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# IS THE GENDER PAY GAP IN THE US JUST THE RESULT OF GENDER SEGREGATION AT WORK? 

Katie Meara* , Francesco Pastore ${ }^{\forall}$ and Allan Webster ${ }^{¥}$


#### Abstract

This study examines the gender wage gap between male and female workers in the US using a cross-section from the Current Population Survey (CPS) It shows that the extent of gender segregation by both industry and occupation is significantly greater than previously supposed. For the wage gap this creates problems of sample selection bias, of non-comparability between male and female employment. To address these problems the study uses a matching approach, which we also extend to a more recent methodological version with a yet stronger statistical foundation - Inverse Probability Weighted Regression Adjustment (IPWRA) - not previously used in related studies. Despite this, doubts remain about even these well founded and appropriate techniques in the presence of such strong gender segregation. To secure even greater precision we repeat the matching analysis for a small number of industries and occupations, each carefully selected for employing similar numbers of men and women. This is an approach that has not previously been explored in the relevant literature. The findings for the full sample are replicated at the level of industry and occupation, where comparability is more reliable. The study supports the view of the existing literature that the gender wage gap varies by factors such as age and parenthood. But it also finds that, even when these and other important "control" variables such as part-time working, industry and occupation are taken into account, a statistically significant gender wage gap remains.


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Keywords: Gender Pay Gap; Segregation; Sample Selection Bias; Propensity Score Matching IPWRA; USA.

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## AN EMPIRICAL ANALYSIS OF THE GENDER PAY GAP IN THE UNITED STATES

## 1. Introduction

This paper looks at determinants of the gender wage gap in the US. The gender wage gap has been extensively researched previously and the US more than many countries. Many studies look for determinants and explanations of the crude gender wage gap - for explanations as to why the mean wage for women is less than for men. This approach is both useful and valid. The relevant literature has been both extensive long established: see the early review by Weichselbaumer and Winter-Ebmer (2005). The findings that wage gaps are related to gender segregation at work (such as the study by Walby and Ohlsen, 2002) or that they increase with age (for example Pastore et al, 2016) are of importance in understanding what creates the gap. This paper is, in part, in keeping with this tradition in that it looks at determinants of the gender gap. It shows that, despite important differences between the employment of men and women, the conclusion that women are paid less than men for essentially the same work is inescapable.

However, there is another theme in the same literature which seeks to identify a "residual" wage gap - the difference in pay between men and women which cannot be explained by age, education or other determinants. In short, this theme within the literature looks for evidence that women do not indeed receive the same pay for the same work as men. This paper is also in that tradition. It takes a Popper type approach. That women do not receive the same pay as men for the same work is a falsifiable proposition. It then focuses on whether or not the evidence allows us to falsify this proposition. The use of a matching approach is a comparatively recent methodological innovation to the study of the gender pay gap and such studies (see Novo 2008) are still few. This study extends the matching methodology to include the recent development of Inverse Probability Weighted Regression Adjustment estimators. The paper shows this approach to be a powerful tool in understanding the gender gap.

There are extensive difficulties in being able to identify accurately the "same work" to assess whether or not women receive less than the same pay. This is one key reason for the extensive research on the subject. In this paper we use a large sample of individuals drawn from the US Current Population Survey to investigate this residual gender wage gap. We find that, after careful construction of control groups at an industry level, we remain unable to reject the proposition that women do indeed receive less pay for the same work despite differences arising from gender segregation, part-time working and other factors. Our approach using matching techniques both for the full sample and for specific industries and occupations represents a stronger attempt to falsify the existence of a gender wage gap in the US than previous research. It provides increased confidence that the findings of previous research are robust.

An important contribution of the paper is that it shows gender segregation by both industry and by occupation to have been far more extensive than had been supposed. This, in turn, suggests that problems of sample selection bias in gender wage comparisons are much more acute than previously supposed. Many men and women are simply not in comparable forms of employment.

A second important contribution is methodological. Like a small number of previous studies, a propensity score matching approach is used to address this lack of comparability. This matching approach is extended to the more recent, more statistically robust Inverse Probability Weighted Regression Adjustment (IPWRA) estimator to provide an even more suitable set of controls for non-comparability. As far as can be ascertained this approach has not been previously used in gender wage gap studies.

Despite using a more robust statistical approach there remain residual doubts whether even the best of techniques could provide an adequate degree of comparability in the presence of such extensive gender segregation. To address this the analysis conducted for the full sample is repeated for a small number of selected industries and occupations. These were not chosen at random but because they employ similar proportions of both men and women. The results for these industries and occupations produce essentially the same conclusions as for the full sample: that no matter how far differences in male and female employment are taken into account a gender wage gap persists.

Section 2 provides a review of literature, section 3 summarises the data and its key characteristics and section 4 provides an overview of our methodology. In section 5, we present our Heckman regression analysis and in sections 6 and 7 our matching analysis, firstly for the full sample and then for three selected industries. Our conclusions are presented in section 8 .

## 2. Review of Literature

The issue of a gender pay gap has hardly been neglected in the empirical literature. Weichselbaumer and Winter-Ebmer (2005) found in their meta-analysis a total of 263 papers with empirical estimates (at that time) of a gender wage gap in one form or another. That it continues to be a topic of interest is partly attributable to its importance but also with the extensive problems and complexity in its estimation. The early literature on the subject had few of the modern advantages of micro data or modern estimation techniques. This, too, means that there remains scope for careful and sensible application of both.

A useful way to divide the existing literature is with respect to the particular aspect or determinant of the gender wage gap that they emphasise. Firstly, a number of studies focus upon evidence that the gender pay gap widens as workers age. In a study of Azerbaijan Pastore et al (2016) found the gender wage gap to widen over time. Bertrand et al (2010) in a study of US MBAs attributed a growing gender wage gap which increased with age to differences in training, career interruptions and weekly hours of work. Manning and Swaffield (2008), in a study of the UK, found that the gender wage gap increased with age.

Some research has linked education to the gender wage gap. The study of Italy provided by Mussida and Picchio (2014).found the gender wage gap to be greater at lower levels of education. Balu and Kahn (1997) found increased demand for highly skilled workers to have widened the gender wage gap for high skill workers. Irrespective of a gender wage gap there is a long and well established literature linking education and wages. Mincer (1958) was unquestionably one of the early researchers involved and there exists a considerable volume of subsequent research supporting the view that education increases wages. Of particular note is the paper by Acemoglu and Autor (2011),

Blau and Kahn (2016) find that, with a decline or reversal in some of the determinants (such as education) of earlier wage gaps in the US that segregation by both occupation and industry remains and important cause of the remaining gender wage gap. The link between gender segregation and the wage gap has long since been made. Polachek (1981) constructs a model in which female earnings potential depreciates during temporary exits from the labour force at the same time that males remaining in the labour force see their earnings potential appreciate from continued skill development. This affects investment in skills and, hence, occupational choice. Polachek (1985) further extends this link between gender wages and a life-cycle view of occupational choice. Polachek (2014) finds the gender pay gap to be smaller between single men and women and larger between married men and women. This is attributable to his life-cycle model of human capital and the resulting different occupational structure between the genders. Cohen et al (2009), in another study of the US, found growing gender segregation but that it coincided with a decreasing gender wage gap. Barón and CobbClark (2010) examined the effects of occupational segregation on the gender wage gap in Australia. They found the gender wage gap to be fully explained by productivity characteristics but not fully explained for high wage workers. Ohlsen and Walby (2004) found evidence from the UK that labour market rigidities - including the segregation of women into certain occupations and into smaller, non-unionised firms - were responsible for about $36 \%$ of the gender wage gap. Walby and Ohlsen (2002) also found both occupational and industrial segregation to have been prevalent in the UK. Livanos and Pouliakas (2012), in a study of Greece, found that gender segregation with respect to educational subject explained part of the gender wage gap. Pastore and Verashchagina (2011) found that the gender wage gap more than doubled during the transition from plan to market in Belarus, particularly because women have experienced increasing segregation in low-wage industries.

That women are much more likely than men to work part-time, which attracts lower rates of pay, has often been identified as an important contributor to the gender wage gap. Blau and Kahn (2013) found that US policies encouraged women to undertaken part-time work in lower level jobs. Ermisch and Wright (1993) provide evidence that women in the UK received lower wages in part-time than in full-time work.

In a study of wages in India, Menon (2009) found the gender wage gap to increase with respect to openness to international trade. Oostendorp (2009) found evidence that the occupational gender wage gap tends to decrease with respect to trade and foreign direct investment in richer countries but little evidence of any effect in poorer countries.

## 3. Data - Key Characteristics of the Sample

Our sample comprised a total of 82,887 employed individuals interviewed between October 2011 and March 2012 ( 6 sets of monthly interviews). These were drawn from a larger sample of 638,062 individuals (employed and not) aged 15 years or older. The data were taken from the US Current Population Survey (CPS). Details of the sampling and methodology used to conduct the survey can be found on the CPS website -https://www.census.gov/programs-surveys/cps.html . Only those individual returns which reported an hourly wage or sufficient information for one to be calculated were included in the sample of employed individuals. The remainder of the sample were used to adjust for possible sample selection bias.

The purpose of this section is to identify the most important characteristics of our sample for further analysis - to identify what is commonly referred to as the "stylized facts". The sample comprises a total of 41,677 males ( $50.3 \%$ of the total) and 41,210 females ( $49.7 \%$ of the total). The mean hourly wage for women was $\$ 20.02$ against a mean of $\$ 24.15$ for men. This implies a (crude) gender pay gap of $\$ 4.13$ per hour or about $21 \%$. There are, of course, many other factors to consider.

In our sample a much higher proportion of female workers (11.3\%) were single parents than were male workers $(4.0 \%)$. This, almost certainly, relates to the finding that the proportion of female workers who are part-time employees ( $25.6 \%$ ) is close to being double the proportion of male workers who are employed on a part-time basis ( $12.7 \%$ ). The prevalence of parttime working amongst women is one possible explanation of lower mean wages for females. The sample mean hourly wage for part-time workers was about $\$ 15$ compared to around $\$ 24$ for full-time workers. The first, combined key characteristic of our sample is that a much higher proportion of women than men work part-time and working part-time typically results in a lower hourly rate of pay than does working full-time.

As discussed previously there is an extensive literature which supports the proposition that more education results in higher wages. Table 1 provides summary details of the sample mean hourly wage for different levels of education and reports the proportion of females in each educational category. As with previous studies mean wages increase at every level of education, such that the highest level (post-graduate degree) attracts a mean wage more than three times the lowest level (no high school diploma). However, women represent slightly under $50 \%$ of the total sample but more than $50 \%$ of the sample at each of the four higher education levels. They are also under-represented at the lowest educational level, comprising only $42 \%$ of the relevant sub-sample. This initial examination suggests that, as so often noted before, education is an important determinant of wages but low educational attainment does not seem to be a plausible explanation for the gender pay gap.

| Table 1: Mean Hourly Wages and Proportion of Females by Educational Level |  |  |  |
| :--- | :---: | :---: | :---: |
|  |  |  | Mean hourly <br> wage (\$) |
| Education level | Observations | \% female | $51.94 \%$ |
| Post-graduate degree | 10028 | 37.28 |  |
| Bachelor's degree | 18354 | $52.06 \%$ | 28.93 |
| Associate degree | 8952 | $56.22 \%$ | 20.78 |
| Some college but no degree | 15801 | $50.91 \%$ | 17.94 |
| High school diploma | 22699 | $45.86 \%$ | 16.69 |
| No high school diploma | 7053 | $41.94 \%$ | 11.63 |
| Source: US Current Population Survey |  |  |  |

Other studies, such as Pastore et al (2016), have found that the gender pay gap increases with age. Table 2 provides details of the gap between mean male and female wages by age group. The results show the wage gap to increase with age, at least between the ages of 21 and 60 .

Thus, our sample of US workers exhibits similar properties with respect to a gender pay gap that widens with age.

Table 2: the Gender Pay Gap by Age Group

| Age group | Mean wage |  | gender pay gap (in hourly wages) |  |
| :---: | :---: | :---: | :---: | :---: |
|  | Male | Female |  |  |
|  | \$ | \$ | \$ | \% |
| 15-20 | 10.09 | 8.68 | 1.40 | 16.2\% |
| 21-30 | 16.85 | 15.36 | 1.49 | 9.7\% |
| 31-40 | 24.32 | 21.28 | 3.03 | 14.3\% |
| 41-50 | 28.26 | 21.48 | 6.78 | 31.6\% |
| 51-60 | 31.20 | 22.44 | 8.76 | 39.1\% |
| over 60 | 26.88 | 22.15 | 4.73 | 21.3\% |

Source: US Current Population Survey

A number of previous studies have found a wage premium associated with union membership. Our later analysis considers this more fully but a relevant feature of our sample is that union membership rates are only slightly different between men and women. In our sample $12.7 \%$ of male workers and $11.2 \%$ of females were union members. This makes it unlikely that union membership is the dominant cause of the gender pay gap.

A very striking feature of the US Current Population Census (CPS) data is the high degree of gender segregation in employment. Appendix 1 reports the share of females in total employment for each of 262 detailed categories of industry, along with the mean hourly wage for each. At total of 34,064 workers ( $41 \%$ of the sample) are employed in an industry where one gender accounts for $75 \%$ or more of the total workforce. A majority of the sample 44,016 workers or $53.1 \%$ of the total - are employed in industries where one gender accounts for $2 / 3$ or more of total employment. There are also non-trivial differences in wages which
employ a high proportion of women and those which employ a high proportion of men. Those industries for which employment was at least two thirds men exhibited a mean hourly wage of $\$ 22.63$. In contrast those industries which employed at least two thirds women a mean hourly wage of $\$ 19.09$.

Appendix 2 provides a similar analysis but by occupation. It reports the share of women in each of 525 detailed occupations together with the mean hourly wage for each occupation. If men and women are to a substantial extent in different industries they are even more likely to be engaged in different occupations. More than one half of the sample -51.659 workers or $50.3 \%$ of the sample - were engaged in an occupation for which one gender accounted for $75 \%$ or more of total employment. A total of 59,527 workers ( $71.8 \%$ of the sample) were in occupations where one gender accounted for two thirds or more of overall employment. As with industries, those occupations in which men are concentrated exhibited a higher mean wage than those in which women are concentrated. Those occupations for which men represented $75 \%$ or more of employment exhibited a mean hourly wage of $\$ 23.39$, those for which women represented $75 \%$ or more of employment a mean hourly wage of $\$ 21.05$.

What these findings emphasise is that, to a large extent, men and women work in different industries and different occupations. This gender segregation complicates our understanding of the nature of a gender pay gap. That is, underlying the issue of the gender pay gap is one of equity. The same pay for undertaking the same work is a clear principle. But very often women and men are segregated into different industries and different occupations which make a clear comparison more complex. For this reason our later analysis focuses on trying to control for differences in industry and occupation between men and women.

## 4. Methodology

### 4.1 Regression

Our starting point, as with many previous studies, is with a regression model - the Heckman selection model in this case. We used a Mincer (1958) type equation, with the dependent variable being the log of hourly wages (lhwage). Our specification was:

$$
\begin{equation*}
\text { In hwage }=X \beta+Z \gamma+W \theta+u \tag{1}
\end{equation*}
$$

where Z is a matrix of observations of occupational and sector dummy variables ( 13 sectors), W a matrix of observations of 4 ethnic dummy variables and 4 regional dummy variables (one of each omitted in estimation). The matrix X is a matrix of observations of the following variables:

- gender - $(0,1), 1$ if female
- age - age (in years)
- sparent - single parent $(0,1), 1$ if a single parent
- educyears - number of years of education, starting from first grade
- hours - number of hours worked per week
- migrant $-(0,1), 1$ if born outside the US
- union - $(0,1)$, I if a union member
- parttime $-(0,1), 1$ if a part-time worker.

We estimated two different versions of the model. Model 1 used dummy variables for 22 aggregate categories of occupation and model 2 for 525 disaggregated categories of occupation. In both models we used a redundant variables test for the exclusion of all sector and occupation dummy variables.

### 4.2 Propensity Score Matching with a Single Treatment Variable

As we have seen in the preceding review of literature a key issue in empirical studies of the gender pay gap is the need to try to compare like with like when comparing pay for men and women. Some authors - Nopo (2008) and Frölich (2007) in particular - have advocated and used matching estimators of gender pay gaps. Both authors propose the technique as an alternative to the de-compositions of the type proposed by Blinder (1973) and Oaxaca (1973), arguing that it provides a more solid basis for comparing male and female wages when important differences in observable characteristics exist between the two groups. Nopo (2008) also makes the point that matching estimators are not dependent upon measuring the distributions of male and female earnings at a specific point - usually at the mean. Certainly the basis of the matching approach in the selection of a carefully matched control sample has considerable appeal in addressing the issue of a gender pay gap. For conciseness we do not attempt to provide an exposition of the arguments of Nopo (2008) and Frölich (2007) here and readers requiring elaboration are referred to the original authors.

A matching approach starts by defining an outcome variable (log of hourly earnings) and a $(0,1)$ treatment variable (female). It seeks to establish whether a statistically significant difference exists in the log of hourly earnings between the treated (female) group and the untreated (male) group. The procedure selects a control group from untreated (male) which is selected to be, as far as possible, identical in all other key characteristics to the treated (female) group. This process of creating a "matched" control group is done by the creation of a propensity score, normally (as in this study) by developing a probit model to identify the key characteristics of the treated group.

There are three main parameters within the matching approach::
ATE - the average treatment effect in the population (all indviduals).
ATT - the average treatment effect for "treated" individuals (female workers)
ATNT - the average treatment for "untreated" individuals (male workers).

These parameters are defined as follows:

$$
\begin{align*}
& \mathrm{ATE}=\mathrm{E}(\mathrm{Y} 1 \mathrm{i}-\mathrm{Y} 0 \mathrm{i}) \equiv \mathrm{E}(\beta \mathrm{i})  \tag{1}\\
& \mathrm{ATT}=\mathrm{E}(\mathrm{Y} 1 \mathrm{i}-\mathrm{Y} 0 \mathrm{i} \mid \mathrm{Di}=1) \equiv \mathrm{E}(\beta \mathrm{i} \mid \mathrm{Di}=1)  \tag{2}\\
& \mathrm{ATNT}=\mathrm{E}(\mathrm{Y} 1 \mathrm{i}-\mathrm{Y} 0 \mathrm{i} \mid \mathrm{Di}=0) \equiv \mathrm{E}(\beta \mathrm{i} \mid \mathrm{Di}=0) \tag{3}
\end{align*}
$$

Where Y is the outcome and where subscript 1 denotes individuals who are "treated" (female) and subscript 0 denotes those that are not. D indicates whether or not "treatment" was received ( 1 for treated and 0 for untreated).

In this paper we use kernel density matching (with bootstrapped standard errors) to test for a statistically significant gender pay gap between men and women within our sample. Although propensity score matching is an effective technique for reducing bias on observables (mismatches between male and female workers) it does not follow that it always produces an adequate control group. A further advantage of the technique is that is possible to check how well the control group is matched with the group of interest. The existing literature finds that the gender wage gap varies according to key population characteristics. To test for similar effects in our sample we divide the sample into two and conduct the matching analysis separately for each sub-sample. This is conducted for (i) parents and non-parents (ii) married and unmarried and (iii) young and older workers.

For the full sample our earlier summary of the sample characteristics suggests that there must be real concerns with matching when there is a substantial degree of gender segregation by both industry and occupation. To avoid the risk that such gender segregation makes the creation of an adequate control group difficult we conduct a matching analysis not only for the full sample but for several identifiable sub-samples. The study also repeats the matching analysis for three individual industries - banking, grocery stores and restaurants. We also repeat this analysis for five different occupations - accountants, assemblers, customer service representatives, janitors and lawyers. These were not selected at random but because they (a) have comparable numbers of male and female employees and (b) each offer a sufficiently large sample size (each industry excess of 1200 observations and each occupation in excess of 600 ).

A standard concern within the literature is with bias on observables (common support) - in essence how well does the control group of male (untreated) match with the female (treated) group according to observable characteristics. This study presents evidence for the extent to which the matching process reduced bias on observables in Appendix 3. A further, more intractable problem is the risk of bias on unobservables - that an excluded variable may have biased the results. This type of problem is not unique to matching estimators. Problems with confounding variables and omitted variable bias are well known in relation to other estimators. To reduce the risk of bias on observables the probit model (used to create the propensity score) was first estimated in a general form, including as many potentially relevant variables as the available data would allow. However, as King and Nielsen (2016) have pointed out, this creates a further risk of bias from matching on irrelevant variables. To limit this risk a "specific" form of the probit model (in which all variables jointly insignificant were removed from the general specification) was used to create the propensity score employed.

### 4.3 Matching with Two Treatment Variables

A further possible limitation with the single treatment approach to matching is that other variables interact with gender in a way that makes more like a second treatment than a control. For example, the wages of part-time workers are lower than those of full-time workers but more women work part-time than men. Having two treatment variables - for example gender and part-time working - provides an opportunity to assess how both interact rather than thinking of part-time working as being independent of gender. Likewise, the interaction between gender and parenthood in determining pay is of more interest when both are treatment variables than parenthood is simply, in effect, a control.

Cattaneo (2010) and Cattaneo et al (2013) propose an estimator - inverse probability weighting regression analysis (IPWRA) - which allows for two or more $(0,1)$ treatment effects on the same outcome variable. IPWRA estimators have desirable properties beyond the ability to include more than one treatment effect. As King and Nielsen (2016) point out they are less prone to mis-matching on irrelevant observables. The IPWRA approach estimates both a treatment model and an outcome model. Unlike the basic matching approach this means that the treatment is modelled as an endogenous variable. More importantly IPWRA is a "doubly robust" estimator, which offers some protection against possible incorrect assumptions. Hirano et al (2003) show that doubly robust estimator exhibit a lower bias than estimators without the doubly robust property. A Monte Carlo study by Busso et al (2013) shows that bias corrected matching performs well when the match between treated and untreated is poor but, since the performance of the estimator is sensitive to the underlying data generating process, recommend the use of more than one estimator of treatment effects. That is the approach adopted by this study in using both propensity score and IPWRA estimators.

Readers requiring a more detailed exposition of these issues are referred to the original papers. Note: for computational reasons it was not possible to include occupation and sector dummies in the IPWRA analysis. The appropriate comparison with propensity score matching estimates is with those estimated without these dummies.

## 5. Regression Results

Table 3 presents regression results for a Heckman selection model. Regression analysis was by means of the Heckman model (maximum likelihood option) in STATA14. The results are reported in Table 3.

| Variable | Coefficient/ |
| :---: | :---: |
|  | standard error |
| gender | -0.1608*** |
|  | (0.0044) |
| age | 0.0068*** |
|  | (0.0002) |
| union | 0.1705*** |
|  | (0.0062) |
| married | 0.0728*** |
|  | (0.0049) |
| parent | 0.0788*** |
|  | (0.0048) |
| parttime | -0.2225*** |
|  | (0.0144) |
| migrant | -0.0424*** |
|  | (0.0061) |
| educyears | 0.0457*** |
|  | (0.0007) |
| constant | 2.3675*** |
|  | (0.2225) |
| occupation dummies | yes |
| sector dummies | yes |
| regional dummies | yes |
| race dummies | yes |
| Selection component |  |
| gender | -0.0411*** |
|  | (0.0041) |
| age | -0.0023*** |
|  | (0.0001) |
| married | 0.1064*** |
|  | (0.0048) |
| parent | 0.0987*** |
|  | (0.005) |
| retired | -2.6711*** |
|  | (0.1108) |
| migrant | -0.0222*** |
|  | (0.0061) |
| school | 0.3509*** |
|  | (0.0767) |
| constant | -1.0268*** |
|  | (0.0065) |
| observations | 638,062 |
| censored observations | 557,110 |
| uncensored obs | 80,952 |
| Wald, chi square (62) | 42739.43 |
| Probability > chi2 | 0.0000 |
| rho | 0.0126 |
|  | (0.0485) |
| sigma | 0.5302 |
|  | (0.0013) |
| lambda | 0.0067 |
|  | (0.0258) |
| Note: *** significant at 99\% |  |

For the selection component the results show that women are statistically significantly (at $99 \%$ confidence) less likely to be employed than men. Unsurprisingly older and retired workers are statistically significantly less likely to have remained in some form of employment. Parents are statistically significantly (at $99 \%$ ) more likely to be employed. Individuals still in education (note: our sample includes only individuals aged 15 or over) are statistically significantly more likely to be in some form of employment. Presumably, this reflects the need for individuals to work their way through college. Finally, migrants to the US were also statistically significantly less likely to be employed.

For the remainder of the Heckman model there is a statistically significant (at $99 \%$ confidence) estimated gender wage gap of $16 \%$. Of the control variables age, union membership, being married, parenthood and education years were found to have positive and statistically significant effects (at $99 \%$ ) on hourly wages. Part-time working and being a migrant were found to have statistically significant (at 99\%) negative effects on hourly earnings.

The regression analysis is, we believe, of use in its own right and provides evidence to the existence of a gender pay gap which persists despite the inclusion of a considerable number of control variables. The limitations of the Heckman procedure in studies of gender pay gaps are well known and have been discussed in the literature. It does, however, give some important insight into the variables that might be needed to identify an appropriate control group in a matching process. That is, it is clear that a proper comparison between males and females would require matching on a large number of variables. These include industry, occupation, education, age, union membership, ethnicity and region.

## 6. Treatment Effects - Full Sample

The first step in the matching process is to create a propensity score by which a control group is selected, to allow comparison between female and male workers with key common characteristics. This was done, as in most such studies, using a probit model to create the propensity score. The $(0,1)$ dependent variable was gender ( 1 if female) and the independent variables included:

- age
- education
- hours worked
- part-time
- union membership
- sector
- occupational category
- ethnicity
- region
- married
- parent
- migrant

Note that the data for hourly wages were calculated by dividing usual weekly earnings by usual weekly hours. A large proportion of the sample were not hourly paid and reported only weekly earnings, requiring the calculation of an hourly equivalent. This implies that the "hourly wage" for weekly paid workers varies with respect to hours as well as with respect to weekly wages. For this reason hours worked was added as a control variable.

Estimation was conducted in Stata14 and the results are reported in Table 4. Matching was by means of kernel density and bootstrapped standard errors are reported for ATT. Results are reported for two different models - one that includes sector and occupation dummies in the propensity score and one that does not. Both models show that, even when matched with a carefully selected control group, evidence of a statistically significant (at $99 \%$ ) gender pay gap persists. However, the two versions produce different estimate values for the gender pay gap. Without industry or occupation variables to capture the effects of gender segregation at work the results suggest a gender pay gap of about $17 \%$. When industry and occupation are included this falls to about $12 \%$. Note, however, the exclusion of these dummy variables switches industry and occupation from observables to unobservables, and simply transfers bias to unobservables.

Standard checks on the bias on observables (how effective the match between the group of interest and the control group) are presented in Appendix 3. These checks show that the model without industry and occupation variables produces an outcome which, whilst not perfect, is much better than that for the model when these are included. That is, excluding industry and occupation produces a better outcome with respect to selection on observables. This needs careful interpretation. It does not suggest that excluding industry and occupation dummies produces more reliable estimates because the relevant effects are simply transferred to bias on unobservables. An alternative, more plausible conclusion is that gender segregation is so extensive that industry and occupation dummies are not sufficient to secure a wholly satisfactory match in the full sample between female workers and a control group of male workers.

Table 4: Propensity Score Matching results (full sample), outcome variable = log of hourly wages Kernel density matching, treatment = female, bootstrapped standard errors

| Treated | Controls | Difference | S.E. | T-stat | Observations |  |  |
| :--- | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  |  |  | Untreated <br> Treated |  |
|  |  |  |  |  |  |  |  |
| (male) | (female) |  |  |  |  |  |  |
| FULL SAMPLE : |  |  |  |  |  |  |  |
| (a) with industry and occupation dummies |  |  |  |  |  |  |  |
| Unmatched | 2.7523 | 2.9303 | -0.1779 | 0.0045 | -39.37 | 40,752 | 40,011 |
| ATT | 2.7523 | 2.8698 | -0.1175 | 0.0060 | -19.42 |  |  |
| (b) without industry and occupation dummies |  |  |  |  |  |  |  |
| Unmatched | 2.7523 | 2.9303 | -0.1779 | 0.0045 | -39.37 | 40,752 | 40,011 |
| ATT | 2.7523 | 2.9185 | -0.1662 | 0.0048 | -34.76 |  |  |

SAMPLE DIVIDED BY PARENTHOOD

| (a) parents |  |  |  |  |  |  |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| Unmatched | 2.7827 | 3.0671 | -0.2844 | 0.0075 | -37.88 | 13,795 |
| ATT | 2.7827 | 2.9620 | -0.1792 | 0.0132 | -13.62 |  |
| (b) non-parents |  |  |  |  |  |  |
| Unmatched | 2.7359 | 2.8603 | -0.1244 | 0.0056 | -22.19 | 26,954 |
| ATT | 2.7359 | 2.8339 | -0.0980 | 0.0072 | -13.67 |  |

SAMPLE DIVIDED BY MARITAL STATUS

| (a) married |  |  |  |  |  |  |  |
| :--- | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Unmatched | 2.8653 | 3.0881 | -0.2228 | 0.0060 | -37.21 | 23,485 | 20,729 |
| ATT | 2.8653 | 3.0395 | -0.1742 | 0.0091 | -19.22 |  |  |
| (b) unmarried |  |  |  |  |  |  |  |
| Unmatched | 2.6309 | 2.7156 | -0.0847 | 0.0065 | -13.10 | 17,265 | 19,282 |
| ATT | 2.6309 | 2.7343 | -0.1034 | 0.0089 | -11.59 |  |  |
| SAMPLE DIVIDED BY AGE GROUP |  |  |  |  |  |  |  |
| (a) Young (24 or under) |  |  |  |  |  |  |  |
| Unmatched | 2.1934 | 2.2970 | -0.1036 | 0.0096 | -10.80 | 4,096 | 4,235 |
| ATT | 2.1934 | 2.2448 | -0.0514 | 0.0116 | -4.42 |  |  |
| (b) Older (25 or |  |  |  |  |  |  |  |
| Unmatched | 2.8186 | 3.0011 | -0.1825 | 0.0047 | -39.22 | 36,654 | 35,774 |
| ATT | 2.8186 | 2.9564 | -0.1379 | 0.0065 | -21.34 |  |  |
| SAMPLE DIVIDED BY PART-TIME AND FULL-TIME |  |  |  |  |  |  |  |
| (a) Part-time |  |  |  |  |  |  |  |
| Unmatched | 2.4470 | 2.4063 | 0.0407 | 0.0103 | 3.97 | 5,461 | 10,962 |
| ATT | 2.4470 | 2.4759 | -0.0289 | 0.0141 | 2.04 |  |  |
| (b) Full-time |  |  |  |  |  |  |  |
| Unmatched | 2.8622 | 3.0084 | -0.1462 | 0.0048 | -30.37 | 35,451 | 29,403 |
| ATT | 2.8622 | 3.0299 | -0.1677 | 0.0066 | -25.47 |  |  |

Table 4 also reports matching results for a number of sub-samples, created to reflect effects found to have an influence on the gender wage gap in the existing literature. The estimate of the gender wage gap for parents was about $18 \%$ compared to about $10 \%$ for non-parents, confirming the importance of having children in understanding the gap. For married workers there are broadly similar estimates - a gender wage gap of about $17 \%$ for married workers and about $10 \%$ for unmarried. The estimate of the gender wage gap for young (aged 24 or under) workers is very much lower at about $5 \%$ but still statistically significant at $99 \%$ confidence. By comparison the estimated gender wage gap for older workers was
approximately $18 \%$. Finally, the lowest estimated gender wage gap was for part-time workers at roughly $3 \%$, statistically significant at $95 \%$ but not $99 \%$ confidence.

Table 5 reports inverse probability weighting regression adjustment (IPWRA) analysis using female as a treatment variables and each of a number of other treatment variables (separately). The other treatment variables were:

- married
- young (24 or under)
- parent, and
- part-time.

The results of the IPWRA analysis consistently suggest a statistically significant gender wage gap. Depending on the second treatment effect estimates of the gap vary from about $13 \%$ (when married or parent are the second treatment) to just under $20 \%$ (when part-time is the second treatment). With respect to the second treatment variables the results suggest that married workers (male and female) are typically paid about $11 \%$ more than unmarried ones, that young workers are typically paid at least $30 \%$ less than older ones and that parents (of both genders) are paid about $10 \%$ more than non-parents.

Some of the other results of the IPWRA analysis imply estimates of the gender wage gap which are worth noting. These are:

- an estimated statistically significant gender wage gap for married women of around 24-28\% (compared to married males)
- no statistically significant gender wage gap for part-time workers
- a statistically significant estimated gender wage gap of about $25 \%$ for female compared to male parents.
- a statistically significant estimated wage difference between part-time and full-time workers of about 33-35\%
- Since part-time workers are predominantly female there is a substantial overlap between the female and part-time categories. The combined effects of being both female and a part-time worker is in the order of a $35-42 \%$ reduction in mean hourly wages. That is, part-time working is an important mechanism by which women are paid less than men

| Table 5 : IPWRA Results for the Full Sample |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
| Outcome variable $=\log$ of hourly wage |  |  |  |  |
|  | Treatment Group |  |  |  |
| Control Group | None | Female | Married | Both |
| None |  | -0.125144*** | 0.115671*** | -0.0633846*** |
|  |  | (0.006543) | (0.0107098) | (0.0138961) |
| Female | 0.1298907*** |  | 0.283408*** | 0.0872596*** |
|  | (0.0057258) |  | (0.0073488) | (0.0067485) |
| Married | -0.109139*** | -0.2408149*** |  |  |
|  | (0.0103845) | (0.0099226) |  |  |
| Both | 0.0419071*** | -0.0876773*** | 0.2152207*** |  |
|  | (0.0093642) | (0.0070426) | (0.005651) |  |
|  | Treatment Group |  |  |  |
| Control Group | None | Female | Young | Both |
| None | - | -0.1582487*** | -0.3050489*** | -0.3828652*** |
|  |  | (0.0048917) | (0.011865) | (0.0133226) |
| Female | 0.1792499*** | - | -0.2470155*** | -0.3243379*** |
|  | (0.0042308) |  | (0.0107038) | (0.0109828) |
| Young | 0.4713551*** | 0.3182097*** |  | -0.0903919*** |
|  | (0.0245741) | (0.0226418) |  | (0.0100671) |
| Both | 0.5906125*** | 0.4086961*** | 0.0995921*** |  |
|  | (0.0237252) | (0.0210996) | (0.0101585) |  |
|  | Treatment Group |  |  |  |
| Control Group | None | Female | Parent | Both |
| None | - | -0.1311908*** | 0.1028185*** | -0.0823592*** |
|  |  | (0.0052239) | (0.0074061) | (0.0067756) |
| Female | 0.1457914*** |  | 0.2798527*** | 0.0583344*** |
|  | (0.0047408) |  | (0.0079426) | (0.0060906) |
| Parent | -0.1128119*** | -0.2552655*** |  | -0.2093114*** |
|  | (0.0120452) | (0.019492) |  | (0.0106078) |
| Both | 0.0939689*** | -0.0467048*** | 0.2235659*** |  |
|  | (0.0069651) | (0.0076259) | (0.0075187) |  |
|  | Treatment Group |  |  |  |
| Control Group | None | Female | Part-time | Both |
| None | - | -0.1980886*** | -0.3359224*** | -0.4119995*** |
|  |  | (0.0049261) | (0.056984) | (0.0567705) |
| Female | 0.1981587*** |  | -0.2665149*** | -0.3804477*** |
|  | (0.0044029) |  | (0.0357973) | (0.029303) |
| Part-time | 0.3513055*** | 0.0966296 |  | -0.060694*** |
|  | (0.0575298) | (0.1449512) |  | (0.0120776) |
| Both | 0.3485879*** | 0.1504993** | 0.0473681*** |  |
|  | (0.0837318) | (0.0836521) | (0.0091105) |  |

As with our regression analysis we believe that our matching analysis using the whole sample provides valuable insights but does not yet provide our ultimate conclusion. If the existence
of a gender wage gap is a falsifiable hypothesis then this study has not yet made sufficient effort to falsify it. The matching model without industry or occupation variables offers at least a reasonable profile with respect to selection on observables. But this is only by transferring these variables to the "unobservable" category, with the resultant risk of bias on unobservables. That is, the degree of gender segregation by both industry and occupation in our sample is so high that it is doubtful that it is possible to select a control group of men which adequately match the women in the sample in terms of both industry and occupation. Gender segregation makes it very difficult to properly compare like with like - to be certain that women do indeed receive less pay for the same work.

Since we believe our results on matching with the full sample to be useful but not conclusive we adopted one further approach. Within the sample (see Appendix 1) there are only a few detailed industries which employ men and women in more or less equal proportions and for which there were in excess of 1000 observations. We selected three of these - banking, grocery stores and restaurants - for which we repeated the matching analysis at the industry level. Since we have concerns about using the full sample in the presence of gender segregation the intention was to improve the accuracy of matching by using (separately) three industries where we know men and women to be employed in significant numbers. The following section reports the results. Section 8 takes a similar approach but using a number of occupations selected for employing significant numbers of both sexes - see Appendix 2.

## 7. Propensity Score Matching at the Industry Level

The results of the matching analysis (for each of the three selected industries) using gender as a single treatment are reported in Table 6.

| Table 6: Propensity Score Matching Results for Selected Industries, outcome variable = log of hourly wages |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Kernel density matching, treatment = female, bootstrapped standard errors |  |  |  |  |  |  |  |
|  | Treated | Controls | Difference | S.E. | T-stat | Observations |  |
|  |  |  |  |  |  | Untreated | Treated |
|  |  |  |  |  |  | (male) | (female) |
| Banking |  |  |  |  |  |  |  |
| Unmatched | 2.8973 | 3.3489 | -0.4516 | 0.0321 | -14.07 | 456 | 849 |
| ATT | 2.8973 | 3.0702 | -0.1729 | 0.0537 | -3.22 |  |  |
| Grocery Stores |  |  |  |  |  |  |  |
| Unmatched | 2.3703 | 2.4979 | -0.1276 | 0.0233 | 5.48 | 823 | 893 |
| ATT | 2.3703 | 2.4834 | -0.1131 | 0.0291 | 3.89 |  |  |
| Restaurants |  |  |  |  |  |  |  |
| Unmatched | 2.0932 | 2.2974 | -0.2043 | 0.0157 | -12.98 | 2,213 | 2,581 |
| ATT | 2.0932 | 2.2882 | -0.1950 | 0.0181 | -10.79 |  |  |

The variables used to create the propensity score were the same as for the full sample, except that sector dummy variables were no longer used. That is, the propensity score was created using age, education years, hours worked, part-time, union membership, occupational category, ethnicity, region, married, parent and migrant. Those variables not jointly significant in a trial run of the (probit) treatment model were eliminated from the version used to generate the propensity score.

The results suggest a statistically significant gender pay gap (at 99\% confidence) for all three industries. The lowest estimate is for grocery stores - an estimated gender pay gap of about $11 \%$. For banking the estimated gender pay gap was approximately $17 \%$ and for restaurants about $19 \%$. Checks on the matching (diagrams only) are reported in Appendix 3. These suggest that, at industry level, matching of the control group (male) with the female group is much closer than for the full sample, although still not perfect in every respect. Using an industry which employs both men and women in similar proportions does improve the accuracy of matching.

The gender wage gap for both the banking and restaurants sectors are of a similar magnitude to estimates for the full sample. For these two the matching analysis at industry level does provide more statistically sound estimates and serves to re-enforce earlier conclusions. The reasons for the lower wage gap for grocery stores are not immediately obvious. The preponderance of small and, in particular, family firms might be one reason but the restaurants sector also shares these characteristics.

As with the full sample we also conducted IPWRA analysis for each of the three industries. Table 7 reports the results using gender and young ( 24 or under) as the two treatment variables. The results suggest an estimated gender wage gap of about $23-25 \%$ for banking, about $12 \%$ for grocery stores and around $21-22 \%$ for restaurants. The IPWRA analysis included the same variables as for the propensity score matching except that occupational dummies were excluded for computational reasons. In consequence, differences in the gender wage gap between the two estimators may be partly explained by the effects of the omission of occupational dummies. The results also suggest that young workers are paid less than older ones by an estimate of about $25-29 \%$ for banking, $20-37 \%$ for grocery stores and about $19 \%$ for restaurants.

Table 7: IPWRA Analysis for Selected Industries, treatments = (a) female and (b) young (24 or under) Outcome variable: log of hourly wages

| Control Group | Treatment Group |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
|  | None | Female | Young | Both |
| Banking |  |  |  |  |
| None | - | $-0.2488845^{* * *}$ | $-0.2458963 * *$ | $-0.3822232^{* * *}$ |
|  |  | (0.0366476) | (0.1102328) | (0.0555384) |
| Female | 0.2309572*** | - | -0.234765** | -0.3964884*** |
|  | (0.0361972) |  | (0.0928724) | (0.0416393) |
| Young (24 or under) | 0.2912628*** | $0.4214551^{* * *}$ | - | -0.0909604 |
|  | (0.0854079) | (0.1015625) |  | (0.0755514) |
| Both | 0.7827763*** | $0.4139921^{* * *}$ | 0.1773528* |  |
|  | (0.1323177) | (0.0665209) | (0.0956104) |  |
| Grocery Stores |  |  |  |  |
| None | - | $-0.1187162^{* * *}$ | $-0.1999603 * * *$ | -0.2472074*** |
|  |  | (0.0243205) | (0.0364294) | (0.0370578) |
| Female | 0.1155783*** | - | $-0.2203828^{* * *}$ | -0.2757366*** |
|  | (0.0264012) |  | (0.0592837) | (0.0646771) |
| Young (24 or under) | 0.3700041*** | $0.1955258 * * *$ | - | -0.0748831* |
|  | (0.0427763) | (0.039766) |  | (0.0389249) |
| Both | 0.8775184*** | 0.5256967*** | 0.087469 |  |
|  | (0.1896265) | (0.1592932) | (0.0536876) |  |
| Restaurants |  |  |  |  |
| None | - | $-0.2223971^{* * *}$ | -0.1856789*** | $-0.2750826^{* * *}$ |
|  |  | (0.0238335) | (0.0531225) | (0.062223) |
| Female | 0.2057629*** | - | 0.0141359 | -0.0472287 |
|  | (0.0218401) |  | (0.0293309) | (0.0301994) |
| Young (24 or under) | 0.1936046*** | -0.0427095 | - | $-0.079008^{* * *}$ |
|  | (0.0396057) | (0.0334089) |  | (0.0198733) |
| Both | 0.3720949*** | 0.1674352*** | 0.076621** |  |
|  | (0.0323054) | (0.0321687) | (0.0207686) |  |

The results with both gender and part-time working as treatments are presented in Table 8. The results suggest a gender wage gap of between $27 \%$ and $30 \%$ in banking, $16-31 \%$ in grocery stores and about $25 \%$ for restaurants. Part-time workers in banking were estimated to receive between 62 and $67 \%$ lower hourly earnings in banking, $31-39 \%$ lower earnings in grocery stores and 35-38\% lower hourly pay in restaurants.

Table 8: IPWRA Analysis for Selected Industries, treatments = (a) female and (b) part-time Outcome variable: log of hourly wages

| Control Group | Treatment Group |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
|  | None | Female | Part-time | Both |
| Banking |  |  |  |  |
| None | - | $-0.30145^{* * *}$ | -0.67663*** | -0.60625*** |
|  |  | (0.03546) | (0.09576) | (0.05396) |
| Female | 0.27193*** | - | -0.40053*** | -0.33646*** |
|  | (0.03413) |  | (0.07028) | (0.03663) |
| Part-time | 0.61589*** | 0.38520*** | - | 0.0543 |
|  | (0.03874) | (0.02239) |  | (0.04680) |
| Both | 0.77547*** | 0.37721*** | -0.09160 | - |
|  | (0.05706) | (0.03890) | (0.06651) |  |
| Grocery Stores |  |  |  |  |
| None | - | -0.16172*** | -0.31359*** | -0.36529*** |
|  |  | (0.02939) | (0.03791) | (0.03074) |
| Female | 0.16189*** | - | -0.14438** | -0.20047*** |
|  | (0.03061) |  | (0.05451) | (0.04403) |
| Part-time | 0.39218*** | 0.23252*** | - | -0.02201 |
|  | (0.03086) | (0.03129) |  | (0.02503) |
| Both | 0.41870*** | 0.26556*** | 0.01746 | - |
|  | (0.02674) | (0.02741) | (0.02290) |  |
| Restaurants |  |  |  |  |
| None | - | -0.26550*** | -0.25299*** | -0.37692*** |
|  |  | (0.02241) | (0.02113) | (0.01936) |
| Female | 0.25531*** | - | -0.03950* | -0.14468*** |
|  | (0.02145) |  | (0.02400) | (0.0218) |
| Part-time | 0.34500*** | 0.0955*** | - | -0.09049*** |
|  | (0.0225) | (0.02490) |  | (0.01866) |
| Both | 0.44659*** | 0.20174*** | 0.08020*** |  |
|  | (0.02093) | ('0.02311) | (0.01807) |  |

## 8. Propensity Score Matching at the Occupation Level

This section adopts an essentially similar approach to the industry level analysis but at the level of individual occupations. Like the industry level analysis occupations were not selected at random but specifically because they employ significant numbers of both men and women (see Appendix 2). That is, they are occupations which tend not to be gender segregated.

Table 9 presents the propensity score matching results for five different occupations. The control variables used to estimate the propensity score were essentially the same as for earlier analysis with one exception - dummy variables for sectors were used in place of the dummy variables for occupational categories used in the industry level analysis. This was intended to ensure that the control group shared a similar sectoral composition to the treated group.

| Table 9: Propensity Score Matching Results for Selected Occupations, outcome variable = log of hourly wages |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Kernel density matching, treatment = female, bootstrapped standard errors |  |  |  |  |  |  |  |
|  | Treated | Controls | Difference | S.E. | T-stat | Observations |  |
|  |  |  |  |  |  | Untreated | Treated |
|  |  |  |  |  |  | (male) | (female) |
| Customer Representatives |  |  |  |  |  |  |  |
| Unmatched | 2.5956 | 2.6971 | -0.1015 | 0.0292 | 3.48 | 403 | 821 |
| ATT | 2.5956 | 2.7164 | -0.1208 | 0.0396 | 3.05 |  |  |
| Assemblers |  |  |  |  |  |  |  |
| Unmatched | 2.4611 | 2.6461 | -0.1850 | 0.0357 | 5.18 | 358 | 257 |
| ATT | 2.4628 | 2.5875 | -0.1247 | 0.0394 | 3.16 |  |  |
| Accountants |  |  |  |  |  |  |  |
| Unmatched | 3.1920 | 3.3776 | -0.1856 | 0.0410 | 4.52 | 350 | 597 |
| ATT | 3.1920 | 3.3456 | -0.1536 | 0.0490 | 3.13 |  |  |
| Lawyers |  |  |  |  |  |  |  |
| Unmatched | 3.5405 | 3.6506 | -0.1102 | 0.0501 | 2.20 | 343 | 201 |
| ATT | 3.5383 | 3.7013 | -0.1630 | 0.0558 | 2.92 |  |  |
| Janitors |  |  |  |  |  |  |  |
| Unmatched | 2.3765 | 2.5037 | -0.1272 | 0.0254 | 5.00 | 961 | 414 |
| ATT | 2.3731 | 2.4572 | -0.0841 | 0.0272 | 3.10 |  |  |

For all five occupations a statistically significant (at $99 \%$ confidence) gender wage gap remains despite matching for a carefully selected control group and despite narrowing the comparison between male and female workers to a single occupation. That is, controlling for gender segregation does not eliminate a gender wage gap. The estimated wage gap for each occupation was:

- Customer representatives - $12 \%$
- Assemblers - 12\%
- Accountants - $15 \%$
- Lawyers - $16 \%$
- Janitors - 8\%

These estimates at the level of an individual occupation are lower than the comparable estimate for the gender wage gap for the full sample (16\%) when industry and occupation
effects are ignored. But it is also clear that the gender wage gap is not eliminated by separately considering one of the few individual occupations which is not dominated by one gender. It is only possible to speculate the reasons for variation in the gender wage gap by occupation. It is worth noting that the two most highly educated occupations - lawyers and accountants - exhibited the highest wage gaps but the least skilled occupation (janitors) exhibited the lowest wage gap. Such evidence is consistent with Polachek's (1981) view of depreciation of human capital during absences from the work force.

As with earlier sections we extend the matching analysis to use the IPWRA estimator. Table 10 reports IPWRA results for each of the five selected occupations, using female and young as the two $(0,1)$ treatment variables and the log of hourly earnings as the outcome. The results suggest a gender wage gap of around $12-14 \%$ for customer service representatives, between 12 and $16 \%$ for assemblers, about $18-20 \%$ for accountants, $11-13 \%$ for lawyers and between 7 and $10 \%$ for janitors. In all cases the gender wage gap is statistically significant at $99 \%$, with one exception which is statistically significant at $95 \%$ confidence.

For each occupation Table 10 suggests that hourly earnings for young workers were statistically significantly less than for older ones. For customer service representatives the difference was about $35 \%$, for assemblers about $14 \%$, for accountants $29 \%$ and janitors $14 \%$. Within our sample there were no lawyers aged 24 or under so the definition of "young" was changed to 32 or under. Lawyers in this category exhibited earnings approximately $10 \%$ less than older colleagues.

Table 10: IPWRA Analysis for Selected Occupations, treatments = (a) female and (b) young (24 or under) Outcome variable: log of hourly wages

| Control Group | Treatment Group |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
|  | None | Female | Young | Both |
| Customer Service Representatives |  |  |  |  |
| None | - | -0.124793*** | $-0.3496312^{* * *}$ | -0.4176019*** |
|  |  | (0.0503465) | (0.0658485) | (0.1100788) |
| Female | 0.1443882*** | - | $-0.3240012^{* * *}$ | -0.3594625*** |
|  | (0.034854) |  | (0.0597759) | (0.0772233) |
| Young (24 or under) | 0.4161964*** | 0.3039913*** |  | -0.0131877 |
|  | (0.0433557) | (0.0290541) |  | (0.0431123) |
| Both | 0.6588445*** | 0.4420365*** | 0.0068195 |  |
|  | (0.1237194) | (0.0549305) | (0.0413747) |  |
| Assemblers |  |  |  |  |
| None | - | $-0.1205212^{* * *}$ | -0.1412449** | -0.3189945*** |
|  |  | (0.0409546) | (0.0599494) | (0.1014189) |
| Female | 0.1671849*** | - | -0.0666222 | -0.2366206*** |
|  | (0.0374647) |  | (0.0490757) | (0.0667401) |
| Young (24 or under) | 0.3674162*** | 0.1690203*** |  | -0.2054902** |
|  | (0.0478571) | (0.042697) |  | (0.0962227) |
| Both | $0.2970866^{* * *}$ | $0.0932166^{* *}$ | 0.1450502*** |  |
|  | (0.0376251) | (0.0463679) | (0.052546) |  |
| Accountants |  |  |  |  |
| None | - | $-0.186109 * * *$ | $-0.2899971^{* * *}$ | -0.4911419*** |
|  |  | (0.0494381) | (0.0901414) | (0.1298124) |
| Female | 0.2027532*** | - | $-0.2433694^{* * *}$ | $-0.4434765^{* * *}$ |
|  | (0.0379802) |  | (0.0888154) | (0.11202) |
| Young (24 or under) | 0.28952*** | 0.103411 |  | -0.1223937 |
|  | (0.0824908) | (0.0743557) |  | (0.1358909) |
| Both | 0.2643761*** | 0.2028435*** | 0.1981847* |  |
|  | (0.0391886) | (0.0603698) | (0.107261) |  |
| Lawyers |  |  |  |  |
| None | - | -0.1148562* | -0.1034099 | -0.2558959** |
|  |  | (0.0617978) | (0.0765544) | (0.1002805) |
| Female | 0.1330056** | - | -0.0899415 | -0.2172641** |
|  | (0.0528731) |  | (0.0730595) | (0.0965388) |
| Young ( 32 or under) | 0.1944572*** | 0.0537724 |  | -0.1640895 |
|  | (0.0709555) | (0.0702609) |  | (0.1012082) |
| Both | 0.3041815*** | 0.2330991** | 0.1816597* |  |
|  | (0.1087568) | (0.1000024) | (0.1002733) |  |
| Janitors |  |  |  |  |
| None | - | -0.0761538*** | $-0.1434114^{* * *}$ | -0.1701779** |
|  |  | (0.0260189) | (0.0478079) | (0.0794163) |
| Female | 0.1040407*** | - | -0.0455125 | -0.0757402 |
|  | (0.0252121) |  | (0.0512779) | (0.0791689) |
| Young (24 or under) | 0.2295591*** | 0.0638495* |  | -0.004467 |
|  | (0.0390682) | (0.0371308) |  | (0.0756111) |
| Both | 0.3911997*** | 0.3723689*** | -0.0134814 | - |
| Both | (0.0782343) | (0.098374) | (0.0738851) |  |

Tables 11 examines the treatment effects of female and part-time using IPWRA analysis for each of the same five occupations. For each of the five occupations there remains a statistically significant gender wage gap despite both the careful matching of control and treatment groups and despite narrowing of the sample to a single occupation in each case. The estimated gender wage gaps by occupation are:

- Customer service representatives - about $14 \%$ to $15 \%$
- Assemblers - between $13 \%$ and $14 \%$
- Accountants - around 9\%-10\%
- Lawyers - approximately $4 \%-6 \%$
- Janitors - between $13 \%$ and $15 \%$

The results presented in Table 11 also show clearly that there is a substantial (and statistically significant at $99 \%$ confidence) gap in hourly wages between part-time and full-time worker in the same occupation. For each of the five occupations the gap between full-time and parttime hourly rates was estimated as:

- Customer service representatives - about $35 \%$ to $40 \%$
- Assemblers - between $45 \%$ and $55 \%$
- Accountants - around $31 \%-35 \%$
- Lawyers - between $8 \%$ and $16 \%$
- Janitors - between $13 \%$ and $15 \%$

From these results it is clear that part-time working has a substantial negative effect on hourly wages rates but this effect also varies considerably by occupation. The much higher prevalence of women in part-time work combined with the existence of a significant gap in hourly earnings between part-time and full-time workers makes an important contribution to the overall gender wage gap. It is also interesting to note that there is significant variation in the gap between full-time and part-time by occupation.

Table 11: IPWRA Analysis for Selected Occupations treatments = (a) female and (b) part-time employment Outcome variable: log of hourly wages

| Control Group | Treatment Group |  |  |  |
| :--- | :---: | :---: | :---: | :---: |
|  | None | Female | Part-time | Both |

Customer service representatives

| None | - | $-0.1487057^{* * *}$ | $-0.3534196^{* * *}$ | $-0.3680808^{* * *}$ |
| :---: | :---: | :---: | :---: | :---: |
| Female | $0.1414865^{* * *}$ |  | - | $-0.2845025^{* * *}$ |
|  | $(0.0336538)$ |  | $(0.03477408)$ |  |
| Part-time | $0.4027189^{* * *}$ | $0.295491^{* * *}$ |  | $(0.0275038)$ |
|  | $(0.0586685)$ | $(0.0545803)$ |  | 0.012795 |
| Both | $0.4302522^{* * *}$ | $0.3046563^{* * *}$ | -0.0282729 | $(0.0439877)$ |
|  | $(0.038757)$ | $(0.0274633)$ | $(0.0375144)$ | - |


| Assemblers |  |  | $-0.1401634^{* * *}$ | $-0.4519693^{* * *}$ |
| :---: | :---: | :---: | :---: | :---: |
| None |  | $(0.0329684)$ | $(0.1608717)$ | $\left(0.5399095^{* * *}\right.$ |
| Female | $0.1327194^{* * *}$ |  | $-0.3444178^{* *}$ | $-0.3788997)$ |
|  | $(0.0338971)$ |  | $(0.16124)$ | $(0.1324386)$ |
| Part-time | $0.5508458^{* * *}$ | $0.4098758^{* * *}$ |  | 0.3262315 |
|  | $(0.1005878)$ | $(0.1111381)$ |  | $(0.2822952)$ |
| Both | $0.4616181^{* * *}$ | $0.3194279^{* * *}$ | -0.0340648 | - |
|  | $(0.0624531)$ | $(0.075842)$ | $(0.1700163)$ |  |


| Accountants |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
| None | - | -0.094362** | 0.3090078 | -0.3023649*** |
|  |  | (0.0380756) | (0.3277291) | (0.0764005) |
| Female | 0.1027392** | - | 0.3047127 | -0.2105931*** |
|  | (0.0417686) |  | (0.2877341) | (0.0658701) |
| Part-time | 0.3477229** | 0.2834063** | - | 0.1237674 |
|  | (0.1433734) | (0.1096912) |  | (0.1591743) |
| Both | 0.224411*** | 0.1711192** | 0.4734096* |  |
|  | (0.07523) | (0.0709356) | (0.2557447) |  |
| Lawyers |  |  |  |  |
| None | - | -0.0435249 | 0.0877164 | -0.4759689*** |
|  |  | (0.0475804) | (0.3055808) | (0.1589755) |
| Female | 0.062977 | - | 0.2463565 | -0.3299125** |
|  | (0.0496787) |  | (0.3169492) | (0.164113) |
| Part-time | -0.1594749 | -0.2245749 | - | -0.9445919*** |
|  | (0.1942277) | (0.2114903) |  | (0.3599515) |
| Both | 0.556436*** | 0.5147488*** | 0.406542 |  |
|  | (0.0774624) | (0.0628055) | (0.3218023) |  |
| Janitors |  |  |  |  |
| None | - | -0.1354616*** | -0.3176832*** | -0.2892986*** |
|  |  | (0.0272871) | (0.027802) | (0.0416898) |
| Female | 0.1495573*** | - | -0.1526979*** | -0.1455456*** |
|  | (0.0287174) |  | (0.0326459) | (0.0442963) |
| Part-time | 0.3262411*** | 0.174377*** | - | 0.0226654 |
|  | (0.0279084) | (0.0324234) |  | (0.0444763) |
| Both | 0.3213403*** | 0.1410497*** | -0.0151978 | - |
|  | (0.0395824) | (0.0468576) | (0.0426962) |  |

[^1]
## 9. Conclusions

That a crude gender wage gap exists in the US is neither hard to observe nor a surprise, given previous studies of the US and other countries. Like a number of previous studies of the US and other countries we find employment in the US to exhibit a high degree of gender segregation by both industry and by occupation. It is not just industries and occupations that tend to differ between men and women. Another important difference is that women represent a much higher proportion of the part-time labour force than do men.

Gender segregation at work and other differences such as part-time working make it very difficult to accurately compare women's pay with that of men. Heckman selection model estimates regressions with a large number of control variables suggest that a statistically significant gender wage gap exists but the limitations of the estimators in this context are well known. Following a number of authors we used a propensity score matching (PSM) approach and, again, find a statistically significant gender wage gap.

The study also used the PSM approach to estimate the gender wage gap for various categories of workers, already identified in the literature as contributing to the gender wage gap. In particular (as with previous studies) the gender wage gap was found to be much reduced (but still statistically significant) for young workers. For the sample of part-time workers the gender wage gap was even more reduced. This provides an important clue for further research and suggest that the interactions between age, parenthood, marriage and part-time working offer the most likely explanations of a persistent gender wage gap.

Although a matching approach should provide a much more accurate comparison between male and female wages we still have concerns about its adequacy when applied to the full sample. A reasonably matched control group can be selected if industry and occupation are ignored but if they are included, as they must be, it is difficult to obtain an adequate control group. Put simply, gender segregation in particular, means that many women and many men are undertaking different roles which are not easy to directly compare.

Our approach to address this problem is, firstly, to pick three industries in which both men and women are employed in similar numbers and for which there were sufficient observations. This does provide much more accurate selection of a control group than with the overall sample. The results still suggest a statistically significant (at 99\%) gender wage gap for each of the three industries. This gender wage gap persists despite increasingly thorough attempts to control for wage differences arising from age, education, ethnic background, industry, occupation, part-time working, region and other factors.

Finally, we conduct a similar analysis for five different occupations, each of which was selected for having significant numbers of each gender in the same occupation. For all of the five occupations we found robust evidence of a gender pay gap. Taking the study overall we conclude that we were unable to falsify the proposition that women are paid less for undertaking essentially the same work as men. That is, the crude gender pay gap can be reduced (and hence explained) but not eliminated by taking into account a wide range of factors such as part-time working, education, age and, most importantly, gender segregation.

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## Conflict of Interest:

The authors declare that they have no conflict of interest.

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| Appen | Share of Females in Employment and Mean | sorte | ge. |  |
| :---: | :---: | :---: | :---: | :---: |
| Code | Industry Description | Observations | \% female | Mean wage |
| 3370 | Communications, and audio and video equipment manufacturing | 78 | 28.21\% | 58.11 |
| 2070 | Petroleum refining | 93 | 16.13\% | 51.91 |
| 3365 | Computer and peripheral equipment manufacturing | 164 | 34.15\% | 50.77 |
| 0390 | Metal ore mining | 35 | 8.57\% | 49.20 |
| 0470 | Nonmetallic mineral mining and quarrying | 66 | 7.58\% | 48.07 |
| 2090 | Miscellaneous petroleum and coal products | 12 | 16.67\% | 40.62 |
| 6490 | Software publishers | 44 | 38.64\% | 39.72 |
| 6970 | Securities, commodities, funds, trusts, and other financial investments | 624 | 44.23\% | 37.28 |
| 7380 | Computer systems design and related services | 1125 | 30.22\% | 36.52 |
| 1390 | Tobacco manufacturing | 4 | 75.00\% | 36.09 |
| 2290 | Industrial and miscellaneous chemicals | 280 | 22.50\% | 35.84 |
| 2170 | Resin, synthetic rubber and fibers, and filaments manufacturing | 119 | 27.73\% | 35.01 |
| 7460 | Scientific research and development services | 363 | 42.98\% | 34.95 |
| 9590 | National security and international affairs | 539 | 39.52\% | 34.58 |
| 6080 | Rail transportation | 212 | 8.96\% | 33.72 |
| 6570 | Motion pictures and video industries | 165 | 39.39\% | 33.60 |
| 3590 | Aerospace product and parts manufacturing | 268 | 20.90\% | 33.52 |
| 0670 | Water, steam, air-conditioning, and irrigation systems | 138 | 21.74\% | 32.61 |
| 7290 | Architectural, engineering, and related services | 807 | 27.88\% | 32.57 |
| 7390 | Management, scientific, and technical consulting services | 583 | 40.31\% | 31.92 |
| 6672 | Internet publishing and broadcasting and web search portals | 21 | 38.10\% | 31.92 |
| 6670 | Radio and television broadcasting and cable subscription programming | 358 | 33.80\% | 31.79 |
| 2190 | Pharmaceutical and medicine manufacturing | 261 | 47.51\% | 31.55 |
| 6070 | Air transportation | 318 | 36.48\% | 31.01 |
| 7370 | Specialized design services | 111 | 50.45\% | 30.95 |
| 8390 | Vocational rehabilitation services | 103 | 59.22\% | 30.81 |
| 7490 | Other professional, scientific, and technical services | 137 | 55.47\% | 30.79 |
| 9180 | Labor unions | 51 | 45.10\% | 30.67 |
| 3990 | Not specified manufacturing industries | 101 | 29.70\% | 30.26 |
| 7270 | Legal services | 854 | 62.06\% | 30.20 |
| 9380 | Public finance activities | 242 | 66.12\% | 29.83 |
| 8560 | industries | 288 | 41.32\% | 29.54 |
| 6780 | Other information services | 27 | 55.56\% | 29.46 |
| 9570 | Administration of economic programs and space research | 444 | 44.59\% | 29.28 |
| 0590 | Electric and gas, and other combinations | 60 | 28.33\% | 29.23 |
| 0570 | Electric power generation, transmission, and distribution | 457 | 21.23\% | 29.23 |
| 6290 | Services incidental to transportation | 416 | 21.63\% | 29.20 |
| 6480 | Periodical, book, and directory publishers | 149 | 53.69\% | 28.82 |
| 3580 | Aircraft and parts manufacturing | 276 | 19.57\% | 28.57 |
| 0690 | Not specified utilities | 20 | 30.00\% | 28.55 |
| 9490 | Administration of environmental quality and housing programs | 260 | 45.38\% | 28.53 |
| 0380 | Coal mining | 137 | 5.84\% | 28.42 |
| 9470 | Justice, public order, and safety activities | 1810 | 34.70\% | 28.37 |
| 3380 | Navigational, measuring, electromedical, and control instruments | 145 | 35.86\% | 28.23 |
| 6680 | Wired telecommunications carriers | 371 | 33.15\% | 28.17 |
| 6990 | Insurance carriers and related activities | 1503 | 64.60\% | 28.15 |
| 3390 | Electronic component and product manufacturing, n.e.c. | 392 | 34.18\% | 27.94 |
| 0580 | Natural gas distribution | 67 | 31.34\% | 27.87 |
| 4380 | Drugs, sundries, and chemical and allied products merchant wholesalers | 146 | 48.63\% | 27.76 |
| 7280 | Accounting, tax preparation, bookkeeping, and payroll services | 501 | 65.87\% | 27.72 |
| 3890 | Furniture and related product manufacturing | 268 | 25.37\% | 27.39 |
| 4170 | Professional and commercial equipment and supplies merchant wholesale | 209 | 37.80\% | 27.02 |
| 3980 | Miscellaneous manufacturing, n.e.c. | 282 | 37.23\% | 27.01 |
| 6890 | Nondepository credit and related activities | 486 | 58.02\% | 26.75 |
| 9190 | Business, professional, political, and similar organizations | 95 | 56.84\% | 26.62 |
| 3095 | Commercial and service industry machinery manufacturing | 48 | 33.33\% | 26.53 |
| 7470 | Advertising, public relations, and related services | 266 | 51.50\% | 26.46 |


| Appendix 1 (continued) |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
| Code | Industry Description | Observations | \% female | Mean wage |
| 4195 | Household appliances and electrical and electronic goods merchant whole | 128 | 28.13\% | 26.40 |
| 5590 | Electronic shopping | 73 | 52.05\% | 26.35 |
| 0190 | Forestry, except logging | 28 | 35.71\% | 26.24 |
| 6690 | Other telecommunications services | 334 | 35.63\% | 26.21 |
| 6695 | Data processing, hosting, and related services | 66 | 50.00\% | 26.21 |
| 7870 | Colleges, universities, and professional schools, including junior colleges | 2569 | 55.16\% | 26.09 |
| 6870 | Banking and related activities | 1355 | 65.31\% | 26.07 |
| 2470 | Pottery, ceramics, and plumbing fixture manufacturing | 14 | 35.71\% | 26.02 |
| 9480 | Administration of human resource programs | 684 | 70.32\% | 25.94 |
| 4180 | Metals and minerals, except petroleum, merchant wholesalers | 33 | 18.18\% | 25.86 |
| 8080 | Offices of other health practitioners | 77 | 80.52\% | 25.43 |
| 8190 | Hospitals | 4137 | 76.99\% | 25.28 |
| 6270 | Pipeline transportation | 57 | 26.32\% | 25.06 |
| 4490 | Petroleum and petroleum products merchant wholesalers | 123 | 24.39\% | 24.92 |
| 7190 | Commercial, industrial, and other intangible assets rental and leasing | 62 | 19.35\% | 24.90 |
| 7970 | Offices of physicians | 818 | 83.01\% | 24.64 |
| 7860 | Elementary and secondary schools | 5988 | 75.80\% | 24.57 |
| 3960 | Medical equipment and supplies manufacturing | 389 | 48.07\% | 24.57 |
| 1370 | Beverage manufacturing | 139 | 21.58\% | 24.52 |
| 1070 | Animal food, grain, and oilseed milling | 121 | 30.58\% | 24.45 |
| 8180 | Other health care services | 1303 | 70.91\% | 24.39 |
| 9390 | Other general government and support | 81 | 43.21\% | 24.35 |
| 7070 | Real estate | 1088 | 53.77\% | 24.33 |
| 6090 | Water transportation | 43 | 20.93\% | 24.31 |
| 4270 | Machinery, equipment, and supplies merchant wholesalers | 216 | 23.61\% | 24.17 |
| 7880 | Business, technical, and trade schools and training | 68 | 58.82\% | 24.07 |
| 7570 | Management of companies and enterprises | 117 | 49.57\% | 23.95 |
| 0680 | Sewage treatment facilities | 74 | 17.57\% | 23.90 |
| 6170 | Truck transportation | 918 | 13.07\% | 23.82 |
| 9170 | services | 489 | 68.71\% | 23.80 |
| 3470 | Household appliance manufacturing | 39 | 30.77\% | 23.66 |
| 3490 | Electrical lighting and electrical equipment manufacturing, and other | 168 | 29.76\% | 23.65 |
| 3970 | Sporting and athletic goods, and doll, toy and game manufacturing | 54 | 29.63\% | 23.59 |
| 0370 | Oil and gas extraction | 49 | 16.33\% | 23.46 |
| 8090 | Outpatient care centers | 833 | 78.63\% | 23.43 |
| 2970 | Ordnance | 46 | 36.96\% | 23.41 |
| 3680 | Ship and boat building | 120 | 12.50\% | 23.39 |
| 4890 | Lawn and garden equipment and supplies stores | 183 | 38.25\% | 23.28 |
| 0490 | Support activities for mining | 395 | 13.92\% | 23.12 |
| 7980 | Offices of dentists | 484 | 91.12\% | 23.11 |
| 2270 | Paint, coating, and adhesive manufacturing | 42 | 23.81\% | 23.02 |
| 6370 | Postal Service | 467 | 41.33\% | 22.97 |
| 9370 | Executive offices and legislative bodies | 708 | 51.84\% | 22.95 |
| 4265 | wholesalers | 82 | 19.51\% | 22.78 |
| 4560 | Alcoholic beverages merchant wholesalers | 91 | 18.68\% | 22.74 |
| 0480 | Not specified type of mining | 15 | 13.33\% | 22.56 |
| 1870 | Pulp, paper, and paperboard mills | 126 | 17.46\% | 22.51 |
| 2280 | Soap, cleaning compound, and cosmetics manufacturing | 83 | 53.01\% | 22.34 |
| 2670 | Iron and steel mills and steel product manufacturing | 158 | 10.13\% | 22.34 |
| 2180 | Agricultural chemical manufacturing | 21 | 28.57\% | 22.28 |
| 7670 | Travel arrangements and reservation services | 150 | 56.67\% | 22.26 |
| 4570 | Farm supplies merchant wholesalers | 47 | 27.66\% | 22.25 |
| 3190 | Machinery manufacturing, n.e.c. | 367 | 22.34\% | 22.23 |
| 7780 | Other administrative and other support services | 147 | 38.78\% | 22.11 |
| 3080 | Construction, and mining and oil and gas field machinery manufacturing | 83 | 15.66\% | 21.79 |
| 3180 | Engine, turbine, and power transmission equipment manufacturing | 35 | 25.71\% | 21.75 |
| 3570 | Motor vehicles and motor vehicle equipment manufacturing | 535 | 27.66\% | 21.62 |
| 0770 | Construction | 4236 | 10.98\% | 21.62 |


| Appendix 1 (continued) |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
| Code | Industry Description | Observations | \% female | Mean wage |
| 3670 | Railroad rolling stock manufacturing | 14 | 28.57\% | 21.60 |
| 4290 | Miscellaneous durable goods merchant wholesalers | 61 | 40.98\% | 21.50 |
| 8370 | Individual and family services | 940 | 79.15\% | 21.47 |
| 8570 | Museums, art galleries, historical sites, and similar institutions | 232 | 50.86\% | 21.38 |
| 3170 | Metalworking machinery manufacturing | 104 | 16.35\% | 21.37 |
| 4090 | Lumber and other construction materials merchant wholesalers | 79 | 16.46\% | 21.30 |
| 2570 | Cement, concrete, lime, and gypsum product manufacturing | 93 | 9.68\% | 21.29 |
| 5070 | Pharmacies and drug stores | 527 | 66.22\% | 21.22 |
| 2790 | Cutlery and hand tool manufacturing | 20 | 25.00\% | 21.14 |
| 5591 | Electronic auctions | 4 | 25.00\% | 21.05 |
| 4370 | Paper and paper products merchant wholesalers | 39 | 38.46\% | 21.04 |
| 4795 | Electronics stores | 281 | 32.03\% | 20.92 |
| 4470 | Grocery and related product merchant wholesalers | 471 | 25.05\% | 20.86 |
| 2990 | Not specified metal industries | 18 | 33.33\% | 20.86 |
| 7890 | Other schools and instruction, and educational support services | 325 | 66.15\% | 20.74 |
| 8870 | maintenance | 172 | 12.79\% | 20.58 |
| 5690 | Other direct selling establishments | 59 | 55.93\% | 20.48 |
| 2490 | Glass and glass product manufacturing | 80 | 20.00\% | 20.46 |
| 2690 | Nonferrous metal, except aluminum, production and processing | 25 | 8.00\% | 20.27 |
| 1090 | Fruit and vegetable preserving and specialty food manufacturing | 96 | 43.75\% | 20.01 |
| 4585 | Wholesale electronic markets and agents and brokers | 32 | 46.88\% | 20.00 |
| 4390 | Apparel, piece goods, and notions merchant wholesalers | 49 | 55.10\% | 19.97 |
| 2480 | Clay building material and refractories manufacturing | 18 | 16.67\% | 19.97 |
| 8790 | Electronic and precision equipment repair and maintenance | 67 | 11.94\% | 19.89 |
| 9160 | Religious organizations | 697 | 51.22\% | 19.80 |
| 2590 | Miscellaneous nonmetallic mineral product manufacturing | 34 | 23.53\% | 19.79 |
| 2370 | Plastics product manufacturing | 160 | 31.25\% | 19.79 |
| 4080 | Furniture and home furnishing merchant wholesalers | 36 | 38.89\% | 19.64 |
| 1890 | Miscellaneous paper and pulp products | 64 | 35.94\% | 19.62 |
| 2380 | Tire manufacturing | 35 | 8.57\% | 19.58 |
| 2980 | Miscellaneous fabricated metal products manufacturing | 167 | 23.35\% | 19.56 |
| 6470 | Newspaper publishers | 179 | 43.02\% | 19.49 |
| 1990 | Printing and related support activities | 338 | 36.39\% | 19.45 |
| 6380 | Couriers and messengers | 388 | 21.13\% | 19.41 |
| 6880 | Savings institutions, including credit unions | 185 | 72.97\% | 19.37 |
| 2770 | Foundries | 68 | 17.65\% | 19.36 |
| 3780 | Veneer, plywood, and engineered wood products | 16 | 6.25\% | 19.36 |
| 4670 | Automobile dealers | 702 | 20.37\% | 19.32 |
| 4580 | Miscellaneous nondurable goods merchant wholesalers | 88 | 42.05\% | 19.13 |
| 1170 | Dairy product manufacturing | 130 | 24.62\% | 19.02 |
| 4070 | Motor vehicle and motor vehicle parts and supplies merchant wholesalers | 101 | 26.73\% | 19.02 |
| 8380 | Community food and housing, and emergency services | 79 | 72.15\% | 19.01 |
| 6770 | Libraries and archives | 160 | 87.50\% | 18.90 |
| 2780 | Metal forgings and stampings | 31 | 19.35\% | 18.87 |
| 7480 | Veterinary services | 185 | 79.46\% | 18.86 |
| 6180 | Bus service and urban transit | 332 | 40.06\% | 18.84 |
| 1280 | Seafood and other miscellaneous foods, n.e.c. | 133 | 39.85\% | 18.81 |
| 3690 | Other transportation equipment manufacturing | 16 | 18.75\% | 18.76 |
| 3070 | Agricultural implement manufacturing | 113 | 20.35\% | 18.66 |
| 2870 | Structural metals, and boiler, tank, and shipping container manufacturing | 176 | 13.64\% | 18.65 |
| 2880 | Machine shops; turned product; screw, nut, and bolt manufacturing | 184 | 9.78\% | 18.56 |
| 4590 | Not specified wholesale trade | 27 | 33.33\% | 18.52 |
| 0280 | Fishing, hunting, and trapping | 23 | 8.70\% | 18.44 |
| 4680 | Other motor vehicle dealers | 65 | 18.46\% | 18.44 |
| 2390 | Rubber product, except tire, manufacturing | 49 | 32.65\% | 18.43 |
| 7180 | Other consumer goods rental | 50 | 16.00\% | 18.37 |
| 1480 | Fabric mills, except knitting mills | 62 | 40.32\% | 18.36 |
| 9080 | Funeral homes, and cemeteries and crematories | 67 | 31.34\% | 18.30 |


| Append | 1 (continued) |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
| Code | Industry Description | Observations | \% female | Mean wage |
| 0170 | Crop production | 350 | 21.71\% | 18.28 |
| 8590 | Other amusement, gambling, and recreation industries | 1006 | 48.01\% | 18.18 |
| 1770 | Footwear manufacturing | 28 | 53.57\% | 18.14 |
| 8880 | Personal and household goods repair and maintenance | 54 | 16.67\% | 18.13 |
| 7790 | Waste management and remediation services | 263 | 15.21\% | 17.89 |
| 1290 | Not specified food industries | 33 | 48.48\% | 17.86 |
| 5592 | Mail-order houses | 52 | 71.15\% | 17.83 |
| 7590 | Business support services | 467 | 64.24\% | 17.79 |
| 2680 | Aluminum production and processing | 45 | 24.44\% | 17.71 |
| 1880 | Paperboard container manufacturing | 60 | 20.00\% | 17.68 |
| 1670 | Knitting fabric mills, and apparel knitting mills | 7 | 85.71\% | 17.65 |
| 5670 | Vending machine operators | 21 | 33.33\% | 17.61 |
| 7080 | Automotive equipment rental and leasing | 97 | 26.80\% | 17.59 |
| 5680 | Fuel dealers | 76 | 31.58\% | 17.58 |
| 5190 | Jewelry, luggage, and leather goods stores | 103 | 71.84\% | 17.49 |
| 5080 | Health and personal care, except drug, stores | 162 | 70.37\% | 17.46 |
| 4980 | Specialty food stores | 148 | 52.70\% | 17.31 |
| 4480 | Farm product raw material merchant wholesalers | 53 | 32.08\% | 17.29 |
| 7580 | Employment services | 528 | 54.36\% | 17.25 |
| 8770 | Automotive repair and maintenance | 556 | 10.79\% | 17.19 |
| 5480 | Office supplies and stationery stores | 105 | 45.71\% | 17.10 |
| 5790 | Not specified retail trade | 133 | 58.65\% | 17.09 |
| 4770 | Furniture and home furnishings stores | 298 | 38.93\% | 17.07 |
| 9090 | Other personal services | 149 | 63.76\% | 17.00 |
| 4780 | Household appliance stores | 33 | 18.18\% | 16.99 |
| 8070 | Offices of optometrists | 64 | 87.50\% | 16.86 |
| 6590 | Sound recording industries | 10 | 40.00\% | 16.68 |
| 1080 | Sugar and confectionery products | 62 | 35.48\% | 16.63 |
| 4870 | Building material and supplies dealers | 549 | 30.60\% | 16.54 |
| 6390 | Warehousing and storage | 211 | 24.64\% | 16.43 |
| 4280 | Recyclable material merchant wholesalers | 51 | 9.80\% | 16.35 |
| 7990 | Offices of chiropractors | 59 | 86.44\% | 16.31 |
| 8990 | Nail salons and other personal care services | 156 | 78.85\% | 16.28 |
| 7680 | Investigation and security services | 485 | 23.92\% | 16.27 |
| 3770 | Sawmills and wood preservation | 79 | 12.66\% | 16.21 |
| 5580 | Miscellaneous retail stores | 241 | 55.60\% | 16.20 |
| 8670 | Recreational vehicle parks and camps, and rooming and boarding houses | 41 | 53.66\% | 16.17 |
| 1680 | Cut and sew apparel manufacturing | 130 | 61.54\% | 16.16 |
| 3290 | Not specified machinery manufacturing | 5 | 20.00\% | 16.16 |
| 4990 | Beer, wine, and liquor stores | 66 | 36.36\% | 15.95 |
| 0270 | Logging | 52 | 9.62\% | 15.88 |
| 8270 | Nursing care facilities (skilled nursing facilities) | 1204 | 86.13\% | 15.69 |
| 1270 | Bakeries and tortilla manufacturing, except retail bakeries | 103 | 38.83\% | 15.54 |
| 1490 | Textile and fabric finishing and coating mills | 11 | 27.27\% | 15.49 |
| 3790 | Prefabricated wood buildings and mobile homes | 16 | 12.50\% | 15.47 |
| 6190 | Taxi and limousine senvice | 96 | 20.83\% | 15.43 |
| 2890 | Coating, engraving, heat treating and allied activities | 35 | 25.71\% | 15.39 |
| 3875 | Miscellaneous wood products | 117 | 14.53\% | 15.36 |
| 5295 | Musical instrument and supplies stores | 31 | 32.26\% | 15.36 |
| 6280 | Scenic and sightseeing transportation | 19 | 42.11\% | 15.32 |
| 0290 | Support activities for agriculture and forestry | 77 | 40.26\% | 15.20 |
| 8290 | Residential care facilities, except skilled nursing facilities | 509 | 71.51\% | 15.11 |
| 4690 | Automotive parts, accessories, and tire stores | 297 | 16.84\% | 15.09 |
| 8780 | Car washes | 71 | 8.45\% | 15.04 |
| 8170 | Home health care services | 548 | 89.78\% | 14.77 |
| 1570 | Carpet and rug mills | 22 | 45.45\% | 14.54 |
| 8660 | Traveler accommodation | 904 | 56.53\% | 14.39 |
| 1180 | Animal slaughtering and processing | 373 | 37.80\% | 14.37 |


| Appendix 1 (continued) |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
| Code | Industry Description | Observations | \% female | Mean wage |
| 5390 | Miscellaneous general merchandise stores | 323 | 61.30\% | 14.27 |
| 4880 | Hardware stores | 188 | 34.57\% | 14.08 |
| 8470 | Child day care services | 717 | 94.84\% | 13.92 |
| 7770 | Landscaping services | 406 | 11.08\% | 13.74 |
| 1190 | Retail bakeries | 118 | 61.02\% | 13.58 |
| 5470 | Retail florists | 42 | 71.43\% | 13.50 |
| 5180 | Shoe stores | 93 | 55.91\% | 13.46 |
| 5570 | Gift, novelty, and souvenir shops | 86 | 82.56\% | 13.46 |
| 5275 | Sporting goods, and hobby and toy stores | 280 | 41.79\% | 13.41 |
| 5380 | Department stores and discount stores | 1407 | 61.90\% | 13.35 |
| 4970 | Grocery stores | 1797 | 51.53\% | 13.25 |
| 8580 | Bowling centers | 32 | 43.75\% | 13.23 |
| 1590 | Textile product mills, except carpet and rug | 50 | 64.00\% | 13.15 |
| 1470 | Fiber, yarn, and thread mills | 4 | 50.00\% | 13.13 |
| 5170 | Clothing stores | 611 | 79.05\% | 12.95 |
| 8980 | Beauty salons | 350 | 91.43\% | 12.93 |
| 5490 | Used merchandise stores | 112 | 66.07\% | 12.93 |
| 0180 | Animal production and aquaculture | 307 | 18.89\% | 12.81 |
| 7690 | Services to buildings and dwellings | 597 | 49.08\% | 12.59 |
| 5090 | Gasoline stations | 297 | 57.91\% | 12.47 |
| 7170 | Video tape and disk rental | 9 | 55.56\% | 12.41 |
| 8970 | Barber shops | 31 | 45.16\% | 12.29 |
| 9070 | Drycleaning and laundry services | 196 | 63.27\% | 12.27 |
| 5280 | Sewing, needlework, and piece goods stores | 29 | 79.31\% | 12.17 |
| 9290 | Private households | 430 | 87.44\% | 12.08 |
| 1790 | Leather tanning and finishing and other allied products manufacturing | 14 | 28.57\% | 11.87 |
| 5370 | Book stores and news dealers | 83 | 59.04\% | 11.57 |
| 8680 | Restaurants and other food services | 4920 | 54.07\% | 10.57 |
| 8690 | Drinking places, alcoholic beverages | 133 | 52.63\% | 10.38 |
| 8890 | Footwear and leather goods repair | 2 | 50.00\% | 8.41 |
| 1690 | Apparel accessories and other apparel manufacturing | 1 | 0.00\% | 8.00 |


| Appendix 2: Share of Females in Employment and Mean Hourly Wages by Occupation, sorted by mean wage. |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
| Code | Industry Description | Observations | \% female | Mean wage |
| 2920 | Television, video, and motion picture camera operators and editors | 18 | 5.56\% | 173.63 |
| 9650 | Pumping station operators | 23 | 0.00\% | 96.38 |
| 2700 | Actors | 12 | 50.00\% | 89.02 |
| 9410 | Transportation inspectors | 19 | 10.53\% | 85.42 |
| 9200 | Locomotive engineers and operators | 40 | 0.00\% | 72.96 |
| 4340 | Animal trainers | 10 | 80.00\% | 72.53 |
| 3256 | Nurse anesthetists | 19 | 52.63\% | 62.27 |
| 3010 | Dentists | 43 | 25.58\% | 59.02 |
| 3257 | Nurse midwives | 2 | 100.00\% | 52.70 |
| 1220 | Operations research analysts | 96 | 47.92\% | 51.13 |
| 0110 | Computer and information systems managers | 346 | 23.99\% | 51.10 |
| 0010 | Chief executives | 686 | 24.93\% | 50.89 |
| 1210 | Mathematicians | 5 | 20.00\% | 46.92 |
| 0850 | Personal financial advisors | 185 | 35.14\% | 46.67 |
| 1660 | Life scientists, all other | 2 | 50.00\% | 46.46 |
| 3820 | Detectives and criminal investigators | 86 | 22.09\% | 45.85 |
| 2025 | Miscellaneous community and social service specialists, including | 69 | 65.22\% | 45.48 |
| 3050 | Pharmacists | 173 | 57.23\% | 44.48 |
| 3258 | Nurse practitioners | 75 | 93.33\% | 43.31 |
| 2100 | Lawyers | 565 | 36.81\% | 43.27 |
| 2840 | Technical writers | 43 | 60.47\% | 42.87 |
| 1840 | Urban and regional planners | 22 | 36.36\% | 42.53 |
| 1020 | Software developers, applications and systems software | 637 | 23.39\% | 42.33 |
| 4465 | Morticians, undertakers, and funeral directors | 16 | 25.00\% | 42.15 |
| 0300 | Architectural and engineering managers | 70 | 8.57\% | 42.04 |
| 1860 | Miscellaneous social scientists and related workers | 46 | 50.00\% | 41.98 |
| 1106 | Computer network architects | 58 | 15.52\% | 41.93 |
| 9030 | Aircraft pilots and flight engineers | 82 | 7.32\% | 41.34 |
| 0930 | Tax examiners and collectors, and revenue agents | 50 | 54.00\% | 41.10 |
| 1700 | Astronomers and physicists | 14 | 28.57\% | 40.85 |
| 3060 | Physicians and surgeons | 456 | 38.60\% | 40.64 |
| 1010 | Computer programmers | 284 | 22.89\% | 40.32 |
| 1200 | Actuaries | 14 | 35.71\% | 39.96 |
| 4965 | Sales and related workers, all other | 107 | 48.60\% | 39.63 |
| 3040 | Optometrists | 8 | 12.50\% | 39.37 |
| 0230 | Education administrators | 592 | 66.05\% | 39.04 |
| 1320 | Aerospace engineers | 94 | 14.89\% | 38.89 |
| 3250 | Veterinarians | 38 | 52.63\% | 38.71 |
| 1800 | Economists | 23 | 39.13\% | 38.38 |
| 1230 | Statisticians | 34 | 50.00\% | 38.33 |
| 2105 | Judicial law clerks | 4 | 75.00\% | 37.87 |
| 1520 | Petroleum engineers | 16 | 6.25\% | 37.77 |
| 1410 | Electrical and electronics engineers | 193 | 8.29\% | 37.77 |
| 3245 | Therapists, all other | 79 | 81.01\% | 37.43 |
| 0800 | Accountants and auditors | 968 | 63.22\% | 37.40 |
| 1400 | Computer hardware engineers | 43 | 4.65\% | 37.33 |
| 1420 | Environmental engineers | 34 | 14.71\% | 37.23 |
| 0840 | Financial analysts | 28 | 42.86\% | 37.09 |
| 0725 | Meeting, convention, and event planners | 65 | 80.00\% | 37.05 |
| 1530 | Engineers, all other | 219 | 10.05\% | 37.05 |
| 3110 | Physician assistants | 65 | 70.77\% | 37.01 |
| 0430 | Managers, all other | 1643 | 39.68\% | 37.01 |
| 0050 | Marketing and sales managers | 584 | 49.49\% | 36.98 |
| 3235 | Exercise physiologists | 2 | 50.00\% | 36.78 |
| 1510 | Nuclear engineers | 10 | 20.00\% | 36.50 |
| 1350 | Chemical engineers | 44 | 13.64\% | 36.45 |
| 1360 | Civil engineers | 233 | 12.45\% | 36.09 |
| 3850 | Police and sheriff's patrol officers | 424 | 11.08\% | 36.01 |
| 9040 | Air traffic controllers and airfield operations specialists | 36 | 13.89\% | 35.92 |
| 1006 | Computer systems analysts | 279 | 41.94\% | 35.73 |


| Appendi | 2 (continued) |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
| Code | Industry Description | Observations | \% female | Mean wage |
| 0136 | Human resources managers | 161 | 75.78\% | 35.70 |
| 6840 | Mining machine operators | 64 | 3.13\% | 35.30 |
| 1460 | Mechanical engineers | 171 | 4.68\% | 35.02 |
| 0425 | Emergency management directors | 7 | 28.57\% | 35.02 |
| 0820 | Budget analysts | 42 | 52.38\% | 34.95 |
| 0360 | Natural sciences managers | 10 | 80.00\% | 34.85 |
| 1300 | Architects, except naval | 80 | 26.25\% | 34.74 |
| 1005 | Computer and information research scientists | 14 | 42.86\% | 34.64 |
| 0710 | Management analysts | 348 | 44.25\% | 34.64 |
| 1760 | Physical scientists, all other | 107 | 45.79\% | 34.56 |
| 1500 | Mining and geological engineers, including mining safety engineers | 9 | 22.22\% | 33.87 |
| 0420 | Social and community service managers | 244 | 70.90\% | 33.72 |
| 0350 | Medical and health services managers | 383 | 73.63\% | 33.55 |
| 0120 | Financial managers | 698 | 58.02\% | 33.52 |
| 2200 | Postsecondary teachers | 937 | 50.05\% | 33.30 |
| 1610 | Biological scientists | 81 | 49.38\% | 33.20 |
| 1740 | Environmental scientists and geoscientists | 64 | 28.13\% | 33.16 |
| 1430 | Industrial engineers, including health and safety | 120 | 17.50\% | 33.11 |
| 0060 | Public relations and fundraising managers | 53 | 66.04\% | 33.10 |
| 4920 | Real estate brokers and sales agents | 262 | 59.92\% | 33.00 |
| 0150 | Purchasing managers | 131 | 49.62\% | 32.83 |
| 1060 | Database administrators | 70 | 38.57\% | 32.61 |
| 0040 | Advertising and promotions managers | 45 | 48.89\% | 32.27 |
| 1007 | Information security analysts | 31 | 16.13\% | 32.15 |
| 0100 | Administrative services managers | 94 | 42.55\% | 32.14 |
| 1820 | Psychologists | 91 | 73.63\% | 32.02 |
| 0565 | Compliance officers | 150 | 44.67\% | 31.95 |
| 4820 | Securities, commodities, and financial senices sales agents | 140 | 34.29\% | 31.95 |
| 1440 | Marine engineers and naval architects | 6 | 0.00\% | 31.76 |
| 4930 | Sales engineers | 19 | 21.05\% | 31.47 |
| 8840 | Semiconductor processors | 3 | 0.00\% | 31.37 |
| 1105 | Network and computer systems administrators | 150 | 22.67\% | 31.30 |
| 3150 | Occupational therapists | 66 | 90.91\% | 31.25 |
| 1720 | Chemists and materials scientists | 56 | 39.29\% | 31.20 |
| 9340 | Bridge and lock tenders | 4 | 0.00\% | 31.15 |
| 3140 | Audiologists | 8 | 100.00\% | 30.93 |
| 0900 | Financial examiners | 13 | 38.46\% | 30.78 |
| 3160 | Physical therapists | 126 | 74.60\% | 30.66 |
| 0220 | Construction managers | 310 | 10.00\% | 30.65 |
| 0650 | Training and development specialists | 89 | 58.43\% | 30.59 |
| 0020 | General and operations managers | 698 | 32.38\% | 30.50 |
| 1450 | Materials engineers | 27 | 7.41\% | 30.30 |
| 0735 | Market research analysts and marketing specialists | 105 | 53.33\% | 30.15 |
| 0135 | Compensation and benefits managers | 9 | 66.67\% | 30.06 |
| 2320 | Secondary school teachers | 799 | 59.20\% | 29.94 |
| 0740 | Business operations specialists, all other | 165 | 59.39\% | 29.90 |
| 1710 | Atmospheric and space scientists | 5 | 20.00\% | 29.86 |
| 1240 | Miscellaneous mathematical science occupations | 3 | 33.33\% | 29.81 |
| 2710 | Producers and directors | 81 | 45.68\% | 29.71 |
| 1640 | Conservation scientists and foresters | 21 | 33.33\% | 29.56 |
| 1050 | Computer support specialists | 301 | 27.57\% | 29.43 |
| 3310 | Dental hygienists | 97 | 98.97\% | 29.34 |
| 0140 | Industrial production managers | 147 | 19.05\% | 29.24 |
| 2550 | Other education, training, and library workers | 76 | 67.11\% | 28.87 |
| 3255 | Registered nurses | 1836 | 91.67\% | 28.67 |
| 3230 | Speech-language pathologists | 76 | 97.37\% | 28.61 |
| 0137 | Training and development managers | 28 | 46.43\% | 28.58 |
| 1310 | Surveyors, cartographers, and photogrammetrists | 35 | 17.14\% | 28.53 |
| 2825 | Public relations specialists | 107 | 65.42\% | 28.31 |
| 1340 | Biomedical engineers | 7 | 28.57\% | 28.23 |


| Appendix 2 (continued) |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
| Code | Industry Description | Observations | \% female | Mean wage |
| 5500 | Cargo and freight agents | 4 | 0.00\% | 27.88 |
| 0830 | Credit analysts | 20 | 70.00\% | 27.80 |
| 1030 | Web developers | 92 | 27.17\% | 27.79 |
| 0910 | Credit counselors and loan officers | 219 | 57.99\% | 27.77 |
| 0700 | Logisticians | 67 | 32.84\% | 27.74 |
| 3200 | Radiation therapists | 9 | 77.78\% | 27.69 |
| 1600 | Agricultural and food scientists | 37 | 29.73\% | 27.69 |
| 2960 | Media and communication equipment workers, all other | 2 | 50.00\% | 27.54 |
| 3710 | First-line supervisors of police and detectives | 68 | 13.24\% | 27.54 |
| 2340 | Other teachers and instructors | 446 | 65.25\% | 27.51 |
| 0860 | Insurance underwriters | 72 | 73.61\% | 27.44 |
| 1815 | Survey researchers | 5 | 60.00\% | 27.44 |
| 3720 | First-line supervisors of fire fighting and prevention workers | 31 | 3.23\% | 27.39 |
| 4850 | Sales representatives, wholesale and manufacturing | 753 | 27.09\% | 27.21 |
| 9330 | Ship engineers | 4 | 0.00\% | 27.11 |
| 2310 | Elementary and middle school teachers | 2048 | 81.59\% | 27.03 |
| 6910 | Roof bolters, mining | 9 | 0.00\% | 26.88 |
| 0950 | Financial specialists, all other | 38 | 57.89\% | 26.81 |
| 1107 | Computer occupations, all other | 215 | 19.53\% | 26.63 |
| 0630 | Human resources workers | 380 | 76.32\% | 26.59 |
| 9050 | Flight attendants | 55 | 80.00\% | 26.47 |
| 0600 | Cost estimators | 66 | 13.64\% | 26.46 |
| 6700 | Elevator installers and repairers | 19 | 10.53\% | 26.29 |
| 4810 | Insurance sales agents | 273 | 48.72\% | 26.29 |
| 9000 | Supervisors of transportation and material moving workers | 141 | 29.08\% | 26.25 |
| 0410 | Property, real estate, and community association managers | 272 | 58.09\% | 26.23 |
| 7100 | Electrical and electronics repairers, industrial and utility | 11 | 0.00\% | 26.22 |
| 1650 | Medical scientists | 89 | 52.81\% | 26.17 |
| 2810 | News analysts, reporters and correspondents | 42 | 35.71\% | 26.06 |
| 0540 | Claims adjusters, appraisers, examiners, and investigators | 207 | 61.84\% | 26.05 |
| 9310 | Ship and boat captains and operators | 15 | 0.00\% | 26.01 |
| 2600 | Artists and related workers | 53 | 58.49\% | 25.98 |
| 2720 | Athletes, coaches, umpires, and related workers | 150 | 40.67\% | 25.91 |
| 3220 | Respiratory therapists | 73 | 67.12\% | 25.86 |
| 1930 | Geological and petroleum technicians | 13 | 23.08\% | 25.61 |
| 2330 | Special education teachers | 263 | 87.07\% | 25.59 |
| 1550 | Engineering technicians, except drafters | 252 | 15.48\% | 25.51 |
| 4710 | First-line supervisors of non-retail sales workers | 477 | 29.56\% | 25.44 |
| 9730 | Mine shuttle car operators | 1 | 0.00\% | 25.40 |
| 7410 | Electrical power-line installers and repairers | 86 | 1.16\% | 25.33 |
| 3320 | Diagnostic related technologists and technicians | 230 | 70.87\% | 25.25 |
| 4840 | Sales representatives, services, all other | 276 | 32.97\% | 25.24 |
| 0640 | Compensation, benefits, and job analysis specialists | 49 | 81.63\% | 25.22 |
| 1540 | Drafters | 93 | 18.28\% | 25.19 |
| 7700 | First-line supervisors of production and operating workers | 487 | 19.10\% | 25.19 |
| 8150 | Heat treating equipment setters, operators, and tenders, metal and | 2 | 0.00\% | 25.18 |
| 1920 | Chemical technicians | 55 | 47.27\% | 25.00 |
| 7000 | First-line supervisors of mechanics, installers, and repairers | 196 | 8.16\% | 24.92 |
| 1560 | Surveying and mapping technicians | 38 | 13.16\% | 24.82 |
| 2830 | Editors | 110 | 56.36\% | 24.81 |
| 5150 | Procurement clerks | 15 | 66.67\% | 24.80 |
| 0500 | Agents and business managers of artists, performers, and athletes | 24 | 37.50\% | 24.79 |
| 2630 | Designers | 352 | 48.86\% | 24.71 |
| 6200 | First-line supervisors of construction trades and extraction workers | 356 | 3.37\% | 24.66 |
| 8160 | Layout workers, metal and plastic | 6 | 33.33\% | 24.59 |
| 0530 | Purchasing agents, except wholesale, retail, and farm products | 148 | 56.08\% | 24.54 |
| 0160 | Transportation, storage, and distribution managers | 170 | 12.35\% | 24.51 |
| 2015 | Probation officers and correctional treatment specialists | 64 | 50.00\% | 24.46 |
| 3700 | First-line supervisors of correctional officers | 20 | 40.00\% | 24.43 |
| 6800 | Derrick, rotary drill, and service unit operators, oil, gas, and mining | 37 | 0.00\% | 24.30 |


| Appen | 2 (continued) |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
| Code | Industry Description | Observations | \% female | Mean wage |
| 3000 | Chiropractors | 5 | 20.00\% | 24.28 |
| 0810 | Appraisers and assessors of real estate | 39 | 43.59\% | 24.19 |
| 8620 | Water and wastewater treatment plant and system operators | 52 | 7.69\% | 24.17 |
| 2400 | Archivists, curators, and museum technicians | 39 | 51.28\% | 24.16 |
| 2040 | Clergy | 278 | 22.30\% | 24.05 |
| 2010 | Social workers | 495 | 84.24\% | 24.02 |
| 7140 | Aircraft mechanics and service technicians | 96 | 1.04\% | 23.97 |
| 6500 | Reinforcing iron and rebar workers | 6 | 0.00\% | 23.93 |
| 3540 | Other healthcare practitioners and technical occupations | 44 | 43.18\% | 23.91 |
| 6355 | Electricians | 403 | 2.48\% | 23.87 |
| 3030 | Dietitians and nutritionists | 59 | 91.53\% | 23.87 |
| 0340 | Lodging managers | 54 | 57.41\% | 23.86 |
| 9240 | Railroad conductors and yardmasters | 42 | 2.38\% | 23.83 |
| 2850 | Writers and authors | 74 | 60.81\% | 23.81 |
| 3500 | Licensed practical and licensed vocational nurses | 375 | 89.60\% | 23.74 |
| 2900 | Broadcast and sound engineering technicians and radio operators | 52 | 11.54\% | 23.60 |
| 7420 | Telecommunications line installers and repairers | 129 | 6.20\% | 23.59 |
| 6520 | Sheet metal workers | 69 | 1.45\% | 23.58 |
| 7960 | Drilling and boring machine tool setters, operators, and tenders, metal | 2 | 0.00\% | 23.50 |
| 2160 | Miscellaneous legal support workers | 133 | 75.19\% | 23.49 |
| 2800 | Announcers | 32 | 9.38\% | 23.46 |
| 2740 | Dancers and choreographers | 6 | 66.67\% | 23.41 |
| 4800 | Advertising sales agents | 133 | 48.87\% | 23.41 |
| 9420 | Other transportation workers | 8 | 0.00\% | 23.17 |
| 8640 | Chemical processing machine setters, operators, and tenders | 50 | 22.00\% | 23.16 |
| 1940 | Nuclear technicians | 2 | 0.00\% | 23.14 |
| 1900 | Agricultural and food science technicians | 20 | 70.00\% | 23.09 |
| 3300 | Clinical laboratory technologists and technicians | 206 | 74.27\% | 23.04 |
| 2145 | Paralegals and legal assistants | 260 | 85.77\% | 22.98 |
| 2750 | Musicians, singers, and related workers | 62 | 48.39\% | 22.96 |
| 7020 | Radio and telecommunications equipment installers and repairers | 100 | 10.00\% | 22.93 |
| 6440 | Pipelayers, plumbers, pipefitters, and steamfitters | 284 | 1.76\% | 22.89 |
| 2000 | Counselors | 473 | 71.88\% | 22.75 |
| 7330 | Industrial and refractory machinery mechanics | 312 | 3.53\% | 22.72 |
| 0940 | Tax preparers | 52 | 59.62\% | 22.70 |
| 7430 | Precision instrument and equipment repairers | 42 | 7.14\% | 22.61 |
| 8350 | Tailors, dressmakers, and sewers | 31 | 70.97\% | 22.58 |
| 2430 | Librarians | 158 | 87.34\% | 22.53 |
| 0520 | Wholesale and retail buyers, except farm products | 102 | 50.98\% | 22.35 |
| 3830 | Fish and game wardens | 3 | 33.33\% | 22.25 |
| 5540 | Postal service clerks | 99 | 48.48\% | 22.14 |
| 9500 | Conveyor operators and tenders | 3 | 33.33\% | 22.13 |
| 7540 | Locksmiths and safe repairers | 11 | 9.09\% | 22.12 |
| 7030 | Avionics technicians | 8 | 12.50\% | 22.12 |
| 6660 | Construction and building inspectors | 43 | 4.65\% | 22.11 |
| 0330 | Gaming managers | 23 | 43.48\% | 22.09 |
| 7320 | Home appliance repairers | 23 | 4.35\% | 22.04 |
| 7130 | Security and fire alarm systems installers | 28 | 0.00\% | 22.00 |
| 5165 | Financial clerks, all other | 51 | 80.39\% | 21.93 |
| 7110 | Electronic equipment installers and repairers, motor vehicles | 9 | 0.00\% | 21.92 |
| 8630 | Miscellaneous plant and system operators | 30 | 13.33\% | 21.90 |
| 1910 | Biological technicians | 14 | 50.00\% | 21.88 |
| 7520 | Commercial divers | 2 | 0.00\% | 21.86 |
| 5550 | Postal service mail carriers | 195 | 35.90\% | 21.76 |
| 7220 | Heavy vehicle and mobile equipment service technicians and mechanics | 141 | 1.42\% | 21.74 |
| 8610 | Stationary engineers and boiler operators | 71 | 1.41\% | 21.58 |
| 6530 | Structural iron and steel workers | 35 | 0.00\% | 21.56 |
| 6740 | Rail-track laying and maintenance equipment operators | 8 | 0.00\% | 21.55 |
| 5000 | First-line supervisors of office and administrative support workers | 890 | 69.78\% | 21.54 |
| 0726 | Fundraisers | 57 | 73.68\% | 21.49 |
| 5250 | Eligibility interviewers, government programs | 62 | 75.81\% | 21.48 |


| Append | 2 (continued) |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
| Code | Industry Description | Observations | \% female | Mean wage |
| 2910 | Photographers | 35 | 65.71\% | 21.43 |
| 1950 | Social science research assistants | 3 | 33.33\% | 21.36 |
| 7360 | Millwrights | 39 | 5.13\% | 21.27 |
| 1830 | Sociologists | 1 | 100.00\% | 21.26 |
| 7050 | Electrical and electronics installers and repairers, transportation | 2 | 0.00\% | 21.25 |
| 2860 | Miscellaneous media and communication workers | 36 | 63.89\% | 21.17 |
| 5220 | Court, municipal, and license clerks | 54 | 87.04\% | 21.14 |
| 7010 | Computer, automated teller, and office machine repairers | 147 | 12.93\% | 21.13 |
| 4210 | First-line supervisors of landscaping, lawn service, and groundskeeping | 64 | 6.25\% | 21.09 |
| 3730 | First-line supervisors of protective service workers, all other | 66 | 27.27\% | 20.88 |
| 3740 | Firefighters | 172 | 5.81\% | 20.83 |
| 3210 | Recreational therapists | 8 | 87.50\% | 20.83 |
| 3750 | Fire inspectors | 14 | 7.14\% | 20.82 |
| 6820 | Earth drillers, except oil and gas | 20 | 5.00\% | 20.76 |
| 3610 | Occupational therapy assistants and aides | 12 | 91.67\% | 20.73 |
| 7315 | Heating, air conditioning, and refrigeration mechanics and installers | 194 | 1.55\% | 20.59 |
| 6210 | Boilermakers | 8 | 0.00\% | 20.57 |
| 5920 | Statistical assistants | 13 | 53.85\% | 20.51 |
| 2440 | Library technicians | 34 | 82.35\% | 20.49 |
| 6010 | Agricultural inspectors | 13 | 46.15\% | 20.43 |
| 8130 | Tool and die makers | 42 | 2.38\% | 20.42 |
| 7160 | Automotive glass installers and repairers | 13 | 7.69\% | 20.41 |
| 5030 | Communications equipment operators, all other | 4 | 50.00\% | 20.38 |
| 6320 | Operating engineers and other construction equipment operators | 258 | 0.78\% | 20.35 |
| 3400 | Emergency medical technicians and paramedics | 100 | 34.00\% | 20.33 |
| 5230 | Credit authorizers, checkers, and clerks | 33 | 81.82\% | 20.29 |
| 5910 | Proofreaders and copy markers | 6 | 83.33\% | 20.17 |
| 5940 | Office and administrative support workers, all other | 362 | 75.14\% | 20.09 |
| 6220 | Brickmasons, blockmasons, and stonemasons | 59 | 1.69\% | 20.09 |
| 3535 | Miscellaneous health technologists and technicians | 91 | 63.74\% | 20.03 |
| 5520 | Dispatchers | 149 | 56.38\% | 20.01 |
| 6930 | Helpers-extraction workers | 3 | 0.00\% | 20.00 |
| 6250 | Cement masons, concrete finishers, and terrazzo workers | 33 | 0.00\% | 19.96 |
| 5800 | Computer operators | 65 | 47.69\% | 19.87 |
| 1965 | Miscellaneous life, physical, and social science technicians | 108 | 42.59\% | 19.87 |
| 8730 | Furnace, kiln, oven, drier, and kettle operators and tenders | 7 | 14.29\% | 19.86 |
| 5420 | Information and record clerks, all other | 80 | 87.50\% | 19.83 |
| 6940 | Other extraction workers | 62 | 1.61\% | 19.80 |
| 3910 | Private detectives and investigators | 52 | 50.00\% | 19.69 |
| 5600 | Production, planning, and expediting clerks | 183 | 62.84\% | 19.65 |
| 0205 | Farmers, ranchers, and other agricultural managers | 84 | 15.48\% | 19.59 |
| 6730 | Highway maintenance workers | 74 | 0.00\% | 19.58 |
| 3260 | Health diagnosing and treating practitioners, all other | 7 | 57.14\% | 19.58 |
| 7210 | Bus and truck mechanics and diesel engine specialists | 188 | 0.53\% | 19.53 |
| 6460 | Plasterers and stucco masons | 10 | 0.00\% | 19.48 |
| 6750 | Septic tank servicers and sewer pipe cleaners | 6 | 0.00\% | 19.48 |
| 6260 | Construction laborers | 590 | 2.37\% | 19.46 |
| 7630 | Other installation, maintenance, and repair workers | 112 | 4.46\% | 19.40 |
| 7340 | Maintenance and repair workers, general | 264 | 2.27\% | 19.35 |
| 4620 | Recreation and fitness workers | 188 | 66.49\% | 19.24 |
| 2050 | Directors, religious activities and education | 26 | 65.38\% | 19.19 |
| 6240 | Carpet, floor, and tile installers and finishers | 61 | 1.64\% | 19.11 |
| 8030 | Machinists | 261 | 4.60\% | 19.05 |
| 5410 | Reservation and transportation ticket agents and travel clerks | 82 | 63.41\% | 19.02 |
| 3655 | Miscellaneous healthcare support occupations, including medical | 119 | 78.15\% | 19.01 |
| 6400 | Insulation workers | 30 | 3.33\% | 18.97 |
| 5560 | Postal senvice mail sorters, processors, and processing machine | 44 | 47.73\% | 18.95 |
| 5700 | Secretaries and administrative assistants | 1908 | 95.81\% | 18.91 |
| 9230 | Railroad brake, signal, and switch operators | 2 | 0.00\% | 18.91 |
| 4300 | First-line supervisors of gaming workers | 59 | 42.37\% | 18.89 |
| 7900 | Computer control programmers and operators | 47 | 4.26\% | 18.89 |
| 0325 | Funeral service managers | 8 | 37.50\% | 18.89 |


| Appendi | 2 (continued) |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
| Code | Industry Description | Observations | \% female | Mean wage |
| 8120 | Multiple machine tool setters, operators, and tenders, metal and plastic | 4 | 0.00\% | 18.88 |
| 3510 | Medical records and health information technicians | 67 | 97.01\% | 18.87 |
| 6920 | Roustabouts, oil and gas | 13 | 0.00\% | 18.85 |
| 0510 | Buyers and purchasing agents, farm products | 6 | 0.00\% | 18.82 |
| 8740 | Inspectors, testers, sorters, samplers, and weighers | 432 | 33.33\% | 18.81 |
| 8910 | Etchers and engravers | 6 | 33.33\% | 18.73 |
| 8940 | Tire builders | 8 | 12.50\% | 18.66 |
| 7740 | Structural metal fabricators and fitters | 19 | 0.00\% | 18.64 |
| 8040 | Metal furnace operators, tenders, pourers, and casters | 7 | 14.29\% | 18.62 |
| 3800 | Bailiffs, correctional officers, and jailers | 270 | 26.67\% | 18.61 |
| 4830 | Travel agents | 36 | 77.78\% | 18.58 |
| 4700 | First-line supervisors of retail sales workers | 1651 | 49.67\% | 18.48 |
| 2060 | Religious workers, all other | 54 | 62.96\% | 18.43 |
| 5820 | Word processors and typists | 74 | 91.89\% | 18.36 |
| 6230 | Carpenters | 569 | 2.28\% | 18.33 |
| 3900 | Animal control workers | 6 | 33.33\% | 18.30 |
| 3520 | Opticians, dispensing | 29 | 68.97\% | 18.28 |
| 5200 | Brokerage clerks | 8 | 50.00\% | 18.26 |
| 0310 | Food service managers | 487 | 53.59\% | 18.19 |
| 9130 | Driver/sales workers and truck drivers | 1752 | 4.91\% | 18.10 |
| 3420 | Health practitioner support technologists and technicians | 348 | 83.33\% | 18.06 |
| 9560 | Hoist and winch operators | 3 | 0.00\% | 18.04 |
| 5630 | Weighers, measurers, checkers, and samplers, recordkeeping | 40 | 45.00\% | 18.01 |
| 5140 | Payroll and timekeeping clerks | 125 | 90.40\% | 18.00 |
| 8500 | Cabinetmakers and bench carpenters | 34 | 5.88\% | 17.96 |
| 7200 | Automotive service technicians and mechanics | 446 | 1.35\% | 17.86 |
| 8140 | Welding, soldering, and brazing workers | 335 | 6.87\% | 17.74 |
| 8750 | Jewelers and precious stone and metal workers | 18 | 66.67\% | 17.70 |
| 9510 | Crane and tower operators | 40 | 2.50\% | 17.70 |
| 5120 | Bookkeeping, accounting, and auditing clerks | 809 | 90.85\% | 17.62 |
| 7730 | Engine and other machine assemblers | 11 | 18.18\% | 17.60 |
| 4950 | Door-to-door sales workers, news and street vendors, and related | 60 | 38.33\% | 17.56 |
| 2016 | Social and human service assistants | 97 | 80.41\% | 17.54 |
| 6720 | Hazardous materials removal workers | 23 | 17.39\% | 17.54 |
| 5340 | New accounts clerks | 17 | 70.59\% | 17.52 |
| 7120 | Electronic home entertainment equipment installers and repairers | 24 | 0.00\% | 17.47 |
| 9520 | Dredge, excavating, and loading machine operators | 23 | 4.35\% | 17.47 |
| 8760 | Medical, dental, and ophthalmic laboratory technicians | 55 | 69.09\% | 17.45 |
| 7350 | Maintenance workers, machinery | 17 | 11.76\% | 17.41 |
| 2300 | Preschool and kindergarten teachers | 432 | 98.61\% | 17.38 |
| 3630 | Massage therapists | 54 | 88.89\% | 17.37 |
| 5210 | Correspondence clerks | 6 | 50.00\% | 17.33 |
| 6830 | Explosives workers, ordnance handling experts, and blasters | 8 | 0.00\% | 17.31 |
| 8930 | Paper goods machine setters, operators, and tenders | 22 | 27.27\% | 17.30 |
| 5330 | Loan intervewers and clerks | 71 | 90.14\% | 17.29 |
| 5510 | Couriers and messengers | 136 | 20.59\% | 17.27 |
| 6710 | Fence erectors | 19 | 0.00\% | 17.26 |
| 5530 | Meter readers, utilities | 16 | 18.75\% | 17.15 |
| 3620 | Physical therapist assistants and aides | 46 | 65.22\% | 17.12 |
| 6130 | Logging workers | 34 | 2.94\% | 17.11 |
| 6360 | Glaziers | 24 | 0.00\% | 17.02 |
| 8810 | Painting workers | 70 | 8.57\% | 17.00 |
| 8210 | Tool grinders, filers, and sharpeners | 1 | 0.00\% | 17.00 |
| 5020 | Telephone operators | 30 | 73.33\% | 16.96 |
| 9750 | Material moving workers, all other | 32 | 15.63\% | 16.92 |
| 6330 | Drywall installers, ceiling tile installers, and tapers | 65 | 1.54\% | 16.91 |
| 4320 | First-line supervisors of personal service workers | 52 | 63.46\% | 16.90 |
| 9260 | Subway, streetcar, and other rail transportation workers | 10 | 20.00\% | 16.89 |
| 7150 | Automotive body and related repairers | 80 | 1.25\% | 16.83 |
| 7940 | Rolling machine setters, operators, and tenders, metal and plastic | 8 | 25.00\% | 16.82 |
| 5860 | Office clerks, general | 681 | 85.61\% | 16.82 |


| Appen | (continued) |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
| Code | Industry Description | Observations | \% female | Mean wage |
| 5840 | Insurance claims and policy processing clerks | 165 | 81.21\% | 16.79 |
| 5110 | Billing and posting clerks | 288 | 88.89\% | 16.66 |
| 5360 | Human resources assistants, except payroll and timekeeping | 32 | 81.25\% | 16.62 |
| 6420 | Painters, construction and maintenance | 207 | 6.28\% | 16.56 |
| 5310 | Interviewers, except eligibility and loan | 110 | 86.36\% | 16.50 |
| 8250 | Prepress technicians and workers | 24 | 54.17\% | 16.47 |
| 7300 | Control and valve installers and repairers | 13 | 0.00\% | 16.47 |
| 9300 | Sailors and marine oilers | 11 | 0.00\% | 16.45 |
| 4200 | First-line supervisors of housekeeping and janitorial workers | 133 | 39.85\% | 16.44 |
| 7040 | Electric motor, power tool, and related repairers | 18 | 5.56\% | 16.41 |
| 4520 | Miscellaneous personal appearance workers | 122 | 85.25\% | 16.32 |
| 6765 | Miscellaneous construction and related workers | 17 | 0.00\% | 16.19 |
| 3640 | Dental assistants | 200 | 98.50\% | 16.13 |
| 8255 | Printing press operators | 140 | 22.86\% | 16.13 |
| 6300 | Paving, surfacing, and tamping equipment operators | 9 | 11.11\% | 16.06 |
| 5240 | Customer senvice representatives | 1258 | 67.57\% | 16.05 |
| 7600 | Signal and track switch repairers | 2 | 0.00\% | 15.94 |
| 7920 | Extruding and drawing machine setters, operators, and tenders, metal | 8 | 0.00\% | 15.88 |
| 7560 | Riggers | 7 | 0.00\% | 15.85 |
| 5810 | Data entry keyers | 194 | 81.44\% | 15.78 |
| 5100 | Bill and account collectors | 139 | 71.22\% | 15.78 |
| 8965 | Production workers, all other | 533 | 27.02\% | 15.74 |
| 7440 | Wind turbine service technicians | 2 | 0.00\% | 15.73 |
| 7950 | Cutting, punching, and press machine setters, operators, and tenders, | 56 | 7.14\% | 15.65 |
| 7510 | Coin, vending, and amusement machine servicers and repairers | 20 | 15.00\% | 15.64 |
| 4240 | Pest control workers | 30 | 6.67\% | 15.61 |
| 8100 | Molders and molding machine setters, operators, and tenders, metal and | 25 | 24.00\% | 15.55 |
| 3860 | Transit and railroad police | 3 | 0.00\% | 15.49 |
| 9140 | Taxi drivers and chauffeurs | 152 | 16.45\% | 15.48 |
| 3649 | Phlebotomists | 73 | 80.82\% | 15.48 |
| 8650 | Crushing, grinding, polishing, mixing, and blending workers | 59 | 20.34\% | 15.46 |
| 6515 | Roofers | 100 | 2.00\% | 15.37 |
| 9120 | Bus drivers | 368 | 39.95\% | 15.36 |
| 2760 | Entertainers and performers, sports and related workers, all other | 13 | 53.85\% | 15.27 |
| 2540 | Teacher assistants | 678 | 91.74\% | 15.24 |
| 4760 | Retail salespersons | 2005 | 51.82\% | 15.24 |
| 3945 | Transportation security screeners | 19 | 63.16\% | 15.24 |
| 7240 | Small engine mechanics | 25 | 0.00\% | 15.23 |
| 3930 | Security guards and gaming surveillance officers | 603 | 19.40\% | 15.18 |
| 8860 | Cleaning, washing, and metal pickling equipment operators and tenders | 5 | 20.00\% | 15.12 |
| 8020 | Milling and planing machine setters, operators, and tenders, metal and | 3 | 0.00\% | 15.00 |
| 3647 | Pharmacy aides | 29 | 75.86\% | 14.99 |
| 5260 | File Clerks | 224 | 84.82\% | 14.95 |
| 5130 | Gaming cage workers | 7 | 100.00\% | 14.93 |
| 4750 | Parts salespersons | 84 | 9.52\% | 14.82 |
| 4000 | Chefs and head cooks | 220 | 21.82\% | 14.82 |
| 5010 | Switchboard operators, including answering service | 27 | 81.48\% | 14.80 |
| 9600 | Industrial truck and tractor operators | 311 | 6.75\% | 14.77 |
| 5350 | Order clerks | 82 | 67.07\% | 14.75 |
| 8200 | Plating and coating machine setters, operators, and tenders, metal and | 9 | 22.22\% | 14.68 |
| 7850 | Food cooking machine operators and tenders | 17 | 23.53\% | 14.62 |
| 5610 | Shipping, receiving, and traffic clerks | 343 | 30.90\% | 14.59 |
| 9740 | Tank car, truck, and ship loaders | 2 | 0.00\% | 14.58 |
| 8720 | Extruding, forming, pressing, and compacting machine setters, | 24 | 20.83\% | 14.56 |
| 7720 | Electrical, electronics, and electromechanical assemblers | 102 | 48.04\% | 14.49 |
| 8530 | Sawing machine setters, operators, and tenders, wood | 20 | 0.00\% | 14.42 |
| 9720 | Refuse and recyclable material collectors | 56 | 8.93\% | 14.41 |
| 8220 | Metal workers and plastic workers, all other | 221 | 20.81\% | 14.31 |
| 8450 | Upholsterers | 14 | 21.43\% | 14.28 |
| 6600 | Helpers, construction trades | 34 | 8.82\% | 14.26 |


| Append | 2 (continued) |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
| Code | Industry Description | Observations | \% female | Mean wage |
| 7750 | Miscellaneous assemblers and fabricators | 515 | 40.19\% | 14.22 |
| 4740 | Counter and rental clerks | 75 | 41.33\% | 14.19 |
| 8550 | Woodworkers, all other | 11 | 0.00\% | 14.18 |
| 8540 | Woodworking machine setters, operators, and tenders, except sawing | 16 | 0.00\% | 14.18 |
| 8460 | Textile, apparel, and furnishings workers, all other | 15 | 46.67\% | 14.10 |
| 4530 | Baggage porters, bellhops, and concierges | 38 | 15.79\% | 14.09 |
| 8000 | Grinding, lapping, polishing, and buffing machine tool setters, operators, | 33 | 12.12\% | 14.03 |
| 3840 | Parking enforcement workers | 3 | 0.00\% | 14.00 |
| 8950 | Helpers-production workers | 32 | 31.25\% | 13.99 |
| 8710 | Cutting workers | 52 | 23.08\% | 13.97 |
| 5400 | Receptionists and information clerks | 862 | 91.65\% | 13.89 |
| 9415 | Transportation attendants, except flight attendants | 28 | 64.29\% | 13.87 |
| 8920 | Molders, shapers, and casters, except metal and plastic | 15 | 33.33\% | 13.86 |
| 7710 | Aircraft structure, surfaces, rigging, and systems assemblers | 5 | 60.00\% | 13.78 |
| 6540 | Solar photovoltaic installers | 2 | 0.00\% | 13.75 |
| 7810 | Butchers and other meat, poultry, and fish processing workers | 224 | 25.00\% | 13.73 |
| 8256 | Print binding and finishing workers | 7 | 57.14\% | 13.69 |
| 7610 | Helpers-installation, maintenance, and repair workers | 18 | 11.11\% | 13.67 |
| 3646 | Medical transcriptionists | 44 | 93.18\% | 13.66 |
| 6100 | Fishers and related fishing workers | 15 | 0.00\% | 13.64 |
| 4460 | Embalmers and funeral attendants | 11 | 27.27\% | 13.57 |
| 9610 | Cleaners of vehicles and equipment | 172 | 16.86\% | 13.54 |
| 7855 | Food processing workers, all other | 79 | 37.97\% | 13.54 |
| 4220 | Janitors and building cleaners | 1411 | 30.05\% | 13.45 |
| 4900 | Models, demonstrators, and product promoters | 49 | 79.59\% | 13.38 |
| 9620 | Laborers and freight, stock, and material movers, hand | 1123 | 18.52\% | 13.38 |
| 3645 | Medical assistants | 245 | 95.10\% | 13.35 |
| 6430 | Paperhangers | 2 | 100.00\% | 13.31 |
| 8010 | Lathe and turning machine tool setters, operators, and tenders, metal | 4 | 25.00\% | 13.29 |
| 5320 | Library assistants, clerical | 79 | 84.81\% | 13.27 |
| 6005 | First-line supervisors of farming, fishing, and forestry workers | 32 | 9.38\% | 13.24 |
| 4050 | Combined food preparation and serving workers, including fast food | 200 | 66.00\% | 13.21 |
| 8850 | Adhesive bonding machine operators and tenders | 6 | 66.67\% | 13.15 |
| 4640 | Residential advisors | 44 | 65.91\% | 13.15 |
| 9150 | Motor vehicle operators, all other | 38 | 7.89\% | 13.14 |
| 5160 | Tellers | 262 | 88.55\% | 13.13 |
| 7930 | Forging machine setters, operators, and tenders, metal and plastic | 2 | 50.00\% | 13.13 |
| 7840 | Food batchmakers | 71 | 49.30\% | 12.97 |
| 4010 | First-line supervisors of food preparation and serving workers | 303 | 62.05\% | 12.93 |
| 4400 | Gaming services workers | 82 | 45.12\% | 12.92 |
| 5900 | Office machine operators, except computer | 32 | 65.63\% | 12.91 |
| 4510 | Hairdressers, hairstylists, and cosmetologists | 286 | 94.06\% | 12.86 |
| 7550 | Manufactured building and mobile home installers | 3 | 0.00\% | 12.83 |
| 5850 | Mail clerks and mail machine operators, except postal service | 46 | 52.17\% | 12.83 |
| 4350 | Nonfarm animal caretakers | 85 | 78.82\% | 12.79 |
| 5620 | Stock clerks and order fillers | 930 | 34.73\% | 12.77 |
| 4250 | Grounds maintenance workers | 502 | 4.58\% | 12.75 |
| 8800 | Packaging and filling machine operators and tenders | 198 | 56.57\% | 12.75 |
| 9110 | Ambulance drivers and attendants, except emergency medical | 10 | 40.00\% | 12.72 |
| 8340 | Shoe machine operators and tenders | 8 | 87.50\% | 12.66 |
| 3940 | Crossing guards | 42 | 69.05\% | 12.60 |
| 9630 | Machine feeders and offbearers | 20 | 35.00\% | 12.57 |
| 3955 | Lifeguards and other recreational, and all other protective service workers | 74 | 54.05\% | 12.56 |
| 7800 | Bakers | 105 | 55.24\% | 12.42 |
| 4420 | Ushers, lobby attendants, and ticket takers | 24 | 33.33\% | 12.40 |
| 4940 | Telemarketers | 82 | 63.41\% | 12.38 |
| 3600 | Nursing, psychiatric, and home health aides | 1290 | 87.75\% | 12.31 |
| 9360 | Automotive and watercraft service attendants | 58 | 24.14\% | 12.28 |
| 7260 | Miscellaneous vehicle and mobile equipment mechanics, installers, and | 42 | 0.00\% | 12.23 |
| 6120 | Forest and conservation workers | 9 | 22.22\% | 12.21 |
| 4600 | Childcare workers | 574 | 93.73\% | 12.04 |
| 8060 | Model makers and patternmakers, metal and plastic | 3 | 0.00\% | 11.99 |
| 8510 | Furniture finishers | 5 | 20.00\% | 11.95 |
| 4500 | Barbers | 26 | 34.62\% | 11.83 |
| 8420 | Textile winding, twisting, and drawing out machine setters, operators, | 11 | 54.55\% | 11.81 |
| 9640 | Packers and packagers, hand | 240 | 55.83\% | 11.80 |
| 7830 | Food and tobacco roasting, baking, and drying machine operators and | 4 | 50.00\% | 11.73 |


| Appendix 2 (continued) |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
| Code | Industry Description | Observations | \% female | Mean wage |
| 5300 | Hotel, motel, and resort desk clerks | 103 | 67.96\% | 11.64 |
| 6040 | Graders and sorters, agricultural products | 76 | 59.21\% | 11.58 |
| 6050 | Miscellaneous agricultural workers | 456 | 16.45\% | 11.50 |
| 3648 | Veterinary assistants and laboratory animal caretakers | 36 | 75.00\% | 11.43 |
| 4430 | Miscellaneous entertainment attendants and related workers | 113 | 46.90\% | 11.26 |
| 4610 | Personal care aides | 683 | 83.60\% | 11.20 |
| 8320 | Sewing machine operators | 83 | 72.29\% | 10.91 |
| 8830 | Photographic process workers and processing machine operators | 27 | 59.26\% | 10.90 |
| 4230 | Maids and housekeeping cleaners | 811 | 88.90\% | 10.80 |
| 9350 | Parking lot attendants | 35 | 8.57\% | 10.79 |
| 4160 | Food preparation and serving related workers, all other | 1 | 0.00\% | 10.75 |
| 4120 | Food servers, nonrestaurant | 124 | 66.94\% | 10.71 |
| 8300 | Laundry and dry-cleaning workers | 123 | 60.98\% | 10.66 |
| 8330 | Shoe and leather workers and repairers | 4 | 50.00\% | 10.58 |
| 4650 | Personal care and service workers, all other | 52 | 53.85\% | 10.52 |
| 8520 | Model makers and patternmakers, wood | 1 | 0.00\% | 10.50 |
| 4540 | Tour and travel guides | 18 | 61.11\% | 10.44 |
| 4020 | Cooks | 1230 | 41.54\% | 10.44 |
| 4720 | Cashiers | 1964 | 73.98\% | 9.91 |
| 8310 | Pressers, textile, garment, and related materials | 35 | 82.86\% | 9.87 |
| 8400 | Textile cutting machine setters, operators, and tenders | 5 | 40.00\% | 9.84 |
| 4030 | Food preparation workers | 532 | 62.97\% | 9.74 |
| 4040 | Bartenders | 268 | 54.85\% | 9.51 |
| 4130 | Dining room and cafeteria attendants and bartender helpers | 236 | 52.12\% | 9.25 |
| 4140 | Dishwashers | 185 | 20.54\% | 9.19 |
| 6110 | Hunters and trappers | 1 | 0.00\% | 9.00 |
| 4150 | Hosts and hostesses, restaurant, lounge, and coffee shop | 148 | 87.16\% | 8.90 |
| 4410 | Motion picture projectionists | 5 | 40.00\% | 8.73 |
| 4060 | Counter attendants, cafeteria, food concession, and coffee shop | 147 | 73.47\% | 8.62 |
| 4110 | Waiters and waitresses | 1386 | 71.21\% | 8.50 |
| 8440 | Fabric and apparel patternmakers | 2 | 100.00\% | 8.25 |
| 8360 | Textile bleaching and dyeing machine operators and tenders | 2 | 0.00\% | 8.00 |
| 6020 | Animal breeders | 3 | 33.33\% | 6.47 |

## APPENDIX 3: MATCHING CHECKS - BIAS ON OBSERVABLES (COMMON SUPPORT)

## Full Sample with Industry and Occupation Dummies



Full Sample without Industry and Occupation Dummies


## APPENDIX 3 (continued)

## Parents



## Non-parents



## APPENDIX 3 (continued)

## Married



## Unmarried



## APPENDIX 3 (continued)

Young (24 or under):


Older (25 or over):


## APPENDIX 3 (continued)

## Part-time



## Full-time:



## APPENDIX 3 (continued)

## Banking:



## Grocery Stores:



## APPENDIX 3 (continued)

## Restaurants:



## Customer Service Representatives;



## APPENDIX 3 (continued)

## Assemblers:



## Accountants:



## APPENDIX 3 (continued)

## Lawyers:



## Janitors:




[^0]:    * Bournemouth University, Department of Accounting, Finance and Economics, Bournemouth University, Holdenhurst Road, Bournemouth, BH8 8EB, UK Email: i7734605@bournemouth.ac.uk.
    ${ }^{\forall}$ Associate Professor of Economics, University of Campania Luigi Vanvitelli, Faculty of Law, via Mazzocchi 5 I81030, Santa Maria Capua Vetere (CE), Italy. Email: francesco.pastore@unicampania.it.
    ${ }^{¥}$ Professor of Economics, Bournemouth University, Department of Accounting, Finance and Economics, Bournemouth University, Holdenhurst Road, Bournemouth, BH8 8EB, UK Email:
    awebster@bournemouth.ac.uk.

[^1]:    Note: robust standard errors are in parentheses

