)	(5.203)	(4.259)	(4.365)	(4.395)	(3.118)	(3.561)		(3.854)	(4.185)	(4.350)
Married (formal or informal union is equal to one)	0.134	0.647*	0.714*	0.155	0.728*	0.683*	0.260	0.651*	-	-	-	-
	(0.342)	(0.480)	(0.453)	(0.362)	(0.445)	(0.466)	(0.439)	(0.478)				
Potential Experience[2]	8.982	13.745*	16.248*	7.878	13.657*	15.944*	10.693	12.747*	-	11.025	15.477*	19.297*
	(7.707)	(8.221)	(8.081)	(7.088)	(7.316)	(7.738)	(8.167)	(6.973)		(8.538)	(7.130)	(7.939)
Tenure (in months)	3.757	4.922	6.807*	42.712	66.229*	80.827*	4.285	4.577	-	41.030	49.656*	60.750*
	(4.926)	(5.436)	(6.498)	(55.694)	(74.086)	(90.899)	(6.070)	(4.786)		(53.485)	(57.410)	(67.536)
Part-time (less than 35 hours of work per week)	0.140	0.108	0.143	0.038	0.053	0.047	0.243	0.296	-	-	-	-
	(0.348)	(0.312)	(0.351)	(0.192)	(0.225)	(0.493)	(0.429)	(0.458)				
Public (public is equal to one)	0.195	0.284	0.371*	0.115	0.254*	0.267*	0.319	0.446*	-	0.162	0.215*	0.241**
	(0.398)	(0.453)	(0.484)	(0.319)	(0.436)	(0.442)	(0.466)	(0.498)		(0.369)	(0.411)	(0.428)
Less than high school	0.354	0.314	0.300	0.407	0.426	0.417	0.148	0.280*	-	0.499	0.591*	0.596*
	(0.480)	(0.466)	(0.459)	(0.492)	(0.495)	(0.493)	(0.355)	(0.450)		(0.500)	(0.492)	(0.491)
High school	0.183	0.196	0.162	0.207	0.193	0.205	0.299	0.231	-	0.318	0.252*	0.243*
	(0.388)	(0.399)	(0.369)	(0.405)	(0.395)	(0.404)	(0.458)	(0.423)		(0.466)	(0.434)	(0.429)
Some college	0.463	0.490	0.538	0.386	0.381	0.378	0.554	0.489	-	0.182	0.157*	0.161*
	(0.500)	(0.502)	(0.500)	(0.487)	(0.486)	(0.485)	(0.498)	(0.501)		(0.386)	(0.363)	(0.367)
Ethnicity	0.415	0.392	0.414	0.132	0.074*	0.069*	0.025	0.048	-	0.631	0.667*	0.690*
	(0.494)	(0.491)	(0.494)	(0.339)	(0.261)	(0.254)	(0.157)	(0.215)		(0.482)	(0.471)	(0.463)
Head of household	0.122	0.127	0.162	0.101	0.114	0.172*	0.059	0.048	-	0.026	0.022*	0.020*
	(0.328)	(0.335)	(0.369)	(0.302)	(0.318)	(0.378)	(0.235)	(0.215)		(0.159)	(0.147)	(0.139)
<u>Occupations:</u>												
Occ1 – Professionals and technicians	0.213	0.314	0.381*	0.184	0.277*	0.277*	0.404	0.441	-	0.435	0.460	0.447*
	(0.411)	(0.466)	(0.487)	(0.387)	(0.448)	(0.448)	(0.491)	(0.498)		(0.496)	(0.498)	(0.497)
Occ2 – Directors and officials	0.012	0.049	0.062*	0.040	0.063	0.057	0.007	0.011	-	0.112	0.164*	0.223*
	(0.110)	(0.217)	(0.242)	(0.197)	(0.244)	(0.233)	(0.082)	(0.103)		(0.315)	(0.370)	(0.416)
Occ3 – Administrative personnel and intermediate level staff	0.213	0.216	0.176	0.228	0.160*	0.178	0.154	0.124	-	0.178	0.188*	0.194*
	(0.411)	(0.413)	(0.382)	(0.420)	(0.367)	(0.383)	(0.362)	(0.330)		(0.383)	(0.391)	(0.396)
Occ4 – Sales workers	0.165	0.088	0.081*	0.134	0.140	0.115*	0.138	0.086	-	0.045	0.058*	0.067*
	(0.372)	(0.285)	(0.273)	(0.341)	(0.347)	(0.319)	(0.345)	(0.281)		(0.208)	(0.234)	(0.250)

<u>Notes:</u> 1. Significance of two-sample t-test: (*) means significant at 95% confidence level. This two-sample t-test has the following null and alternative hypothesis: Ho: mean (given characteristic for mothers) – mean (given characteristic for non-mothers) = difference = 0; Ha: difference ~= 0; 2. Potential experience in Brazil is defined as (age – years of education – 7) and it is defined as (age – years of education – 6) for the other countries.

Table 4.3., *cont.* Descriptive Statistics by Motherhood Status

	BOLIVIA			ECUADOR			PERU			BRAZIL		
	Non Mothers	Mothers 0-6	Mothers 0-18	Non-Mothers	Mothers 0-6	Mothers 0-18	Non-mothers	Mothers 0-6	Mothers 0-18	Non-mothers	Mothers 0-6	Mothers 0-18
Occ5 – Service workers	0.348	0.255	0.224*	0.291	0.241	0.249	0.203	0.237	-	0.210	0.137*	0.134*
	(0.478)	(0.438)	(0.418)	(0.454)	(0.428)	(0.433)	(0.403)	(0.426)		(0.407)	(0.344)	(0.340)
Occ 6 – Agricultural	0.000	0.020	0.014	0.021	0.025	0.024	0.017	0.027	-	0.148	0.094*	0.078*
workers and related	(0.000)	(0.139)	(0.119)	(0.144)	(0.157)	(0.152)	(0.129)	(0.162)		(0.355)	(0.292)	(0.268)
Occ 7 – Not-agricultural	0.049	0.059	0.062	0.103	0.094	0.100	0.076	0.075	-	0.330	0.406*	0.419*
workers	(0.216)	(0.236)	(0.242)	(0.305)	(0.292)	(0.300)	(0.264)	(0.265)		(0.470)	(0.491)	(0.493)
Occ 8 – Army	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.000	-	0.004	0.016	0.013
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.041)	(0.000)		(0.062)	(0.126)	(0.115)
Industries:												
Ind 1 – Agriculture, Fishery	0.006	0.029	0.014	0.023	0.028	0.027	0.018	0.032	-	0.082	0.096*	0.091
and Hunting	(0.078)	(0.170)	(0.119)	(0.150)	(0.165)	(0.161)	(0.135)	(0.177)		(0.274)	(0.294)	(0.288)
Ind 2 – Mining	0.006	0.000	0.000	0.000	0.003	0.001	0.003	0.000	-	0.003	0.004	0.004
	(0.078)	(0.000)	(0.000)	(0.000)	(0.050)	(0.038)	(0.058)	(0.000)		(0.057)	(0.063)	(0.060)
Ind 3 - Manufacturing	0.122	0.137	0.119	0.099	0.114	0.113	0.104	0.070	-	0.004	0.016*	0.014
	(0.328)	(0.346)	(0.325)	(0.300)	(0.318)	(0.317)	(0.306)	(0.256)		(0.065)	(0.125)	(0.116)
Ind 4 – Electricity and	0.006	0.000	0.000	0.000	0.005	0.006	0.002	0.000	-	0.001	0.000	0.001
Water services	(0.078)	(0.000)	(0.000)	(0.000)	(0.071)	(0.077)	(0.041)	(0.000)		(0.030)	(0.019)	(0.023)
Ind 5 – Construction	0.006	0.000	0.005	0.011	0.005	0.006	0.012	0.000	-	0.106	0.117	0.110
	(0.078)	(0.000)	(0.069)	(0.107)	(0.071)	(0.077)	(0.108)	(0.000)		(0.308)	(0.322)	(0.313)
Ind 6 – Trade, hotels and	0.238	0.186	0.186	0.289	0.282	0.247	0.201	0.215	-	0.003	0.003*	0.003*
restaurants	(0.427)	(0.391)	(0.390)	(0.454)	(0.450)	(0.432)	(0.401)	(0.412)		(0.054)	(0.058)	(0.058)
Ind 7 – Transportation	0.018	0.020	0.019	0.031	0.020	0.024	0.037	0.011	-	0.005	0.004*	0.004*
	(0.134)	(0.139)	(0.137)	(0.172)	(0.141)	(0.152)	(0.189)	(0.103)		(0.069)	(0.060)	(0.061)
Ind 8 – Finance, Insurance,	0.079	0.108	0.090	0.088	0.051*	0.065	0.067	0.043	-	0.205	0.158	0.147*
and Real Estate	(0.271)	(0.312)	(0.288)	(0.283)	(0.220)	(0.246)	(0.250)	(0.203)		(0.404)	(0.365)	(0.354)
Ind 9 – Communal services	0.518	0.520	0.567	0.459	0.492	0.511	0.555	0.629	-	0.019	0.012*	0.013*
	(0.501)	(0.502)	(0.497)	(0.499)	(0.501)	(0.500)	(0.497)	(0.484)		(0.136)	(0.108)	(0.112)
Sample Size	164	102	210	523	394	679	596	186	-	13,405	7,902	15,201

Notes:

1. Significance of two-sample t-test: (*) means significant at 95% confidence level. This two-sample t-test has the following null and alternative hypothesis: Ho: mean (given characteristic for mothers) – mean (given characteristic for non-mothers) = difference = 0; Ha: difference ~= 0; 2. Potential experience in Brazil is defined as (age – years of education – 7) and it is defined as (age – years of education – 6) for the other countries.

Table 4.4. OLS regressions (dependent variable: natural logarithm of hourly wage)

	BOLIVIA			ECUADOR			PERU			BRAZIL		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
First Specification (equation 1)												
Mother of children less than 6 years old	-0.092 (0.089)	-0.069 (0.086)	-0.076 (0.085)	-0.056 (0.053)	-0.068 (0.052)	-0.074 (0.049)	-0.105* (0.060)	-0.114* (0.059)	-0.114** (0.056)	0.074** (0.008)	0.065** (0.008)	0.066** (0.007)
Mother of children between 7 and 12 years old	-0.076 (0.083)	-0.081 (0.081)	-0.117 (0.081)	0.058 (0.054)	0.047 (0.053)	0.067 (0.051)	-	-	-	0.028** (0.009)	0.022** (0.008)	0.026** (0.008)
Mother of children between 13 and 18 years old	0.231** (0.097)	0.181* (0.098)	0.177* (0.099)	0.031 (0.067)	0.027 (0.065)	0.020 (0.063)	-	-	-	0.003 (0.011)	-0.002 (0.010)	0.002 (0.010)
R-squared	0.439	0.480	0.518	0.418	0.437	0.495	0.413	0.463	0.532	0.557	0.603	0.649
Second Specification (equation 2)												
One child	0.013 (0.109)	0.045 (0.106)	0.025 (0.105)	0.067 (0.074)	0.055 (0.072)	0.011 (0.069)	-0.091 (0.061)	-0.111* (0.060)	-0.109* (0.057)	0.089** (0.009)	0.083** (0.009)	0.080** (0.008)
Two or more children	-0.025 (0.103)	-0.43 (0.100)	-0.078 (0.104)	0.026 (0.069)	0.011 (0.067)	0.023 (0.066)	-0.183 (0.151)	-0.131 (0.144)	-0.142 (0.122)	0.087** (0.010)	0.079** (0.009)	0.081** (0.009)
R-squared	0.428	0.474	0.513	0.417	0.436	0.494	0.414	0.463	0.532	0.558	0.604	0.649
Third Specification (equation 3)												
Number of children less than 6 years old	-0.080 (0.056)	-0.074 (0.056)	-0.073 (0.056)	-0.039 (0.035)	-0.042 (0.034)	-0.041 (0.034)	-0.086 (0.052)	-0.082 (0.051)	-0.085* (0.046)	0.048** (0.006)	0.042** (0.006)	0.044** (0.005)
Number of children between 7 and 12 years old	-0.021 (0.054)	-0.028 (0.054)	-0.043 (0.057)	0.007 (0.035)	0.001 (0.035)	0.016 (0.036)	-	-	-	0.010 (0.006)	0.008 (0.006)	0.011 (0.006)
Number of children between 13 and 18 years old	0.122** (0.055)	0.101* (0.056)	0.090 (0.058)	-0.019 (0.044)	-0.022 (0.044)	-0.021 (0.042)	-	-	-	-0.001 (0.006)	-0.003 (0.006)	0.001 (0.006)
R-squared	0.439	0.481	0.517	0.417	0.437	0.495	0.413	0.463	0.531	0.557	0.603	0.649
Sample Size	374	374	374	1202	1202	1202	782	782	782	28,606	28,606	28,606

Notes:

1. Rows 1 to 3 show the coefficients of the first specification, rows 4 and 5 show the second specification and rows 6 to 8 show the third one.
2. Model 1 controls for age, age squared, years of education, years of education squared, marital status, tenure, tenure squared, head of household status, and ethnicity. Model 2 adds part-time status and public. Model 3 adds occupation and industry indicator variables.
3. The variables one child and two or more children are calculated for children aged less than 18 years old. For Peru, this variable means having one child less than 6 years old or two or more children less than 6 years old. This is because children 6 years old or older cannot be identified.
4. * means that the coefficient is statistically significant at a 10% level. ** at 5%.

Table 4.5. OLS regressions by age-groups (dependent variable: natural logarithm of hourly wage)

	BOLIVIA			ECUADOR			PERU			BRAZIL		
	14-25	26-35	36-45	14-25	26-35	36-45	14-25	26-35	36-45	14-25	26-35	36-45
First Specification (equation 1)												
Mother of children less than 6 years old	-0.448*	-0.068	0.108	-0.058	0.011	-0.111	-0.023	-0.205*	-0.087	0.076**	0.068**	0.023
	(0.242)	(0.128)	(0.194)	(0.140)	(0.072)	(0.079)	(0.115)	(0.078)	(0.118)	(0.013)	(0.011)	(0.016)
Mother of children between 7 and 12 years old	0.172	-0.180	-0.077	-0.064	-0.073	0.261**	-	-	-	0.031	0.047**	0.018
	(0.239)	(0.145)	(0.131)	(0.341)	(0.075)	(0.079)				(0.034)	(0.012)	(0.013)
Mother of children between 13 and 18 years old	-	0.104	0.178	-	0.073	-0.106	-	-	-	-0.202*	-0.001	0.015
		(0.205)	(0.132)		(0.111)	(0.079)				(0.106)	(0.017)	(0.012)
R-squared	0.531	0.535	0.616	0.421	0.433	0.547	0.487	0.583	0.582	0.573	0.545	0.583
Second Specification (equation 2)												
One child	-0.401	0.025	0.207	-0.098	-0.041	0.301	0.005	-0.188**	-0.057	0.071**	0.088**	0.061**
	(0.292)	(0.172)	(0.216)	(0.153)	(0.098)	(0.133)	(0.122)	(0.076)	(0.133)	(0.014)	(0.013)	(0.017)
Two or more children	-0.282	-0.110	0.071	0.044	-0.051	0.227	-0.234	-0.325	-0.204	0.111**	0.102**	0.055**
	(0.374)	(0.153)	(0.167)	(0.153)	(0.089)	(0.124)	(0.228)	(0.208)	(0.151)	(0.022)	(0.013)	(0.015)
R-squared	0.521	0.530	0.613	0.422	0.432	0.542	0.489	0.584	0.583	0.573	0.545	0.583
Third Specification (equation 3)												
Number of children less than 6 years old	-0.278**	-0.075	0.049	-0.007	-0.021	-0.072	-0.053	-0.176**	-0.071	0.054**	0.042**	0.013
	(0.137)	(0.091)	(0.115)	(0.075)	(0.050)	(0.056)	(0.091)	(0.070)	(0.076)	(0.009)	(0.008)	(0.012)
Number of children between 7 and 12 years old	0.341	-0.052	-0.039	-0.074	-0.074	0.136	-	-	-	0.017	0.027**	0.003
	(0.245)	(0.089)	(0.102)	(0.338)	(0.054)	(0.057)				(0.027)	(0.008)	(0.008)
Number of children between 13 and 18 years old	-	0.083	0.101	-	0.044	-0.040	-	-	-	-0.186*	-0.005	0.008
		(0.153)	(0.069)		(0.080)	(0.052)				(0.107)	(0.012)	(0.008)
R-squared	0.526	0.533	0.616	0.421	0.435	0.542	0.487	0.584	0.583	0.573	0.545	0.583
Sample size	121	141	112	414	442	346	293	293	196	9,754	10,190	8,662

Notes:
1. Rows 1 to 3 show the coefficients of the first specification, rows 4 and 5 show the second specification and rows 6 to 8 show the third one.
2. This table contains the results from Model 3 that controls for age, age squared, years of education, years of education squared, marital status, tenure, tenure squared, head of household status, ethnicity, part-time status, public, occupation and industry indicators.
3. * means that the coefficient is statistically significant at a 10% level. ** at 5%.

Table 4.6. By level of education (dependent variable: female workers' natural log of hourly wage)

	BOLIVIA		ECUADOR		PERU		BRAZIL	
	Less than High School	High School or more	Less than High School	High School or more	Less than High School	High School or more	Less than High School	High School or more
First Specification (equation 1)								
Mother of children less than 6 years old	0.107	-0.109	-0.164**	-0.003	-0.005	-0.117*	0.045**	0.072**
	(0.161)	(0.100)	(0.076)	(0.065)	(0.128)	(0.062)	(0.009)	(0.012)
Mother of children between 7 and 12 years old	-0.251	-0.081	0.165**	0.014	-	-	0.009	0.035**
	(0.180)	(0.098)	(0.080)	(0.066)			(0.010)	(0.013)
Mother of children between 13 and 18 years old	0.143	0.235**	0.040	0.013	-	-	0.005	-0.007
	(0.201)	(0.108)	(0.092)	(0.084)			(0.012)	(0.017)
R-squared	0.380	0.433	0.227	0.385	0.422	0.436	0.509	0.552
Second Specification (equation 2)								
One child	0.201	-0.007	-0.093	0.056	0.011	-0.113*	0.073**	0.070**
	(0.213)	(0.121)	(0.105)	(0.089)	(0.137)	(0.061)	(0.011)	(0.013)
Two or more children	-0.055	-0.035	0.022	0.036	-0.088	-0.137	0.066**	0.068**
	(0.236)	(0.111)	(0.100)	(0.087)	(0.212)	(0.152)	(0.011)	(0.014)
R-squared	0.380	0.418	0.217	0.385	0.423	0.436	0.418	0.552
Third Specification (equation 3)								
Number of children less than 6 years old	-0.020	-0.077	-0.051	0.048	-0.019	-0.085	0.029**	0.051**
	(0.103)	(0.065)	(0.050)	(0.045)	(0.095)	(0.054)	(0.006)	(0.009)
Number of children between 7 and 12 years old	-0.198	-0.014	0.166**	0.013	-	-	-0.001	0.025**
	(0.115)	(0.067)	(0.046)	(0.049)			(0.006)	(0.009)
Number of children between 13 and 18 years old	0.069	0.102	0.042	0.036	-	-	-0.003	0.008
	(0.088)	(0.069)	(0.055)	(0.049)			(0.007)	(0.012)
R-squared	0.388	0.428	0.174	0.369	0.422	0.436	0.417	0.552
Sample size	121	253	496	706	141	641	15,754	12,852

Notes:
1. Rows 1 to 3 show the coefficients of the first specification, rows 4 and 5 show the second specification and rows 6 to 8 show the third one.
2. This table contains the results from Model 3 that controls for age, age squared, years of education, years of education squared, marital status, tenure, tenure squared, head of household status, ethnicity, part-time status, public, occupation and industry indicators.
3. * means that the coefficient is statistically significant at a 10% level. ** at 5%.

Table 4.7. By public or private institution (dependent variable: female workers' natural log of hourly wage)

	BOLIVIA		ECUADOR		PERU		BRAZIL	
	Public	Private	Public	Private	Public	Private	Public	Private
First Specification (equation 1)								
Mother of children less than 6	-0.063	-0.122	-0.053	-0.071	-0.110	-0.115	0.041**	0.073**
years old	(0.108)	(0.117)	(0.083)	(0.060)	(0.074)	(0.080)	(0.015)	(0.008)
Mother of children between 7	-0.156	-0.051	0.103	0.051	-	-	0.030**	0.021**
and 12 years old	(0.113)	(0.115)	(0.082)	(0.063)			(0.015)	(0.009)
Mother of children between 13	0.264	0.219	-0.076	0.074	-	-	-0.028	0.006
and 18 years old	(0.104)	(0.153)	(0.094)	(0.083)			(0.018)	(0.011)
R-squared	0.451	0.451	0.317	0.447	0.451	0.488	0.584	0.598
Second Specification (equation 2)								
One child	-0.076	0.053	-0.041	0.012	-0.139*	-0.073	0.054**	0.087**
	(0.161)	(0.136)	(0.132)	(0.082)	(0.079)	(0.082)	(0.019)	(0.009)
Two or more children	-0.042	-0.046	0.001	0.027	0.070	-0.330*	0.039**	0.087**
	(0.144)	(0.138)	(0.114)	(0.081)	(0.105)	(0.187)	(0.017)	(0.010)
R-squared	0.408	0.470	0.311	0.445	0.454	0.488	0.584	0.598
Third Specification (equation 3)								
Number of children less than 6	-0.031	-0.110	-0.016	-0.048	-0.043	-0.121*	0.025**	0.048**
years old	(0.071)	(0.073)	(0.061)	(0.040)	(0.054)	(0.067)	(0.011)	(0.006)
Number of children between 7	-0.122*	0.045	0.035	0.007	-	-	0.017**	0.006
and 12 years old	(0.066)	(0.090)	(0.065)	(0.042)			(0.010)	(0.006)
Number of children between 13	0.143**	0.116	-0.079	0.009	-	-	-0.017	0.001
and 18 years old	(0.061)	(0.097)	(0.064)	(0.054)			(0.011)	(0.007)
R-squared	0.447	0.479	0.316	0.446	0.447	0.488	0.584	0.597
Sample size	110	264	241	961	273	509	5,834	22,772

Notes:
1. Rows 1 to 3 show the coefficients of the first specification, rows 4 and 5 show the second specification and rows 6 to 8 show the third one.
2. This table contains the results from Model 3 that controls for age, age squared, years of education, years of education squared, marital status, tenure, tenure squared, head of household status, ethnicity, part-time status, public, occupation and industry indicators.
3. * means that the coefficient is statistically significant at a 10% level. ** at 5%.

APPENDIX A

Sample Restrictions for Chapter 2

The data set used in Chapter 2 follows the same criteria used in Krueger (1993). Therefore, this Appendix will explain the same features that Krueger explains in his Appendix about the CPS data sets, and will also discuss some changes due to the use of three more years (1993, 1997 and 2001).

The data set used in Table I are from all rotation groups of the October 1984, 1989, 1993, 1997 and 2001 CPS. The CPS data used in the OLS regressions are limited to the outgoing groups because only the individuals in these groups were asked about weekly wages. The sample is restricted to individuals 18 to 65 years old who were working at the moment of the survey or who had a job but they have not been at work. The variable representing *usual hours of work* was constructed as the ratio between the usual weekly earnings and usual weekly hours. Individuals who earned more than $1.50 per hour or more than $250 per hour are deleted from the sample.

The weekly wage variable in the 1984 CPS is top coded at $999, whereas the weekly wage in 1989, 1993, 1997 and 2001 is top coded at $1,923. To make the wage variables comparable over time, I calculated an estimate of the mean log hourly wage for individuals who were topcoded in 1984 as follows. I first converted the wage data in the October 1989, 1993, 1997 and 2001 CPS into 1984 dollars using the GNP deflator. Using the deflated values, I then calculated the mean log-hourly wage rate for individuals whose weekly earnings were equal or more than $999. Since I had the means for the three years ($3.27 for 1989, $3.52 for 1993, $3.61 for 1997 and $3.45 for 2001), the next step was calculating an average of the mean for these four years. This figure ($3.46) was assigned to each individual that was topcoded in the 1984 CPS.

The *uses computer at work* dummy equals one if the employee *directly* uses a computer at work (item 48). The computer may be a personal computer, minicomputer, or mainframe computer. The *uses a computer at home* dummy equals one if the individual *directly* uses a computer at home (item 53). The *married* dummy variable equals one if the worker is currently married. The *part-time* dummy variable equals one if the worker usually works less than 35 hours a week. *Potential experience* is age minus education minus 6.

APPENDIX B

The effect of Computer-use on Pay for Men and Women separately using the October CPS

Table B.1. OLS Regression Estimates of the Effect of Computer-use on Pay for Women for 1984, 1989 and 1993.
Dependent variable: ln (hourly wage)

	1984			1989			1993		
Independent variable	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Uses computer at work (yes=1)	0.299	0.185	0.183	0.337	0.205	0.201	0.219	0.121	0.118
	(0.013)	(0.012)	(0.012)	(0.012)	(0.011)	(0.011)	(0.010)	(0.009)	(0.009)
Years of education		0.082	0.082		0.086	0.087		0.095	0.096
		(0.002)	(0.002)		(0.002)	(0.002)		(0.002)	(0.002)
Experience		0.021	0.020		0.022	0.022		0.023	0.023
		(0.001)	(0.001)		(0.002)	(0.002)		(0.002)	(0.002)
Experience Squared / 100		-0.032	-0.031		-0.037	-0.036		-0.038	-0.039
		(0.003)	(0.003)		(0.003)	(0.003)		(0.003)	(0.003)
Black (yes=1)		-0.057	-0.061		-0.079	-0.084		-0.044	-0.050
		(0.017)	(0.017)		(0.017)	(0.017)		(0.017)	(0.017)
Other race (yes=1)		0.004	0.000		0.021	0.014		0.033	0.029
		(0.028)	(0.028)		(0.028)	(0.028)		(0.027)	(0.027)
Part-time (yes=1)		-0.218	-0.216		-0.162	-0.161		-0.172	-0.166
		(0.012)	(0.012)		(0.013)	(0.013)		(0.013)	(0.013)
SMSA (yes=1)		0.078	0.079		0.115	0.110		0.090	0.088
		(0.015)	(0.014)		(0.036)	(0.036)		(0.039)	(0.039)
Veteran (yes=1)		-0.109	-0.104		-0.057	-0.073		0.037	0.023
		(0.201)	(0.2)		(0.051)	(0.051)		(0.051)	(0.051)
Married (yes=1)		0.009	0.014		0.015	0.017		0.026	0.029
		(0.011)	(0.011)		(0.011)	(0.011)		(0.011)	(0.011)
Union member		0.211	0.213		0.222	0.232		0.163	0.181
		(0.015)	(0.016)		(0.016)	(0.016_		(0.016)	(0.017)
One-digit occupation indicators (yes=included)	NO	NO	YES	NO	NO	YES	NO	NO	YES
Intercept	2.147	0.868	0.867	2.152	0.739	0.729	2.207	0.678	0.656
	(0.007)	(0.036)	(0.037)	(0.008)	(0.049)	(0.049)	(0.008)	(0.052)	(0.053)
R^2	0.08	0.33	0.34	0.10	0.35	0.35	0.07	0.33	0.34

Source: October CPS (Education and School Enrollment Supplement).
Note:
1. The sample considers only workers 18 and 65 years old.
2. Standard errors are between parentheses.
3. Sample sizes are 6,263 for 1984, 6,518 for 1989, 6,494 for 1993, 5,770 for 1997 and 6,728 for 2001.

Table B.1., cont. OLS Regression Estimates of the Effect of Computer-use on Pay for Women for 1997 and 2001.
Dependent variable: ln (hourly wage)

	1997			2001		
Independent variable	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Intercept	2.109	0.839	0.989	2.286	0.877	1.004
	(0.01)	(0.119)	(0.125)	(0.01)	(0.037)	(0.04)
Uses computer at work (yes=1)	0.365	0.196	0.195	0.381	0.191	0.149
	(0.013)	(0.013)	(0.012)	(0.013)	(0.012)	(0.013)
Years of education		0.093	0.094		0.088	0.083
		(0.003)	(0.003)		(0.002)	(0.003)
Experience		0.026	0.025		0.018	0.019
		(0.002)	(0.002)		(0.002)	(0.002)
Experience Squared / 100		-0.043	-0.043		-0.029	-0.030
		(0.003)	(0.004)		(0.004)	(0.004)
Black (yes=1)		-0.060	-0.063		-0.029	-0.023
		(0.018)	(0.018)		(0.018)	(0.017)
Other race (yes=1)		0.062	0.057		-0.004	0.005
		(0.027)	(0.027)		(0.023)	(0.023)
Part-time (yes=1)		-0.158	-0.155		-0.165	-0.158
		(0.014)	(0.014)		(0.014)	(0.014)
SMSA (yes=1)		-0.156	-0.151		0.167	0.163
		(0.112)	(0.111)		(0.013)	(0.013)
Veteran (yes=1)		0.102	0.079		0.012	0.020
		(0.055)	(0.055)		(0.048)	(0.048)
Married (yes=1)		0.043	0.045		0.039	0.035
		(0.012)	(0.012)		(0.012)	(0.011)
Union member		0.142	0.158		0.105	0.106
		(0.018)	(0.019)		(0.016)	(0.016)
One-digit occupation indicators (yes=included)	NO	NO	YES	NO	NO	YES
R^2	0.11	0.34	0.35	0.12	0.33	0.34

Source: October CPS (Education and School Enrollment Supplement).
Note:
1. The sample considers only workers 18 and 65 years old.
2. Standard errors are between parentheses.
3. Sample sizes are 6,263 for 1984, 6,518 for 1989, 6,494 for 1993, 5,770 for 1997 and 6,728 for 2001.

Table B.2. OLS Regression Estimates of the Effect of Computer-use on Pay for Men for 1984, 1989 and 1993
Dependent variable: ln (hourly wage)

	1984			1989			1993		
Independent variable	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Intercept	2.147	0.868	0.867	2.152	0.739	0.729	2.207	0.678	0.656
	(0.007)	(0.036)	(0.037)	(0.008)	(0.049)	(0.049)	(0.008)	(0.052)	(0.053)
Uses computer at work (yes=1)	0.299	0.185	0.183	0.337	0.205	0.201	0.219	0.121	0.118
	(0.013)	(0.012)	(0.012)	(0.012)	(0.011)	(0.011)	(0.010)	(0.009)	(0.009)
Years of education		0.082	0.082		0.086	0.087		0.095	0.096
		(0.002)	(0.002)		(0.002)	(0.002)		(0.002)	(0.002)
Experience		0.021	0.020		0.022	0.022		0.023	0.023
		(0.001)	(0.001)		(0.002)	(0.002)		(0.002)	(0.002)
Experience Squared / 100		-0.032	-0.031		-0.037	-0.036		-0.038	-0.039
		(0.003)	(0.003)		(0.003)	(0.003)		(0.003)	(0.003)
Black (yes=1)		-0.057	-0.061		-0.079	-0.084		-0.044	-0.050
		(0.017)	(0.017)		(0.017)	(0.017)		(0.017)	(0.017)
Other race (yes=1)		0.004	0.000		0.021	0.014		0.033	0.029
		(0.028)	(0.028)		(0.028)	(0.028)		(0.027)	(0.027)
Part-time (yes=1)		-0.218	-0.216		-0.162	-0.161		-0.172	-0.166
		(0.012)	(0.012)		(0.013)	(0.013)		(0.013)	(0.013)
SMSA (yes=1)		0.078	0.079		0.115	0.110		0.090	0.088
		(0.015)	(0.014)		(0.036)	(0.036)		(0.039)	(0.039)
Veteran (yes=1)		-0.109	-0.104		-0.057	-0.073		0.037	0.023
		(0.201)	(0.2)		(0.051)	(0.051)		(0.051)	(0.051)
Married (yes=1)		0.009	0.014		0.015	0.017		0.026	0.029
		(0.011)	(0.011)		(0.011)	(0.011)		(0.011)	(0.011)
Union member		0.211	0.213		0.222	0.232		0.163	0.181
		(0.015)	(0.016)		(0.016)	(0.016_		(0.016)	(0.017)
One-digit occupation indicators (yes=included)	NO	NO	YES	NO	NO	YES	NO	NO	YES
R^2	0.08	0.33	0.34	0.10	0.35	0.35	0.07	0.33	0.34

Source: October CPS (Education and School Enrollment Supplement).
Note:
1. The sample considers only workers 18 and 65 years old.
2. Standard errors are between parentheses.
3. Sample sizes are 6,263 for 1984, 6,518 for 1989, 6,494 for 1993, 5,770 for 1997 and 6,984 for 2001.

Table B.2., cont. OLS Regression Estimates of the Effect of Computer-use on Pay for Men for 1997 and 2001
Dependent variable: ln (hourly wage)

	1997			2001		
Independent variable	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Intercept	2.364	1.059	1.086	2.538	1.225	1.389
	(0.010)	(0.149)	(0.152)	(0.009)	(0.035)	(0.041)
Uses computer at work (yes=1)	0.420	0.206	0.208	0.433	0.190	0.153
	(0.014)	(0.014)	(0.013)	(0.013)	(0.013)	(0.013)
Years of education		0.075	0.079		0.076	0.070
		(0.003)	(0.003)		(0.002)	(0.003)
Experience		0.030	0.030		0.024	0.024
		(0.002)	(0.002)		(0.002)	(0.002)
Experience Squared / 100		-0.046	-0.045		-0.039	-0.038
		(0.004)	(0.004)		(0.004)	(0.004)
Black (yes=1)		-0.180	-0.173		-0.156	-0.142
		(0.022)	(0.021)		(0.021)	(0.021)
Other race (yes=1)		-0.038	-0.039		-0.046	-0.034
		(0.028)	(0.028)		(0.024)	(0.024)
Part-time (yes=1)		-0.261	-0.250		-0.253	-0.224
		(0.024)	(0.024)		(0.024)	(0.024)
SMSA (yes=1)		0.011	-0.009		0.124	0.118
		(0.143)	(0.143)		(0.013)	(0.013)
Veteran (yes=1)		-0.040	-0.044		-0.006	-0.003
		(0.016)	(0.016)		(0.015)	(0.015)
Married (yes=1)		0.119	0.119		0.114	0.105
		(0.013)	(0.013)		(0.013)	(0.012)
Union member		0.180	0.195		0.113	0.122
		(0.016)	(0.017)		(0.015)	(0.015)
One-digit occupation indicators (yes=included)	NO	NO	YES	NO	NO	YES
R^2	0.13	0.37	0.38	0.14	0.35	0.37

Source: October CPS (Education and School Enrollment Supplement).
Note:
1. The sample considers only workers 18 and 65 years old.
2. Standard errors are between parentheses.
3. Sample sizes are 6263 for 1984, 6518 for 1989, 6494 for 1993, 5770 for 1997 and 6,984 for 2001.

APPENDIX C

Percentage of workers which use a computer at work, by industry

Table C.1. Percentage of workers which use a computer at work, by industry, year 1984

Industry	Percentage Female	Standard error	n	Percentage Male	Standard error	n	Two-sample test	Probability value
Agriculture service	0.153	0.043	72	0.049	0.014	243	2.995	0.003
Other agriculture	0.042	0.011	332	0.040	0.005	1386	0.146	0.884
Mining	0.697	0.049	89	0.195	0.016	591	10.892	0.000
Construction	0.253	0.023	359	0.052	0.004	3789	14.721	0.000
Lumber and wood products, except furniture	0.197	0.048	71	0.050	0.011	402	4.520	0.000
Furniture and fixtures	0.128	0.036	86	0.080	0.019	213	1.291	0.198
Stone clay, glass, and concrete product	0.258	0.047	89	0.104	0.018	279	3.700	0.000
Primary metals	0.371	0.058	70	0.173	0.018	423	3.898	0.000
Fabricated metal	0.257	0.032	191	0.144	0.015	582	3.590	0.000
Machinery, except electrical	0.500	0.026	362	0.399	0.015	1109	3.371	0.001
Electrical machinery, equipment, and supplies	0.302	0.019	593	0.416	0.018	724	-4.299	0.000
Motor vehicles and equipment	0.219	0.037	128	0.237	0.018	590	-0.449	0.654
Aircraft and parts	0.613	0.057	75	0.415	0.030	277	3.089	0.002
Other transportation equipment	0.516	0.063	64	0.307	0.025	342	3.268	0.001
Professional and photographic equipment,	0.368	0.039	152	0.443	0.033	221	-1.446	0.149
Toys, amusements, and sporting goods	0.206	0.070	34	0.176	0.066	34	0.304	0.762
Miscellaneous and not specified manufacturing	0.167	0.037	102	0.157	0.034	115	0.202	0.840
Food and kindred products	0.204	0.023	318	0.121	0.012	703	3.507	0.001
Tobacco manufactures	0.000	0.000	15	0.364	0.152	11	-2.813	0.010
Textile mill products	0.114	0.022	210	0.148	0.025	210	-1.011	0.312
Apparel and other finished textile products	0.058	0.010	502	0.102	0.029	108	-1.680	0.094
Paper and allied products	0.239	0.046	88	0.179	0.024	263	1.230	0.219
Printing, publishing and allied industries	0.369	0.023	425	0.247	0.018	572	4.226	0.000
Chemicals and allied products	0.524	0.035	208	0.306	0.021	471	5.537	0.000
Petroleum and coal products	0.588	0.123	17	0.398	0.044	123	1.487	0.139
Rubber and miscellaneous plastics products	0.201	0.034	144	0.220	0.025	282	-0.439	0.661
Leather and leather products	0.069	0.027	87	0.182	0.052	55	-2.089	0.039
Transportation	0.409	0.020	591	0.132	0.007	2075	15.782	0.000
Communications	0.715	0.022	410	0.401	0.022	509	9.982	0.000
Utilities and sanitary services	0.623	0.038	162	0.228	0.016	720	10.519	0.000
Wholesale trade	0.401	0.018	705	0.241	0.010	1786	8.092	0.000
Retail trade	0.142	0.005	5324	0.154	0.005	4563	-1.660	0.097
Banking and other finance	0.732	0.013	1201	0.625	0.019	630	4.729	0.000
Insurance and real estate	0.526	0.015	1128	0.361	0.015	974	7.653	0.000
Private household services	0.010	0.004	510	0.014	0.014	74	-0.295	0.768
Business services	0.360	0.015	1062	0.345	0.015	1022	0.683	0.495
Automobile and repair services	0.212	0.035	137	0.062	0.008	867	6.000	0.000
Personal services, except private household	0.075	0.007	1272	0.093	0.012	578	-1.373	0.170
Entertainment and recreation services	0.181	0.023	282	0.093	0.014	454	3.532	0.000
Hospitals	0.335	0.011	1919	0.278	0.019	571	2.544	0.011
Health services, except hospitals	0.126	0.008	1658	0.158	0.017	469	-1.787	0.074
Educational services	0.307	0.008	3348	0.322	0.011	1900	-1.108	0.268
Social services	0.106	0.011	733	0.146	0.026	185	-1.510	0.131
Other professional services	0.408	0.016	966	0.336	0.014	1124	3.388	0.001
Forestry and fisheries	0.531	0.090	32	0.237	0.044	93	3.205	0.002
Justice, public order and safety	0.392	0.030	263	0.263	0.016	719	3.936	0.000
Administration of human resource programs	0.498	0.032	241	0.444	0.043	133	1.005	0.315
National security and internal affairs	0.515	0.039	169	0.341	0.026	337	3.806	0.000
Other public administration	0.521	0.022	509	0.357	0.019	607	5.550	0.000

Source: October CPS (Education and School Enrollment Supplement). Notes: (1) Female sample has no observations

Table C.2. Percentage of workers which use a computer at work, by industry, year 1989

Industry	Percentage Female	Standard error	n	Percentage Male	Standard error	n	Two-sample test	Probability value
Agriculture service	0.340	0.040	144	0.113	0.017	328	6.112	0.000
Other agriculture	0.077	0.015	298	0.061	0.007	1064	0.998	0.318
Mining	0.684	0.054	76	0.256	0.022	387	7.724	0.000
Construction	0.458	0.025	404	0.091	0.005	3906	22.375	0.000
Lumber and wood products, except furniture	0.155	0.043	71	0.086	0.014	382	1.793	0.074
Furniture and fixtures	0.266	0.043	109	0.127	0.021	245	3.269	0.001
Stone clay, glass, and concrete product	0.350	0.054	80	0.206	0.024	287	2.706	0.007
Primary metals	0.476	0.063	63	0.258	0.023	357	3.567	0.000
Fabricated metal	0.391	0.039	156	0.252	0.019	508	3.391	0.001
Machinery, except electrical	0.643	0.026	333	0.469	0.015	1043	5.582	0.000
Electrical machinery, equipment, and supplies	0.414	0.023	449	0.554	0.020	610	-4.538	0.000
Motor vehicles and equipment	0.397	0.042	136	0.316	0.021	491	1.783	0.075
Aircraft and parts	0.578	0.062	64	0.578	0.034	211	-0.001	0.999
Other transportation equipment	0.667	0.049	93	0.436	0.027	328	3.993	0.000
Professional and photographic equipment,	0.543	0.039	164	0.622	0.031	241	-1.603	0.110
Toys, amusements, and sporting goods	0.281	0.081	32	0.216	0.069	37	0.618	0.539
Miscellaneous and not specified manufacturing	0.240	0.044	96	0.189	0.035	127	0.915	0.361
Food and kindred products	0.222	0.022	343	0.194	0.015	659	1.019	0.308
Tobacco manufactures	0.600	0.163	10	0.316	0.110	19	1.482	0.150
Textile mill products	0.219	0.029	210	0.209	0.029	201	0.249	0.804
Apparel and other finished textile products	0.087	0.013	459	0.197	0.034	137	-3.608	0.000
Paper and allied products	0.413	0.052	92	0.337	0.027	306	1.344	0.180
Printing, publishing and allied industries	0.518	0.024	419	0.382	0.020	568	4.285	0.000
Chemicals and allied products	0.613	0.034	204	0.532	0.022	496	1.950	0.052
Petroleum and coal products	0.688	0.120	16	0.447	0.057	76	1.757	0.082
Rubber and miscellaneous plastics products	0.318	0.038	148	0.271	0.028	258	0.989	0.323
Leather and leather products	0.204	0.055	54	0.167	0.069	30	0.410	0.683
Transportation	0.489	0.019	689	0.212	0.009	1999	14.444	0.000
Communications	0.842	0.019	361	0.631	0.023	447	6.872	0.000
Utilities and sanitary services	0.776	0.032	170	0.348	0.018	675	10.722	0.000
Wholesale trade	0.571	0.018	769	0.357	0.011	1800	10.243	0.000
Retail trade	0.246	0.006	5156	0.250	0.006	4550	-0.479	0.632
Banking and other finance	0.847	0.010	1270	0.738	0.017	650	5.802	0.000
Insurance and real estate	0.726	0.012	1328	0.535	0.016	1004	9.726	0.000
Private household services	0.009	0.005	350	0.039	0.027	51	-1.846	0.066
Business services	0.509	0.014	1356	0.493	0.014	1328	0.809	0.418
Automobile and repair services	0.335	0.035	179	0.123	0.011	921	7.311	0.000
Personal services, except private household	0.131	0.009	1264	0.171	0.016	555	-2.282	0.023
Entertainment and recreation services	0.258	0.026	291	0.221	0.020	417	1.144	0.253
Hospitals	0.549	0.011	2060	0.416	0.021	565	5.642	0.000
Health services, except hospitals	0.286	0.010	1982	0.325	0.021	486	-1.693	0.091
Educational services	0.458	0.008	3746	0.474	0.012	1748	-1.080	0.280
Social services	0.213	0.013	979	0.301	0.030	236	-2.868	0.004
Other professional services	0.636	0.014	1202	0.537	0.014	1256	5.005	0.000
Forestry and fisheries	0.647	0.119	17	0.371	0.049	97	2.157	0.033
Justice, public order and safety	0.606	0.027	327	0.452	0.018	732	4.653	0.000
Administration of human resource programs	0.729	0.028	258	0.648	0.043	122	1.617	0.107
National security and internal affairs	0.813	0.029	182	0.670	0.026	324	3.488	0.001
Other public administration	0.773	0.017	595	0.596	0.021	565	6.601	0.000

Source: October CPS (Education and School Enrollment Supplement).
Notes: (1) Female sample has no observations

Table C.3. Percentage of workers which use a computer at work, by industry, year 1993

Industry	Percentage Female	Standard error	n	Percentage Male	Standard error	n	Two-sample test	Probability value
Agriculture service	0.417	0.044	127	0.115	0.018	321	7.629	0.000
Other agriculture	0.226	0.028	226	0.116	0.011	923	4.325	0.000
Mining	0.889	0.043	54	0.381	0.026	360	7.445	0.000
Construction	0.612	0.027	335	0.121	0.006	3454	24.936	0.000
Lumber and wood products, except furniture	0.329	0.054	76	0.102	0.016	371	5.320	0.000
Furniture and fixtures	0.371	0.051	89	0.207	0.025	256	3.110	0.002
Stone clay, glass, and concrete product	0.333	0.058	66	0.291	0.031	213	0.652	0.515
Primary metals	0.531	0.072	49	0.326	0.028	273	2.777	0.006
Fabricated metal	0.461	0.041	152	0.311	0.021	469	3.382	0.001
Machinery, except electrical	0.506	0.027	350	0.657	0.022	478	-4.421	0.000
Electrical machinery, equipment, and supplies	0.441	0.040	152	0.403	0.023	447	0.824	0.411
Motor vehicles and equipment	0.700	0.073	40	0.670	0.035	179	0.360	0.719
Aircraft and parts	0.758	0.055	62	0.580	0.033	231	2.581	0.010
Other transportation equipment	0.628	0.040	145	0.665	0.033	209	-0.726	0.469
Professional and photographic equipment,	0.289	0.075	38	0.406	0.088	32	-1.018	0.312
Toys, amusements, and sporting goods	0.319	0.048	94	0.259	0.038	135	0.987	0.325
Miscellaneous and not specified manufacturing	0.313	0.027	294	0.282	0.018	620	0.952	0.341
Food and kindred products	0.444	0.176	9	0.600	0.112	20	-0.760	0.454
Tobacco manufactures	0.240	0.032	175	0.302	0.032	212	-1.359	0.175
Textile mill products	0.137	0.019	344	0.215	0.035	135	-2.113	0.035
Apparel and other finished textile products	0.628	0.050	94	0.444	0.030	277	3.109	0.002
Paper and allied products	0.610	0.025	372	0.491	0.023	468	3.453	0.001
Printing, publishing and allied industries	0.673	0.033	205	0.663	0.023	413	0.241	0.809
Chemicals and allied products	0.733	0.118	15	0.561	0.066	57	1.203	0.233
Petroleum and coal products	0.364	0.043	129	0.388	0.030	273	-0.460	0.646
Rubber and miscellaneous plastics products	0.273	0.079	33	0.333	0.080	36	-0.540	0.591
Leather and leather products	0.610	0.018	731	0.294	0.010	1966	15.704	0.000
Transportation	0.893	0.016	366	0.754	0.020	451	5.202	0.000
Communications	0.868	0.026	174	0.474	0.020	623	9.794	0.000
Utilities and sanitary services	0.682	0.018	667	0.461	0.012	1611	9.836	0.000
Wholesale trade	0.345	0.007	4999	0.331	0.007	4441	1.438	0.150
Retail trade	0.921	0.008	1144	0.865	0.014	592	3.765	0.000
Banking and other finance	0.837	0.010	1266	0.613	0.016	920	12.237	0.000
Insurance and real estate	0.027	0.008	412	0.000	0.000	49	1.157	0.248
Private household services	0.630	0.014	1112	0.516	0.014	1286	5.660	0.000
Business services	0.454	0.051	97	0.206	0.014	814	5.532	0.000
Automobile and repair services	0.218	0.013	1043	0.247	0.018	582	-1.371	0.171
Personal services, except private household	0.388	0.025	371	0.297	0.021	474	2.776	0.006
Entertainment and recreation services	0.649	0.010	2101	0.592	0.020	628	2.601	0.009
Hospitals	0.380	0.010	2228	0.416	0.021	553	-1.565	0.118
Health services, except hospitals	0.558	0.008	3614	0.560	0.012	1701	-0.145	0.885
Educational services	0.285	0.013	1209	0.344	0.032	227	-1.794	0.073
Social services	0.785	0.012	1267	0.676	0.012	1526	6.476	0.000
Other professional services	0.667	0.088	30	0.333	0.055	75	3.242	0.002
Forestry and fisheries	0.757	0.022	370	0.599	0.018	718	5.241	0.000
Justice, public order and safety	0.824	0.021	329	0.716	0.042	116	2.496	0.013
Administration of human resource programs	0.877	0.028	138	0.756	0.027	246	2.857	0.005
National security and internal affairs	0.854	0.015	540	0.739	0.018	621	4.845	0.000
Other public administration	0.000	0.000	0	0.000	0.000	0	0.000	0.000

Source: October CPS (Education and School Enrollment Supplement).
Notes: (1) Female sample has no observations

Table C.4. Percentage of workers which use a computer at work, by industry, year 1997

Industry	Percentage Female	Standard error	n	Percentage Male	Standard error	n	Two-sample test	Probability value
Goods producing - agriculture service	0.594	0.088	32	0.128	0.049	47	4.958	0.000
Goods producing - other agriculture	0.231	0.122	13	0.060	0.034	50	1.892	0.063
Mining	0.867	0.091	15	0.347	0.057	72	3.971	0.000
Construction	0.753	0.049	77	0.152	0.016	519	13.304	0.000
Lumber and wood products, except furniture	0.125	0.125	8	0.108	0.039	65	0.146	0.884
Furniture and fixtures	0.375	0.125	16	0.271	0.065	48	0.781	0.438
Stone clay, glass, and concrete product	0.571	0.137	14	0.211	0.067	38	2.615	0.012
Primary metals	0.385	0.140	13	0.451	0.070	51	-0.424	0.673
Fabricated metal	0.588	0.086	34	0.299	0.047	97	3.084	0.003
Machinery, except electrical	0.710	0.058	62	0.518	0.036	199	2.689	0.008
Electrical machinery, equipment, and supplies	0.519	0.057	77	0.715	0.041	123	-2.852	0.005
Motor vehicles and equipment	0.333	0.092	27	0.424	0.052	92	-0.839	0.403
Aircraft and parts	0.769	0.122	13	0.647	0.083	34	0.792	0.433
Other transportation equipment	0.857	0.143	7	0.578	0.074	45	1.413	0.164
Professional and photographic equipment,	0.591	0.107	22	0.811	0.065	37	-1.860	0.068
Toys, amusements, and sporting goods	0.429	0.202	7	0.417	0.149	12	0.048	0.962
Miscellaneous and not specified manufacturing	0.444	0.121	18	0.258	0.080	31	1.338	0.187
Food and kindred products	0.263	0.059	57	0.200	0.038	110	0.929	0.354
Tobacco manufactures (2)	-							
Textile mill products	0.316	0.110	19	0.324	0.081	34	-0.057	0.955
Apparel and other finished textile products	0.155	0.048	58	0.360	0.098	25	-2.108	0.038
Paper and allied products	0.632	0.114	19	0.479	0.073	48	1.120	0.267
Printing, publishing and allied industries	0.654	0.054	78	0.611	0.052	90	0.570	0.570
Chemicals and allied products	0.615	0.068	52	0.626	0.051	91	-0.130	0.897
Petroleum and coal products	1.000	0.000	3	0.625	0.125	16	1.269	0.222
Rubber and miscellaneous plastics products	0.517	0.094	29	0.358	0.067	53	1.395	0.167
Leather and leather products (3)	-							
Transportation	0.658	0.039	149	0.337	0.026	323	6.817	0.000
Communications	0.942	0.028	69	0.806	0.039	103	2.560	0.011
Utilities and sanitary services	0.923	0.043	39	0.530	0.046	117	4.671	0.000
Wholesale trade	0.748	0.038	131	0.480	0.028	319	5.362	0.000
Eating and drinking places	0.194	0.024	279	0.163	0.024	246	0.922	0.357
Other retail services	0.493	0.019	665	0.486	0.021	591	0.269	0.788
Banking and other finance	0.908	0.019	240	0.890	0.025	154	0.606	0.545
Insurance and real estate	0.858	0.022	260	0.632	0.039	155	5.484	0.000
Private household services	0.061	0.030	66	0.000	0.000	9	0.752	0.455
Tobacco manufactures (2)	-							
Business services	0.651	0.030	261	0.633	0.031	245	0.438	0.662
Automobile and repair services	0.450	0.114	20	0.236	0.035	148	2.052	0.042
Personal services, except private household	0.346	0.036	179	0.286	0.048	91	1.003	0.317
Entertainment and recreation services	0.456	0.061	68	0.412	0.049	102	0.567	0.572
Hospitals	0.725	0.021	455	0.645	0.046	110	1.656	0.098
Health services, except hospitals	0.497	0.022	521	0.489	0.052	92	0.141	0.888
Educational services	0.647	0.017	782	0.641	0.026	345	0.209	0.834
Social services	0.366	0.030	254	0.391	0.073	46	-0.324	0.746
Other professional services	0.810	0.025	247	0.825	0.024	252	-0.453	0.651
Forestry and fisheries	0.000	.	1	0.333	0.333	3	.	.
Justice, public order and safety	0.789	0.043	90	0.600	0.039	160	3.090	0.002
Administration of human resource programs	0.824	0.045	74	0.722	0.076	36	1.233	0.220
National security and internal affairs	0.923	0.053	26	0.811	0.054	53	1.298	0.198

Source: October CPS (Education and School Enrollment Supplement).
Notes: (1) & (2) Female sample has no observations
(3) Male sample has no observations

Table C.5. Percentage of workers which use a computer at work, by industry, year 2001

Industry	Percentage Female	Standard error	n	Percentage Male	Standard error	n	Two-sample test	Probability value
Goods producing - agriculture service	0.616	0.035	190	0.236	0.020	441	9.844	0.000
Goods producing - other agriculture	0.386	0.028	303	0.200	0.014	813	6.475	0.000
Mining	0.745	0.059	55	0.387	0.026	344	5.133	0.000
Construction	0.668	0.021	500	0.224	0.006	4481	22.271	0.000
Lumber and wood products, except furniture	0.517	0.066	58	0.232	0.022	340	4.604	0.000
Furniture and fixtures	0.416	0.047	113	0.313	0.032	211	1.861	0.064
Stone clay, glass, and concrete product	0.596	0.072	47	0.372	0.035	191	2.826	0.005
Primary metals	0.709	0.062	55	0.447	0.029	291	3.627	0.000
Fabricated metal	0.578	0.041	147	0.430	0.023	477	3.176	0.002
Machinery, except electrical	0.731	0.028	253	0.570	0.017	811	4.638	0.000
Electrical machinery, equipment, and supplies	0.576	0.029	295	0.684	0.021	493	-3.057	0.002
Motor vehicles and equipment	0.484	0.040	159	0.418	0.024	409	1.428	0.154
Aircraft and parts	0.721	0.069	43	0.644	0.038	163	0.943	0.347
Other transportation equipment	0.755	0.060	53	0.575	0.034	214	2.423	0.016
Professional and photographic equipment,	0.711	0.037	152	0.744	0.031	199	-0.692	0.489
Toys, amusements, and sporting goods	0.567	0.092	30	0.520	0.102	25	0.340	0.735
Miscellaneous and not specified manufacturing	0.480	0.045	123	0.470	0.037	181	0.172	0.864
Food and kindred products	0.387	0.030	271	0.291	0.020	515	2.748	0.006
Tobacco manufactures (2)								
Textile mill products	0.571	0.202	7	0.273	0.141	11	1.252	0.229
Apparel and other finished textile products	0.404	0.050	99	0.333	0.046	105	1.045	0.298
Paper and allied products	0.260	0.036	146	0.329	0.051	85	-1.120	0.264
Printing, publishing and allied industries	0.493	0.062	67	0.510	0.036	198	-0.248	0.805
Chemicals and allied products	0.730	0.023	359	0.595	0.022	486	4.113	0.000
Petroleum and coal products	0.762	0.030	206	0.714	0.023	377	1.264	0.207
Rubber and miscellaneous plastics products	0.692	0.133	13	0.820	0.055	50	-1.006	0.319
Leather and leather products (3)	0.512	0.045	125	0.500	0.033	230	0.215	0.830
Transportation	0.440	0.101	25	0.538	0.100	26	-0.693	0.492
Communications	0.598	0.017	831	0.345	0.010	2296	13.065	0.000
Utilities and sanitary services	0.896	0.014	424	0.774	0.017	572	5.074	0.000
Wholesale trade	0.872	0.027	149	0.543	0.021	591	7.639	0.000
Eating and drinking places	0.738	0.017	703	0.561	0.012	1710	8.214	0.000
Other retail services	0.274	0.011	1681	0.259	0.012	1320	0.894	0.371
Banking and other finance	0.502	0.008	3749	0.478	0.008	3666	2.099	0.036
Insurance and real estate	0.866	0.010	1219	0.900	0.011	780	-2.260	0.024
Private household services	0.836	0.010	1339	0.695	0.014	962	8.133	0.000
Tobacco manufactures (2)								
Business services	0.091	0.016	319	0.133	0.063	30	-0.758	0.449
Automobile and repair services	0.679	0.011	1656	0.657	0.011	1926	1.357	0.175
Personal services, except private household	0.615	0.041	143	0.359	0.016	947	5.940	0.000
Entertainment and recreation services	0.342	0.013	1304	0.404	0.019	649	-2.674	0.008
Hospitals	0.534	0.021	549	0.454	0.019	665	2.766	0.006
Health services, except hospitals	0.736	0.009	2135	0.707	0.019	600	1.421	0.156
Educational services	0.553	0.009	2794	0.608	0.018	679	-2.624	0.009
Social services	0.720	0.007	4256	0.721	0.010	1777	-0.038	0.970
Other professional services	0.462	0.013	1462	0.489	0.028	309	-0.863	0.388
Forestry and fisheries	0.851	0.009	1584	0.825	0.009	1689	2.036	0.042
Justice, public order and safety	0.658	0.078	38	0.511	0.052	94	1.543	0.125
Administration of human resource programs	0.787	0.020	436	0.692	0.017	778	3.582	0.000
National security and internal affairs	0.836	0.021	324	0.837	0.033	129	-0.021	0.984
Other public service	0.779	0.041	104	0.776	0.029	205	0.064	0.949

Source: October CPS (Education and School Enrollment Supplement).
Notes: (1) & (2) Female sample has no observations
(3) Male sample has no observations

APPENDIX D

Percentage of workers which use a computer at work, by occupation

Table D.1. Percentage of workers which use a computer at work, by occupation, year 1984

Occupations	Percentage Female	Standard error	n	Percentage Male	Standard error	n	Two-sample test	Probability value
Administrators and officials, Public administration	0.408	0.049	103	0.376	0.034	205	0.545	0.586
Other executive, administrators,	0.396	0.013	1487	0.377	0.008	3312	1.271	0.204
Management related occupations	0.635	0.016	864	0.531	0.016	1013	4.586	0.000
Engineers	0.833	0.049	60	0.613	0.016	897	3.432	0.001
Mathematical and computer scientists	0.900	0.032	90	0.860	0.025	200	0.943	0.347
Natural scientists	0.565	0.074	46	0.619	0.035	194	-0.664	0.507
Health diagnosing occupations	0.261	0.065	46	0.242	0.023	360	0.285	0.776
Health assessment & treating occupations	0.257	0.014	1010	0.363	0.039	157	-2.775	0.006
Teachers, college and university	0.311	0.038	151	0.502	0.029	295	-3.893	0.000
Teachers, except college and university	0.290	0.011	1606	0.319	0.018	703	-1.375	0.169
Lawyers and judges	0.296	0.051	81	0.303	0.026	310	-0.121	0.904
Other professional specialty occupations	0.289	0.015	899	0.250	0.013	1134	1.962	0.050
Health technologists and technicians	0.275	0.019	578	0.381	0.045	118	-2.317	0.021
Engineering and science technicians	0.481	0.043	135	0.456	0.022	511	0.528	0.598
Technicians, except health engineering,	0.799	0.027	224	0.755	0.022	380	1.239	0.216
Supervisors, proprietors, sales	0.227	0.017	604	0.277	0.012	1343	-2.333	0.020
Sales representatives, finance, & business	0.544	0.024	445	0.400	0.019	683	4.793	0.000
Sales reps, commodities, except retail	0.361	0.040	144	0.272	0.017	703	2.165	0.031
Sales workers, retail & personal services	0.115	0.007	2217	0.151	0.012	922	-2.793	0.005
Sales related occupations	0.000	0.000	21	0.286	0.184	7	-2.793	0.010
Supervisors - administrative support	0.732	0.032	198	0.541	0.036	194	4.005	0.000
Computer equipment operators	0.966	0.011	296	0.956	0.019	114	0.486	0.627
Secretaries, stenographers, and typists	0.471	0.009	2884	0.381	0.062	63	1.415	0.157
Financial records, processing occupations	0.439	0.013	1357	0.521	0.046	119	-1.722	0.085
Mail and message distributing	0.127	0.029	134	0.077	0.014	339	1.712	0.088
Other administrative support occupations	0.511	0.009	3152	0.364	0.015	1058	8.382	0.000
Private household service occupations	0.009	0.004	454	0.063	0.063	16	-2.062	0.040
Service occ, except protection &Protective service occupations	0.203	0.036	123	0.216	0.014	843	-0.319	0.750
Food service occupations	0.031	0.004	1812	0.030	0.006	895	0.182	0.856
Health service occupations	0.075	0.009	914	0.046	0.023	87	1.011	0.312
Cleaning and building service occupations	0.018	0.005	662	0.040	0.006	908	-2.449	0.014
Personal service occupations	0.037	0.006	1002	0.079	0.020	189	-2.624	0.009
Mechanics and repairers	0.264	0.048	87	0.129	0.007	2518	3.655	0.000
Construction trades	0.077	0.037	52	0.034	0.003	2773	1.680	0.093
Other precision production occupations	0.098	0.013	530	0.160	0.009	1855	-3.569	0.000
Machine operators & tenders, not precision	0.046	0.006	1317	0.083	0.007	1776	-4.012	0.000
Fabricator, assembler, inspector, sampler	0.067	0.010	653	0.104	0.010	978	-2.562	0.011
Motor vehicle operators	0.056	0.016	198	0.026	0.004	1760	2.337	0.020
Other transportation & material moving	0.132	0.056	38	0.050	0.008	805	2.198	0.028
Construction laborer	0.000	0.000	16	0.007	0.004	405	-0.345	0.731
Freight, stock and material handlers	0.061	0.019	164	0.035	0.008	592	1.458	0.145
Other handlers, equipment cleaners,	0.062	0.014	290	0.039	0.006	950	1.675	0.094
Farm operators and managers	0.024	0.014	125	0.049	0.007	877	-1.251	0.211
Farm workers and related occupations	0.035	0.012	228	0.016	0.004	838	1.887	0.059
Forestry and fishing occupations	0.250	0.164	8	0.036	0.018	110	2.716	0.008

Source: October CPS (Education and School Enrollment Supplement).

Table D.2. Percentage of workers which use a computer at work, by occupation, year 1989

Occupations	Percentage Female	Standard error	n	Percentage Male	Standard error	n	Two-sample test	Probability value
Administrators and officials, Public administration	0.765	0.033	166	0.663	0.033	205	2.151	0.032
Other executive, administrators,	0.577	0.011	2098	0.523	0.008	3592	3.923	0.000
Management related occupations	0.828	0.011	1105	0.736	0.014	1054	5.205	0.000
Engineers	0.859	0.038	85	0.779	0.014	910	1.714	0.087
Mathematical and computer scientists	0.953	0.015	191	0.959	0.011	317	-0.327	0.744
Natural scientists	0.779	0.051	68	0.780	0.031	177	-0.004	0.997
Health diagnosing occupations	0.326	0.050	89	0.360	0.026	342	-0.594	0.553
Health assessment & treating occupations	0.457	0.015	1134	0.614	0.034	202	-4.140	0.000
Teachers, college and university	0.603	0.036	184	0.707	0.027	280	-2.329	0.020
Teachers, except college and university	0.380	0.011	1833	0.477	0.020	637	-4.335	0.000
Lawyers and judges	0.570	0.047	114	0.473	0.027	351	1.807	0.072
Other professional specialty occupations	0.450	0.016	1013	0.490	0.015	1067	-1.828	0.068
Health technologists and technicians	0.447	0.020	638	0.558	0.049	104	-2.109	0.035
Engineering and science technicians	0.629	0.042	132	0.618	0.022	510	0.235	0.815
Technicians, except health engineering,	0.864	0.022	236	0.833	0.018	414	1.051	0.294
Supervisors, proprietors, sales	0.353	0.018	740	0.439	0.013	1417	-3.879	0.000
Sales representatives, finance, & business	0.688	0.020	539	0.608	0.019	674	2.899	0.004
Sales reps, commodities, except retail	0.475	0.037	181	0.396	0.019	671	1.911	0.056
Sales workers, retail & personal services	0.190	0.009	2032	0.329	0.016	897	-8.262	0.000
Sales related occupations	0.043	0.043	23	0.091	0.091	11	-0.536	0.596
Supervisors - administrative support	0.788	0.026	255	0.661	0.036	177	2.974	0.003
Computer equipment operators	0.978	0.009	279	0.980	0.011	153	-0.132	0.895
Secretaries, stenographers, and typists	0.750	0.008	2704	0.762	0.067	42	-0.182	0.855
Financial records, processing occupations	0.674	0.013	1281	0.716	0.048	88	-0.804	0.422
Mail and message distributing	0.213	0.030	183	0.166	0.021	313	1.304	0.193
Other administrative support occupations	0.673	0.008	3573	0.529	0.015	1085	8.707	0.000
Private household service occupations	0.010	0.006	304	0.000	0.000	8	0.282	0.779
Service occ, except protection &Protective service occupations	0.293	0.038	147	0.352	0.017	821	-1.399	0.162
Food service occupations	0.057	0.006	1628	0.058	0.008	909	-0.187	0.852
Health service occupations	0.135	0.011	967	0.123	0.032	106	0.368	0.713
Cleaning and building service occupations	0.026	0.006	724	0.041	0.007	828	-1.604	0.109
Personal service occupations	0.071	0.008	1078	0.118	0.024	187	-2.229	0.026
Mechanics and repairers	0.414	0.050	99	0.196	0.008	2352	5.311	0.000
Construction trades	0.088	0.038	57	0.056	0.004	2849	1.019	0.308
Other precision production occupations	0.136	0.016	491	0.263	0.011	1651	-5.878	0.000
Machine operators & tenders, not precision	0.069	0.007	1205	0.134	0.008	1639	-5.566	0.000
Fabricator, assembler, inspector, sampler	0.155	0.015	574	0.136	0.012	867	1.004	0.316
Motor vehicle operators	0.075	0.018	226	0.061	0.006	1797	0.854	0.393
Other transportation & material moving	0.138	0.065	29	0.093	0.011	721	0.811	0.418
Construction laborer	0.063	0.063	16	0.015	0.007	341	1.455	0.147
Freight, stock and material handlers	0.121	0.027	149	0.092	0.011	640	1.060	0.290
Other handlers, equipment cleaners,	0.111	0.017	343	0.095	0.010	881	0.810	0.418
Farm operators and managers	0.065	0.021	139	0.071	0.010	689	-0.268	0.789
Farm workers and related occupations	0.046	0.015	197	0.031	0.006	739	0.999	0.318
Forestry and fishing occupations	0.000	0.000	5	0.086	0.026	116	-0.681	0.497

Source: October CPS (Education and School Enrollment Supplement).

Table D.3. Percentage of workers which use a computer at work, by occupation, year 1993

Occupations	Percentage Female	Standard error	n	Percentage Male	Standard error	n	Two-sample test	Probability value
Administrators and officials, Public administration	0.903	0.023	165	0.847	0.025	202	1.613	0.108
Other executive, administrators,	0.712	0.010	2073	0.637	0.008	3379	5.746	0.000
Management related occupations	0.918	0.008	1083	0.834	0.012	992	5.888	0.000
Engineers	0.953	0.023	85	0.884	0.011	818	1.942	0.052
Mathematical and computer scientists	0.994	0.006	176	0.984	0.007	366	1.033	0.302
Natural scientists	0.870	0.034	100	0.893	0.022	206	-0.597	0.551
Health diagnosing occupations	0.520	0.050	100	0.509	0.028	326	0.189	0.851
Health assessment & treating occupations	0.581	0.014	1249	0.733	0.032	187	-3.961	0.000
Teachers, college and university	0.670	0.031	224	0.813	0.024	262	-3.665	0.000
Teachers, except college and university	0.487	0.012	1801	0.561	0.020	618	-3.203	0.001
Lawyers and judges	0.782	0.041	101	0.659	0.027	314	2.332	0.020
Other professional specialty occupations	0.606	0.015	1068	0.590	0.015	1036	0.750	0.454
Health technologists and technicians	0.556	0.019	685	0.592	0.041	142	-0.772	0.440
Engineering and science technicians	0.708	0.039	137	0.717	0.020	484	-0.204	0.839
Technicians, except health engineering,	0.931	0.017	233	0.860	0.019	344	2.672	0.008
Supervisors, proprietors, sales	0.556	0.018	790	0.574	0.014	1279	-0.811	0.418
Sales representatives, finance, & business	0.780	0.019	490	0.724	0.018	634	2.133	0.033
Sales reps, commodities, except retail	0.613	0.039	155	0.546	0.020	595	1.490	0.137
Sales workers, retail & personal services	0.285	0.010	1884	0.390	0.016	944	-5.695	0.000
Sales related occupations	0.250	0.131	12	0.389	0.118	18	-0.772	0.447
Supervisors - administrative support	0.900	0.018	290	0.818	0.030	170	2.544	0.011
Computer equipment operators	0.974	0.013	154	0.979	0.015	94	-0.233	0.816
Secretaries, stenographers, and typists	0.866	0.007	2086	0.711	0.075	38	2.774	0.006
Financial records, processing occupations	0.823	0.012	1099	0.871	0.033	101	-1.217	0.224
Mail and message distributing	0.390	0.036	182	0.204	0.024	294	4.500	0.000
Other administrative support occupations	0.775	0.007	3804	0.680	0.013	1242	6.765	0.000
Private household service occupations	0.014	0.006	361	0.000	0.000	13	0.426	0.670
Service occ, except protection &Protective service occupations	0.371	0.038	159	0.462	0.017	823	-2.108	0.035
Food service occupations	0.123	0.008	1637	0.108	0.010	959	1.140	0.254
Health service occupations	0.159	0.011	1015	0.159	0.033	126	-0.003	0.998
Cleaning and building service occupations	0.042	0.008	642	0.065	0.009	765	-1.915	0.056
Personal service occupations	0.103	0.009	1054	0.132	0.022	234	-1.292	0.197
Mechanics and repairers	0.583	0.059	72	0.303	0.010	2183	5.083	0.000
Construction trades	0.216	0.058	51	0.078	0.005	2480	3.569	0.000
Other precision production occupations	0.285	0.020	487	0.353	0.012	1538	-2.756	0.006
Machine operators & tenders, not precision	0.121	0.010	977	0.200	0.011	1451	-5.136	0.000
Fabricator, assembler, inspector, sampler	0.168	0.016	524	0.173	0.013	809	-0.242	0.809
Motor vehicle operators	0.103	0.020	232	0.122	0.008	1685	-0.802	0.423
Other transportation & material moving	0.292	0.095	24	0.144	0.014	631	1.991	0.047
Construction laborer	0.150	0.082	20	0.029	0.009	314	2.853	0.005
Freight, stock and material handlers	0.236	0.029	220	0.158	0.015	608	2.611	0.009
Other handlers, equipment cleaners,	0.162	0.025	222	0.126	0.012	802	1.403	0.161
Farm operators and managers	0.255	0.044	98	0.157	0.015	592	2.393	0.017
Farm workers and related occupations	0.145	0.027	172	0.043	0.007	743	5.066	0.000
Forestry and fishing occupations	0.000	0.000	8	0.053	0.021	114	-0.661	0.510

Source: October CPS (Education and School Enrollment Supplement).

Table D.4. Percentage of workers which use a computer at work, by occupation, year 1997

Occupations	Percentage Female	Standard error	n	Percentage Male	Standard error	n	Two-sample test	Probability value
Administrators and officials, Public administration	0.952	0.033	42	0.854	0.056	41	1.527	0.131
Other executive, administrators,	0.820	0.017	512	0.834	0.016	566	-0.590	0.555
Management related occupations	0.923	0.016	284	0.878	0.024	180	1.605	0.109
Engineers	0.958	0.042	24	0.930	0.019	185	0.525	0.600
Mathematical and computer scientists	0.947	0.037	38	0.976	0.017	82	-0.797	0.427
Natural scientists	0.875	0.069	24	0.825	0.061	40	0.526	0.601
Health diagnosing occupations	0.619	0.109	21	0.800	0.074	30	-1.426	0.160
Health assessment & treating occupations	0.674	0.029	261	0.744	0.071	39	-0.866	0.388
Teachers, college and university	0.800	0.060	45	0.828	0.050	58	-0.355	0.724
Teachers, except college and university	0.577	0.024	409	0.746	0.039	126	-3.443	0.001
Lawyers and judges	0.929	0.071	14	0.851	0.052	47	0.745	0.459
Other professional specialty occupations	0.700	0.031	223	0.805	0.032	159	-2.337	0.020
Health technologists and technicians	0.682	0.038	148	0.786	0.079	28	-1.090	0.277
Engineering and science technicians	0.750	0.073	36	0.864	0.034	103	-1.589	0.115
Technicians, except health engineering,	0.930	0.034	57	0.833	0.040	90	1.704	0.091
Supervisors, proprietors, sales	0.722	0.036	158	0.701	0.031	214	0.431	0.667
Sales representatives, finance, & business	0.856	0.035	104	0.805	0.043	87	0.940	0.348
Sales reps, commodities, except retail	0.784	0.069	37	0.627	0.048	102	1.738	0.085
Sales workers, retail & personal services	0.343	0.025	359	0.461	0.036	193	-2.744	0.006
Sales related occupations	0.500	0.289	4	0.500	0.500	2	0.000	1.000
Supervisors - administrative support	0.875	0.048	48	0.625	0.087	32	2.710	0.008
Computer equipment operators	0.909	0.063	22	0.824	0.095	17	0.778	0.441
Secretaries, stenographers, and typists	0.898	0.015	392	1.000	0.000	5	-0.752	0.453
Financial records, processing occupations	0.893	0.025	159	0.750	0.112	16	1.683	0.094
Mail and message distributing	0.488	0.077	43	0.219	0.052	64	3.009	0.003
Other administrative support occupations	0.795	0.014	834	0.683	0.030	249	3.708	0.000
Private household service occupations	0.070	0.034	57	0.000	0.000	6	0.662	0.510
Service occ, except protection &Protective service occupations	0.356	0.072	45	0.537	0.038	175	-2.187	0.030
Food service occupations	0.128	0.019	298	0.060	0.016	233	2.606	0.009
Health service occupations	0.191	0.026	230	0.200	0.082	25	-0.104	0.917
Cleaning and building service occupations	0.077	0.023	130	0.075	0.020	174	0.072	0.943
Personal service occupations	0.221	0.035	145	0.205	0.066	39	0.208	0.835
Mechanics and repairers	0.769	0.122	13	0.365	0.023	427	2.983	0.003
Construction trades	0.000	0.000	7	0.119	0.017	386	-0.971	0.332
Other precision production occupations	0.179	0.044	78	0.369	0.029	287	-3.201	0.002
Machine operators & tenders, not precision	0.124	0.024	186	0.210	0.024	290	-2.431	0.015
Fabricator, assembler, inspector, sampler	0.212	0.040	104	0.166	0.028	181	0.962	0.337
Motor vehicle operators	0.102	0.044	49	0.164	0.021	299	-1.107	0.269
Other transportation & material moving	0.000	0.000	3	0.147	0.037	95	-0.713	0.478
Construction laborer	0.000	.	1	0.065	0.028	77	.	.
Freight, stock and material handlers	0.167	0.054	48	0.147	0.034	109	0.317	0.752
Other handlers, equipment cleaners,	0.235	0.060	51	0.146	0.028	158	1.493	0.137
Farm operators and managers	0.000	.	1	0.000	0.000	7	.	.
Farm workers and related occupations	0.269	0.089	26	0.019	0.014	104	4.849	0.000

Source: October CPS (Education and School Enrollment Supplement).

Table D.5. Percentage of workers which use a computer at work, by occupation, year 2001

Occupations	Percentage Female	Standard error	n	Percentage Male	Standard error	n	Two-sample test	Probability value
Administrators and officials, Public administration	207	0.021	207	0.879	0.021	240	0.482	0.630
Other executive, administrators,	3100	0.007	3100	0.766	0.007	4112	0.462	0.000
Management related occupations	1538	0.008	1538	0.872	0.010	1024	0.288	0.198
Engineers	89	0.029	89	0.896	0.010	891	0.764	0.445
Mathematical and computer scientists	300	0.014	300	0.946	0.009	689	0.804	0.422
Natural scientists	107	0.024	107	0.894	0.021	207	0.184	0.237
Health diagnosing occupations	163	0.032	163	0.720	0.023	397	0.900	0.058
Health assessment & treating occupations	1439	0.012	1439	0.747	0.029	221	0.741	0.459
Teachers, college and university	236	0.021	236	0.925	0.015	306	0.721	0.086
Teachers, except college and university	2180	0.010	2180	0.802	0.015	721	0.452	0.000
Lawyers and judges	156	0.019	156	0.919	0.015	344	0.937	0.349
Other professional specialty occupations	1457	0.011	1457	0.780	0.012	1174	0.034	0.973
Health technologists and technicians	816	0.017	816	0.602	0.039	161	0.046	0.296
Engineering and science technicians	169	0.029	169	0.785	0.018	520	0.057	0.291
Technicians, except health engineering,	324	0.016	324	0.864	0.017	398	0.937	0.053
Supervisors, proprietors, sales	968	0.015	968	0.712	0.012	1454	0.714	0.476
Sales representatives, finance, & business	615	0.014	615	0.835	0.014	751	0.374	0.170
Sales reps, commodities, except retail	162	0.030	162	0.739	0.019	513	0.302	0.022
Sales workers, retail & personal services	1883	0.011	1883	0.459	0.015	1037	0.733	0.000
Sales related occupations	31	0.089	31	0.467	0.133	15	0.504	0.617
Supervisors - administrative support	225	0.022	225	0.776	0.037	125	0.448	0.015
Computer equipment operators	95	0.030	95	0.840	0.043	75	0.283	0.201
Secretaries, stenographers, and typists	1557	0.009	1557	0.923	0.053	26	0.142	0.254
Financial records, processing occupations	1087	0.012	1087	0.738	0.050	80	0.848	0.065
Mail and message distributing	206	0.034	206	0.223	0.025	287	0.268	0.000
Other administrative support occupations	4131	0.006	4131	0.676	0.013	1282	0.777	0.000
Private household service occupations	292	0.016	292	0.000	0.000	9	0.915	0.361
Service occ, except protection and protective service occupations	224	0.033	224	0.557	0.016	920	0.644	0.100
Food service occupations	1688	0.009	1688	0.176	0.012	1080	0.554	0.580
Health service occupations	1189	0.013	1189	0.291	0.038	141	0.204	0.839
Cleaning and building service occupations	799	0.012	799	0.133	0.012	819	0.705	0.481
Personal service occupations	1253	0.013	1253	0.290	0.028	255	0.535	0.593
Mechanics and repairers	119	0.044	119	0.416	0.010	2338	0.624	0.000
Construction trades	72	0.052	72	0.173	0.007	3162	0.016	0.044
Other precision production occupations	431	0.023	431	0.417	0.013	1415	0.779	0.075
Machine operators & tenders, not precision	706	0.016	706	0.272	0.012	1277	0.573	0.116
Fabricator, assembler, inspector, sampler	423	0.022	423	0.228	0.015	753	0.808	0.005
Motor vehicle operators	274	0.025	274	0.162	0.008	1947	0.046	0.041
Other transportation & material moving	47	0.073	47	0.192	0.015	652	0.853	0.000
Construction laborer	21	0.048	21	0.099	0.014	486	0.776	0.438
Freight, stock and material handlers	224	0.028	224	0.187	0.016	632	0.039	0.299
Other handlers, equipment cleaners,	288	0.024	288	0.177	0.014	767	0.154	0.249
Farm operators and managers	185	0.036	185	0.279	0.020	523	0.527	0.012
Farm workers and related occupations	187	0.034	187	0.133	0.012	815	0.820	0.000

Source: October CPS (Education and School Enrollment Supplement).

APPENDIX E

Sample Restrictions for Chapter 3

E.1. Sample Selection for the NLSY79

The data set used for this study is the 1996 wave of the National Longitudinal Survey of Youth 1979 (NLSY79), sponsored by the Bureau of Labor Statistics (BLS), US Department of Labor. The data files are provided by the BLS. Data comes from the 1997 CD-ROM that contains the main file and Work History data.

The NLSY79 sample design selected as respondents individuals aged 14 to 21 as of December 31, 1978, who were connected to a surveyed households during 1978. The total sample of respondents in 1979 was 12,886.

Table E.1. shows the sample generation process for 1996. In 1996 the sample is composed by 8,636 individuals aged 31-39. Basic restrictions imposed on the sample (these restrictions include the standard missing values, and positive values when logarithms of certain variables are taken) reduce the sample to 5,140 individuals. Further restrictions make the final sample equal to 1,871 individuals, 845 males and 1,026 females.

To replicate Table E.1., one would have to follow the order in which the restrictions are imposed.

Table E.1. NSLY79 Sample Generation

Restriction	Pooled	Male	Female
Interviewed (in 1996) Sample	8,636	4,275	4,361
Sample after basic restrictions	*6,609*	*3,671*	*2,938*
Eliminate observations in which union information is missing	6,155	3,379	2,776
Eliminate observations in which firm size information is missing	5,880	3,247	2,633
Eliminate observations in which occupation information is missing	5,825	3,217	2,608
Eliminate observations in which industry information is missing	5,722	3,156	2,566
Eliminate observations in which the individual has an hourly wage smaller than 1 dollar	5,713	3,148	2,565
Sample after further basic restrictions	*5,713*	*3,148*	*2,565*
Eliminate observations in which Female supervisor is missing	5,713	3,148	2,565
Eliminate observations in which proportion of female co-workers information is missing	4,701	2,520	2,181
Have only those supervised by someone	4,701	2,520	2,181
Eliminate observations in which the individual reports a firm size smaller or equal to the workgroup	3,622	1,878	1,744
Eliminate observations in which the individual works in a workgroup with less than 3 people, in which the 3-digit occupation proportion of females is missing or the variable satisfaction at job is missing	3,370	1,769	1,601
Eliminate observations in which AFQT and/or number of children are missing	3,370	1,769	1,601
Eliminate observations with fully segregated male or female workgroups (proportion o female workers equal to 0 or equal to 1)	2,913	1,515	1,398
Eliminate observations in which benefits information is missing	2,031	937	1,094
Final Sample (after all restrictions)	1,871	845	1,026

Source: Own construction from the NLSY79.

E.2. Sample Selection for the Personnel Records from a Single Firm

Table E.2. shows the sample generation process for the firm's data set. The original pooled sample is composed by 86,789 year-person observations. After the restrictions imposed on the sample, the final sample equal to 5,075 individuals, 2,498 males and 2,577 females.

Table E.2. Personnel Records from a Single Firm Sample Generation

Restriction	Pooled	Male	Female
Original Sample	89,789	44,895	44,894
Rule 1: If there is more than one entry in their files, keep the last observation, which is the most updated one	48,189	23,622	24,567
Rule 2: If the worker has information for more than one year, keep the last year's observation	18,334	8,988	9,336
Only full-time workers.	18,303	8,971	9,332
Eliminate observations in which wage and other covariates information is missing.	5,075	2,498	2,577
Sample after all restrictions	5,075	2,498	2,577

Source: Own construction from firm's data set.

APPENDIX F
Regression Results

Table F.1. Pooled Sample. Regression Results. NLSY79. (Dependent variable: log of hourly wages)

	Model 0	Model 1	Model 2	Model 3	Model 4	Model 5
Female	-0.217**	-0.146**	-0.112**	-0.047*	-0.089**	-0.082**
	(0.025)	(0.028)	(0.029)	(0.023)	(0.023)	(0.022)
Proportion of Female co-workers		-0.285**	-0.197**	-0.201**	-0.162**	-0.155**
		(0.048)	(0.052)	(0.043)	(0.044)	(0.044)
Proportion of females in 3-digit Occupation			-0.233**	-0.247**	-0.152**	-0.174**
			(0.050)	(0.039)	(0.046)	(0.055)
Age				0.033	-0.021	-0.040
				(0.135)	(0.122)	(0.120)
Age Squared/100				-0.042	0.035	0.064
				(0.193)	(0.175)	(0.171)
Years of Education				0.071**	0.046**	0.047**
				(0.006)	(0.006)	(0.006)
Married				0.124**	0.091**	0.090**
				(0.021)	(0.019)	(0.019)
White				-0.036	-0.033	-0.035
				(0.025)	(0.023)	(0.023)
North Central region				0.084*	0.086*	0.090**
				(0.036)	(0.034)	(0.033)
South region				-0.154**	-0.111**	-0.111**
				(0.032)	(0.029)	(0.030)
West region				-0.151**	-0.109**	-0.096**
				(0.030)	(0.028)	(0.029)
Number of children				-0.018*	-0.009	-0.009
				(0.008)	(0.007)	(0.007)
AFQT				0.005**	0.004**	0.003**
				(0.000)	(0.000)	(0.000)
Female Supervisor					-0.058**	-0.071**
					(0.022)	(0.021)
Firm Size/1000					0.009**	0.008**
					(0.002)	(0.002)
Union					0.134**	0.170**
					(0.023)	(0.022)
Maternity/Paternity benefits					0.163**	0.162**
					(0.024)	(0.024)
Global Satisfaction Indicators			NO	NO	YES	YES
1-digit Occupation Indicators			NO	NO	YES	NO
1-digit Industry Indicators			NO	NO	YES	NO
2-digit Occupation Indicators			NO	NO	NO	YES
2-digit Industry Indicators			NO	NO	NO	YES
Intercept		2.622**	2.728**	0.940	2.338	2.570
		(0.019)	(0.025)	(2.366)	(2.153)	(2.102)
Sample size		1,871	1,871	1,871	1,871	1,871
R-squared		0.04	0.06	0.41	0.52	0.57

Notes: 1. (.) White-corrected s.e.; 2. * if the probability value is less than or equal to 0.05 and ** less than or equal to 0.01.

Table F.2. Male Sample. Regression Results. NLSY79.
(Dependent variable: log of hourly wages)

	Model 1	Model 2	Model 3	Model 4	Model 5
Proportion of Female co-workers	-0.397**	-0.317**	-0.274**	-0.186*	-0.189*
	(0.075)	(0.082)	(0.069)	(0.075)	(0.076)
Proportion of females in 3-digit		-0.196*	-0.253**	-0.215**	-0.270**
Occupation		(0.085)	(0.069)	(0.072)	(0.096)
Age			0.087	-0.027	-0.123
			(0.203)	(0.191)	(0.192)
Age Squared/100			-0.111	0.046	0.186
			(0.290)	(0.272)	(0.274)
Years of Education			0.058**	0.038**	0.038**
			(0.009)	(0.008)	(0.008)
Married			0.214**	0.176**	0.164**
			(0.034)	(0.031)	(0.032)
White			-0.006	0.003	-0.008
			(0.038)	(0.037)	(0.036)
North Central region			0.092	0.095	0.087
			(0.054)	(0.051)	(0.049)
South region			-0.092*	-0.056	-0.060
			(0.043)	(0.042)	(0.042)
West region			-0.095*	-0.072	-0.082
			(0.041)	(0.042)	(0.043)
Number of children			-0.008	-0.005	-0.007
			(0.011)	(0.010)	(0.011)
AFQT			0.006**	0.004**	0.003**
			(0.001)	(0.001)	(0.001)
Female Supervisor				-0.099*	-0.103*
				(0.040)	(0.041)
Firm Size/1000				0.007*	0.006
				(0.003)	(0.004)
Union				0.096**	0.144**
				(0.033)	(0.033)
Maternity/Paternity benefits				0.113**	0.112**
				(0.033)	(0.035)
Global Satisfaction Indicators		NO	NO	YES	YES
1-digit Occupation Indicators		NO	NO	YES	NO
1-digit Industry Indicators		NO	NO	YES	NO
2-digit Occupation Indicators		NO	NO	NO	YES
2-digit Industry Indicators		NO	NO	NO	YES
Intercept		2.769**	-0.040	2.459	4.071
		(0.032)	(3.547)	(3.352)	(3.353)
Sample size		845	845	845	845
R-squared		0.03	0.40	0.50	0.58

Notes: 1. (.) White-corrected s.e.; 2. * if the probability value is less than or equal to 0.05 and ** less than or equal to 0.01.

Table F.3. Female Sample. Regression Results. NLSY79.
(Dependent variable: log of hourly wages)

	Model 1	Model 2	Model 3	Model 4	Model 5
Proportion of Female co-workers	-0.203**	-0.111	-0.121*	-0.125*	-0.102
	(0.063)	(0.066)	(0.054)	(0.056)	(0.056)
Proportion of females in 3-digit		-0.252**	-0.226**	-0.098	-0.107
Occupation		(0.061)	(0.047)	(0.060)	(0.071)
Age			0.030	0.027	0.034
			(0.177)	(0.156)	(0.154)
Age Squared/100			-0.046	-0.040	-0.046
			(0.253)	(0.222)	(0.220)
Years of Education			0.080**	0.052**	0.054**
			(0.007)	(0.008)	(0.009)
Married			0.052*	0.025	0.039
			(0.026)	(0.024)	(0.024)
White			-0.055	-0.064*	-0.064*
			(0.032)	(0.031)	(0.030)
North Central region			0.077	0.072	0.075
			(0.049)	(0.045)	(0.044)
South region			-0.210**	-0.170**	-0.158**
			(0.045)	(0.043)	(0.042)
West region			-0.194**	-0.147**	-0.121**
			(0.042)	(0.040)	(0.038)
Number of children			-0.030**	-0.016	-0.020*
			(0.010)	(0.010)	(0.010)
AFQT			0.005**	0.003**	0.003**
			(0.001)	(0.001)	(0.001)
Female Supervisor				-0.036	-0.055*
				(0.027)	(0.026)
Firm Size/1000				0.012**	0.011**
				(0.004)	(0.003)
Union				0.142**	0.172**
				(0.032)	(0.033)
Maternity/Paternity benefits				0.241**	0.235**
				(0.035)	(0.035)
Global Satisfaction Indicators		NO	NO	YES	YES
1-digit Occupation Indicators		NO	NO	YES	NO
1-digit Industry Indicators		NO	NO	YES	NO
2-digit Occupation Indicators		NO	NO	NO	YES
2-digit Industry Indicators		NO	NO	NO	YES
Intercept		2.531**	0.934	1.339	1.183
		(0.042)	(3.104)	(2.742)	(2.725)
Sample size		1026	1026	1026	1026
R-squared		0.01	0.41	0.54	0.59

Notes:
1. (.) White-corrected s.e.
2. * if the probability value is less than or equal to 0.05 and ** less than or equal to 0.01.

Table F.4. Pooled Sample. Regression Results. Personnel records from a single firm.
(Dependent variable: log of hourly wages)

	Model 1	Model 2	Model 3
Proportion of Female Co-workers	-0.452**	-0.389**	-0.505**
	(0.042)	(0.038)	(0.031)
Female	-0.099**	-0.083**	-0.099**
	(0.015)	(0.010)	(0.008)
No High School degree		-0.151**	-0.094**
		(0.018)	(0.017)
Two-year degree		0.183**	0.056*
		(0.029)	(0.022)
Four-year degree		0.461**	0.130**
		(0.014)	(0.013)
Graduate degree		0.754**	0.292**
		(0.023)	(0.021)
Age		0.050**	0.040**
		(0.005)	(0.004)
Age squared / 100		-0.051**	-0.041**
		(0.006)	(0.005)
White		0.111**	0.055**
		(0.010)	(0.008)
Married		0.065**	0.057**
		(0.010)	(0.008)
US States	No	Yes	Yes
Job classifications	No	No	Yes
Intercept	2.593**	1.284**	1.440**
	(0.020)	(0.115)	(0.125)
Sample size	5,075	5,075	5,075
R-squared	0.04	0.61	0.75

Notes: 1. (.) are White-corrected standard errors; 2. * means that the probability value is less than or equal to 0.05 and ** less than or equal to 0.01; 3. The excluded education category is complete High School.

Table F.5. Male Sample. Regression Results. Personnel records from a single firm.
(Dependent variable: log of hourly wages)

	Model 1	Model 2	Model 3
Proportion of Female Co-workers	-0.377**	-0.378**	-0.502**
	(0.055)	(0.053)	(0.045)
No High School degree		-0.112**	-0.070*
		(0.028)	(0.028)
Two-year degree		0.112**	-0.008
		(0.043)	(0.033)
Four-year degree		0.472**	0.106**
		(0.022)	(0.021)
Graduate degree		0.726**	0.242**
		(0.033)	(0.032)
Age		0.053**	0.042**
		(0.007)	(0.006)
Age squared / 100		-0.054**	-0.041**
		(0.009)	(0.007)
White		0.106**	0.063**
		(0.015)	(0.012)
Married		0.100**	0.086**
		(0.015)	(0.013)
US States	No	Yes	Yes
Job classifications	No	No	Yes
Intercept	2.559**	1.263**	1.574**
	(0.025)	(0.155)	(0.139)
Sample size	2,498	2,498	2,498
R-squared	0.02	0.60	0.73

Notes: 1. (.) are White-corrected standard errors; 2. * means that the probability value is less than or equal to 0.05 and ** less than or equal to 0.01; 3. The excluded education category is complete High School.

Table F.6. Female Sample. Regression Results. Personnel records from a single firm.
(Dependent variable: log of hourly wages)

	Model 1	Model 2	Model 3
Proportion of Female Co-workers	-0.554**	-0.306**	-0.393**
	(0.062)	(0.062)	(0.046)
No High School degree		-0.189**	-0.105**
		(0.024)	(0.021)
Two-year degree		0.248**	0.100**
		(0.037)	(0.027)
Four-year degree		0.441**	0.132**
		(0.019)	(0.015)
Graduate degree		0.766**	0.329**
		(0.033)	(0.026)
Age		0.042**	0.034**
		(0.006)	(0.005)
Age squared / 100		-0.043**	-0.036**
		(0.007)	(0.006)
White		0.112**	0.031**
		(0.014)	(0.011)
Married		0.027*	0.024*
		(0.013)	(0.009)
US States	No	Yes	Yes
Job classifications	No	No	Yes
Intercept	2.552**	1.375**	1.204**
	(0.036)	(0.137)	(0.110)
Sample size	2,577	2,577	2,577
R-squared	0.02	0.63	0.79

Notes: 1. (.) are White-corrected standard errors; 2. * means that the probability value is less than or equal to 0.05 and ** less than or equal to 0.01; 3. The excluded education category is complete High School.

APPENDIX G
Sample Restrictions for Chapter 4

Table G.1. Sample restrictions using the Bolivian, Ecuadorian, Peruvian and Brazilian data sets.

	Bolivia	Ecuador	Peru	Brazil
Original sample size	13,023	26,129	19,957	352,229
Only women	6,541	13,112	10,057	180,570
Earning a wage	1163	3,214	2,441	50,640
Only urban areas	961	2,142	1,864	45,472
Not self-employed	484	1,462	947	36,758
Age between 14 and 45	408	1,227	808	30,596
Working more than 1 hour per day but less than 16 hours per day	402	1,213	794	30,388
Final sample (after all restrictions)	374	1,202	782	28,606

APPENDIX H

Table H.1. OLS Regression Results. First Specification (equation 1) of Chapter 4.
(dependent variable: natural logarithm of hourly wage)

	BOLIVIA	ECUADOR	PERU	BRAZIL
Mother of children 0 to 6	-0.077	-0.075	-0.105*	0.066*
years old	(0.086)	(0.050)	(0.058)	(0.008)
Mother of children 7 to 12	-0.117	0.068	-	0.026*
years old	(0.082)	(0.051)		(0.008)
Mother of children 13 to 18	0.178*	0.020	-	0.002
years old	(0.100)	(0.063)		(0.010)
Age	0.057*	0.103*	0.058*	0.057*
	(0.032)	(0.022)	(0.025)	(0.003)
Age squared	-0.001	-0.002*	-0.001*	-0.001*
	(0.001)	(0.000)	(0.000)	(0.000)
Years of education	-0.031	0.040*	0.041	-0.034*
	(0.033)	(0.023)	(0.046)	(0.003)
Years of education squared	0.004*	0.001	0.002	0.007*
	(0.002)	(0.001)	(0.002)	(0.000)
Tenure	0.019	0.002*	0.015*	0.003*
	(0.018)	(0.000)	(0.008)	(0.000)
Tenure squared	-0.001	0.000*	0.000*	0.000*
	(0.001)	(0.000)	(0.000)	(0.000)
Married	0.162	0.100*	0.148*	-
	(0.108)	(0.053)	(0.058)	
Head	0.206*	0.199*	-0.099	0.077*
	(0.111)	(0.065)	(0.121)	(0.009)
Ethnicity	-0.179*	0.213*	0.071	-0.090*
	(0.073)	(0.071)	(0.108)	(0.007)
Part-time	0.329*	0.363*	0.296*	-
	(0.101)	(0.115)	(0.058)	
Public	0.244*	0.313*	0.194*	0.091*
	(0.111)	(0.075)	(0.075)	(0.011)
Regional dummies	Yes	Yes	Yes	Yes
Occupation dummies	Yes	Yes	Yes	Yes
Industry indicators	Yes	Yes	Yes	Yes
Intercept	-0.101	6.543	-0.463	-0.328
	(0.556)	(0.374)	(0.544)	(0.082)

Notes: 1. This table contains the results from Model 3 and * means that the coefficient is statistically significant at a 10% level.

VITA

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