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LABOR MARKET IMPERFECTIONS: EFFECTS ON OCCUPATIONAL INJURIES AND EARNINGS

A dissertation presented

by

Andrea Germiniasi

to

The Department of Economics

In partial fulfillment of requirements for the degree of

Doctor of Philosophy

in the field of

Economics

Northeastern University

Boston, Massachusetts

August, 2010

LABOR MARKET IMPERFECTIONS: EFFECTS ON OCCUPATIONAL INJURIES AND EARNINGS

by

Andrea Germiniasi

ABSTRACT OF DISSERTATION

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Trade unions and gender discrimination are generally considered as sources of labor market imperfections. My dissertation is a study of the effects of these distortions on three specific outcomes: occupational injuries, earnings of injured workers, and gender pay differentials in the arts occupations.

The first chapter of my dissertation investigates the relationship between union coverage and work-related injuries. Trade unions play a central role in establishing a safe work place at the firm level. Union representatives ensure the implementation of safety standards set by the Occupational and Safety Health Administration (OSHA) and provide employees in bargaining units with education on job-specific risks. As a consequence, the injury rates of workers covered by union contracts may be expected to be lower than those of uncovered workers, given similar demographic and occupational characteristics. However, the work environment is not the sole determinant of injury rates. One additional factor is the worker's effort to avoid and minimize work-related hazards. When the personal accident-prevention activities cannot be monitored, the employee needs to face a correct system of incentives. If union representation fails to provide these incentives, covered workers may experience higher injury rates than uncovered employees. In analyzing this relationship, previous studies have failed to include controls for one or both of the following factors: 1) individual unobservable characteristics, and 2) firm-specific hazards. Using data from the NLSY79, the goal of the first chapter is to address these major limitations and provide an estimate of the effect of union coverage on the probability of nonfatal work-related injuries. The results of this chapter indicate that covered workers are about 50 percent more likely to suffer an occupational injury than similar uncovered workers. The direction of this estimate is then interpreted within a moral hazard framework, where union and nonunion workers face different incentives when they choose their level of accident-prevention activities.

The second chapter examines the economic consequences of a work-related injury. Injured workers may experience reductions in earnings for multiple reasons. First, injured workers may experience temporary or permanent decreases in work hours. Second, the wage of the worker may decrease because of lower post-injury productivity caused by any loss in general, specific or health human capital. This outcome is more likely to occur when the injured worker is forced to change firms, occupation or industry. In this setting, union coverage at the time of the injury may play an important role in reducing the size of the earnings losses. Unions provide protection against dismissal without just cause and may favor the assignment of an

injured worker to a different job or work schedule within the same firm, therefore decreasing the probability of quitting. Using data from the NLSY79, this chapter applies a A standard version of the difference-in-difference methodology is used to investigate whether union coverage at the time of the injury is able to reduce the earnings losses caused by the injury. The findings indicate that union coverage is able to preserve workers' earnings in the year of the injury.

The third chapter investigates whether gender discrimination affects the earnings in the arts occupations. Female artists generally earn less than male artists who work in the same occupation. This gender earnings gap can be due to a combination of differences in individual characteristics (explained portion) and differences in the returns to endowments (unexplained portion). The latter have been often interpreted as an estimate of discrimination, although they could be the result of gender differences in unobservable skills. Using the Five Percent PUMS from the 2000 U.S. Census, a modified Blinder-Oaxaca decomposition technique (Yun, 2005) is applied to the gender wage gap for eleven arts occupations. The results of this chapter show that a significant unexplained pay gap, which could be attributed to discrimination, exists for female artists employed in full-time jobs. The explained portion of the gap indicates that women are often segregated into low-paying industries. A second type of decomposition (Fairlie, 2003) is then used to investigate the reasons of gender segregation across industries. These additional findings suggest that discriminatory hiring practices are likely to exist for some arts occupations.

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Introduction

In economics a distortion is defined as a divergence from the conditions of a perfectly competitive market. The effects of a distortion on market outcomes have been widely investigated in every economic field. Labor economics, in particular, has focused on the wage and employment consequences..

If labor markets are perfectly competitive, workers will be paid according to their marginal product and will be efficiently allocated to jobs. These outcomes will not be guaranteed in the presence of distortions such as information asymmetries, mobility costs, inequality in bargaining power, and institutional barriers. Union representation and sexual discrimination are two examples of these kinds of distortions and their impact on specific labor market outcomes will be the subject of this dissertation. The effects of union representation will be analyzed in the setting of occupational injuries. Injuries may harm the productivity of workers, with consequences on wages and employment. First, an investigation will be undertaken to determine if union representation produces the correct system of incentives to induce a worker to devote effort to safety. Second, the bargaining power of unions will be evaluated in relation to their capacity to protecting the earnings of injured workers who are potentially less productive. However, it should be noted that the effect of a distortion could be socially beneficial as it offsets other labor market imperfections (for example, corporate monopoly power). The effects of sexual discrimination will be analyzed with reference to the wages and job opportunities for workers in the arts occupations. Qualified artists may be shut out of potential positions based only on their gender. This, in turn, may have consequences on their current earnings and future reputation. In this case, the outcome is not only sub-optimal but also raises issues of fairness and justice. The remedy for distortions represented by institutional barriers would be, of course, to remove the barriers.

CHAPTER I

The Effect of Union Coverage on the Probability of Work-related Injuries

1 Introduction

Occupational safety in the workplace has been an issue of great concern for workers, employers, unions and policy makers since the beginning of the modern industrial era. A safe work environment is considered a necessary condition for decreasing the probability of work-related injuries, illnesses and deaths. In this setting, unions have played a central role at the firm level, by ensuring the implementation of safety standards set by the Occupational Safety and Health Administration (OSHA) and providing employees of bargaining units with education on job-specific risks. As a consequence, the injury rates[1] of workers in bargaining units with union representation may be expected to be lower than those of uncovered employees, given similar demographic and occupational characteristics. However, the work environment is not the sole determinant of injury rates. One additional factor is the worker's effort to avoid and minimize work-related hazards. When the personal accident-prevention activities cannot be monitored, the employee needs to face a correct system of incentives. If union representation fails to provide these incentives, covered workers may experience higher injury rates than uncovered employees.

The main goal of this paper is to evaluate the effect of working in a bargaining unit on the probability of nonfatal work-related injuries. The investigation of this relationship is confronted by the following challenges. First, coverage status may be correlated with unmeasurable characteristics that also influence the probability of injury. In this regard, previous studies have failed to include controls for one or both of the following factors: 1) firm-specific hazards; and 2) individual unobservable characteristics. In the first case, it has been argued that unions and other forms of workers' associations tend to organize in dangerous workplaces. In the second case, individuals with unobserved risky characteristics may select themselves into bargaining units, as a collective bargaining agreement (CBA) generally contains favorable provisions for injured workers. The present paper employs different strategies to control for the potential endogeneity of union coverage. Second, the data available for this study are collected based on individual self-reporting. Consequently, injury occurrences may be underreported. The discrepancy between the self-reported and actual injury rates is likely to depend on the worker's coverage status for the following reasons. First, covered workers may be more capable of identifying an occupational injury than uncovered workers, as the former are better

[1] In the remainder of the paper, the word "injury" indicates both injuries and illnesses, unless otherwise specified.

educated about the specific hazards of their jobs. Second, individuals are more likely to recall an injury if they filed a compensation claim for it. The probability of filing a claim is positively correlated with coverage status, which can be explained by the fact that injured covered workers are better informed about filing procedures and that they are protected from employer retaliation. A different measure for the injury rate can be obtained by combining the self-reported events with the number of lost work-days. This approach follows the reasoning that some types of injuries (e.g. a fractured skull) may necessarily require days off from work. A benefit of this measure is that the reporting of an injury should be less affected by the individual ability to identify even minor work-related injuries. However, it is possible that covered workers may be more prone to taking days off because they are not discouraged from filing compensation claims. At the same time, uncovered workers may return to work earlier for fear of being penalized. Despite these data limitations, it would be still relevant to investigate whether covered workers are more likely to 1) report an injury; and 2) take time away from work, as lost work-days may involve a loss of productivity and result in an economic cost for the firm and the injured worker.

Assuming that there is not a significant discrepancy between the self-reported and actual injury rates, the direction of the coverage effect can be interpreted within a general moral hazard framework, where union and nonunion workers differ in the unobserved effort to avoid work-related accidents. Other studies have expressed this effort as a function of the expected amount of compensation benefits which a worker receives in case of an injury. The innovation of this paper is to relate this effort to the probability of different post-injury events. For example, an injured worker may be fired or laid off, reassigned to a different task or work schedule, or quit the job. Specifically, the empirical analysis tries to assess whether the probability of a given outcome depends on the coverage status. If there were significant differences in these probabilities, covered and uncovered workers would devote different efforts in accident-prevention activities.

The literature on workplace hazards suggests that unions play an active role in increasing plant safety (Olson, 1981, Robinson, 1998). This effort may be explained by the fact that union workers are generally found to hold more dangerous jobs than nonunion workers. The conclusion is based on the estimation of a hazard equation, where the dependent variable can be either the worker's probability of being employed in a hazardous occupation (Leigh, 1982) or the industry injury rate (Viscusi, 1979, Worral and Butler, 1983,

Fairris, 1992). In the first case, the measure of risk may be considered rather subjective, as it is produced by the worker's perception and knowledge (respondents are asked such questions as, "Is your job dangerous or unhealthy?"). Gegax et al. (1991) suggest that covered members possibly overestimate the level of risk faced. Instead of a subjective measure of risk, the present study includes as a control variable a subjective measure of physical effort, which is less likely to be correlated with union status. In the second case, the measure is based on the monitoring activities of third parties, causing nonunion employees to underreport minor accidents for fear of retaliation by the employer (Olson, 1981, Dorsey and Walzer, 1983). Moreover, a recent report by the Government Accountability Office indicates that employers avoid reporting workplace injuries and illnesses for fear of jeopardizing workers compensation premium discounts. An additional problem is that the use of aggregate industry measures does not allow one to adequately control for individual characteristics, which may significantly contribute to the probability of injury. For these reasons, the present study uses self-reported injuries as the dependent variable, while the detailed industry injury rate is added as an additional control in the hazard equation. Many studies in public health (Larkin and Zimmerman, 2005, Pergamit and Krishnamurty, 2006) have used self-reported injuries to investigate racial or educational disparities in injury rates and lost work-days. Larkin and Zimmerman (2005) include a union dummy as an additional control in a logistic equation and union members are found to be approximately 80 percent more likely to suffer occupational injuries. The authors acknowledge that "reporting a lost-worktime injury or illness may have been influenced by a number of factors, such as perceptions of what constitutes an injury, financial pressure to remain at work, level of job autonomy, and workplace discrimination against taking time off or filing for workers' compensation." In particular, these studies do not provide a solution for dealing with two potentially important sources of bias in the union coefficient. The first source is the greater ability of union workers to identify work-related injuries. Olson (1981) suggests, however, that union and nonunion workers may have the same ability to identify serious injuries. Adding to this, Pergamit and Krishnamurty (2006) make the strong argument that the severity of an injury can be measured in terms of the number of workdays lost due to the injury. Given these premises, the present study addresses the potential ability bias by redefining injury occurrences based on the number of lost work-days. As explained above, a possible limitation of this approach is that covered workers are likely to take more time away from work than uncovered workers,

given similar injuries. However, if the measure was accurate, this analysis would provide further evidence on the factors determining the probability of injury. The second source is the potential endogeneity of union coverage. Robinson (1998) shows that the union membership rate is constantly higher in the "most hazardous" jobs. In the present study, two alternative strategies are suggested to deal with this problem. The first strategy is to instrument for union coverage, using as instruments the impact that right-to-work laws have on the unionization of the industry of employment. The second strategy is to consider workers who change coverage status while remaining employed in the same job.

A separate issue addressed by this study is to assess the role of the unobserved risk-attitude of the respondent. As described in Kahn (1990), "individuals may have inherently different degrees of accident-proneness" and "workers may choose to be more or less careful; for instance, they may choose to use personal safety devices." A study by Garen (1988) on compensating differentials explains why individuals with certain unobserved attributes, such as "cool-headness", may choose to work in a dangerous job. The present study investigates whether the estimate of the coverage effect is biased by a higher proportion of high risk individuals in a bargaining unit. High risk individuals may be more willing to sustain the costs of union coverage than low risk individuals, given the favorable provisions of a CBA for injured workers. A similar argument can be found in Levine (1991), who shows that, in the presence of heterogeneous workers, any firm that switches to just cause policy will attract a disproportionate share of workers who provide low effort.

The work is organized as follows: section two describes the institutional setting; section three illustrates the estimation strategy; section four describes the data in use; section five presents the empirical results; and section six outlines the moral hazard model. Conclusions are presented in section seven.

2 The Institutional Setting

2.1 Unions and Bargaining Units

A bargaining unit is a group of job classifications and positions that have a commonality of work, skills, working conditions and job duties. It cannot include supervisors or managers. There are two general types

of bargaining units. The first is a comprehensive, or *vertical*, bargaining unit, which usually includes all "production and maintenance employees" regardless of their skill or classification. The second type is an inclusive, or *horizontal,* bargaining unit, which may be defined very specifically (e.g., nurses, flight attendants, engineers).

The employees in the bargaining unit are represented by a labor union in their dealings with firm management. Bargaining unit status (that is, whether the position is in or out of the unit) pertains solely to the employee's position in the bargaining unit– it does not take into consideration whether the employee is a dues paying union member. As such, these are two distinct groups. Bargaining unit members are employees whose positions are included in the defined bargaining unit while union members are employees that pay dues to the labor organization.

Whether or not workers must join the union to work in a bargaining unit depends on what type of *shop* is present in their workplace. There are three types of shops: union shop, agency shop, and open shop. The union shop requires that employees in a bargaining unit join the union. In an agency shop workers must pay union dues whether they are a member of a labor union or not. On the other hand, in an "open shop" the union represents the entire bargaining unit regardless of whether or not all employees are members of the union or paying union dues. The case of open shops will turn out to be relevant for the analysis in this study, therefore it is worthy of a few more details. Open shops are required by law in *right-to-work* jurisdictions. Right-to-work (RTW) laws are statutes enforced in twenty-two states[2], mostly in the southern or western U.S., which prohibit agreements between trade unions and employers making membership or payment of union dues or "fees" a condition of employment, either before or after hiring.

Once a union has been certified as the exclusive representative of a bargaining unit, it must represent all its workers equally, regardless of their membership status. In other words, when the union and management negotiate a collective bargaining agreement, its terms and conditions cover all employees in the bargaining unit irrespective of their membership status. A CBA may include provisions regarding wages and working hours, job termination, working conditions and health insurance benefits. Specifically, a CBA generally limits the employer's ability to fire employees: the employer must have a *just cause* (defined by the CBA)

[2] Alabama, Arizona, Arkansas, Florida, Georgia, Idaho, Iowa, Kansas, Louisiana, Mississippi, Nebraska, Nevada, North Carolina, North Dakota, Oklahoma, South Carolina, South Dakota, Tennessee, Texas, Utah, Virginia, Wyoming

in order to terminate the employment relationship. In the case of employment-at-will, both the employer and the employee can, instead, end the employment relationship at any time without notice or reason (so long as the reason is not illegal)[3]. Injured workers are therefore granted more protection under a CBA, as employers are aware that termination may create a lawsuit (absence of just cause) or, at best, make a Workers' Compensation[4] case stay open much longer. Additionally, a CBA usually makes available a set of instruments (rate retention, job transfer, and seniority rights) which allow injured workers, who are unable to do their former jobs, to do some other kind of work.

2.2 Unions and Occupational Safety

In 1971 the OSHA was established with the mission of preventing work-related injuries, illnesses, and deaths through the development and enforcement of standards for workplace safety and health. Statistics compiled by the National Center for Health Statistics and the Bureau of Labor Statistics (BLS) show that the overall job fatality rate has been cut by 78 percent since 1970. The injury rate has also fallen (11 injuries and illnesses per 100 full-time workers in 1973; by 2007, the rate was 4.2) and the declines in workplace fatalities and injuries have been much greater in those industries, such as manufacturing and construction, where OSHA has targeted its standards and enforcement activities. Trade unions claim part of the credit for these achievements by arguing that without their involvement some of these standards would not have been issued. For instance, this has been the case with the Cotton Dust Standard (1978), defended in court by the AFL-CIO, and the Protective Lead Standard (1978, Steelworkers and United Auto Workers). Today, trade unions promote the establishment of safe work environments through union representation by OSHA inspections, and by advising on bargaining strategies over health and safety issues.

[3] Illegal reasons: race, sex, age, religion, nationality, jury duty, or disability.

[4] The Workers' Compensation System provides insurance against income loss and medical expenses incurred by the injured worker. Each state has different compensation laws, yet a common feature is that they are "No-fault" systems, meaning that 1) the employee gives up the right to go to court and sue his employer for on-the-job injurie, instead, the worker is entitled to receive a certain reimbursement based upon fixed maximums set by the various states; and that 2) the employers give up the right to challenge an employee's possible negligence.

3 Empirical Strategy

As described in section two, the terms and conditions of a CBA cover all employees in the bargaining unit irrespective of their union membership status. Therefore, since the efforts of union representatives to ensure occupational safety benefits the whole bargaining unit, the relevant status for the analysis is the worker's union coverage[5] rather than her union membership.

The objective of this study is to obtain an estimate of the effect of union coverage on the probability of a worker incurring a nonfatal work-related injury or illness. Different estimation techniques are employed to control for observable and unobservable factors which may contaminate the relationship. The baseline specification is a static probit of the probability of a work-related injury, where the set of explanatory variables consists of the worker's union coverage status, individual characteristics and other exogenous factors. The model is first estimated by pooling all the observations (section 3.1). However, the coefficient of union coverage may be biased upward by the following unobservable factors: 1) greater ability of union workers to identify work-related injuries; 2) endogeneity of union coverage, in the sense that unions are more likely to be present in dangerous workplaces; and 3) higher proportion of high-risk individuals in bargaining units

The proposed solution to the first problem is to restrict the analysis to injuries which involved some lost work-days. The idea is that the reporting of these injuries should be less affected by union training or subjective perception (section 3.2). Potential union endogeneity is accounted for in three different ways. The first approach is to include, for selected years, dummy variables which capture specific "physical efforts" required in the workplace (Section 3.1). The second approach is to instrument for union coverage, where the source of exogenous variation is represented by residence in a right-to-work state (section 3.3). The third approach consists of estimating a hazard equation for the subset of workers who change coverage status while remaining with the same employer over the years. The underlying assumption is that workplace-specific hazards are fairly constant over alternative coverage status (section 3.4). Lastly, the use of a random-effect estimator allows one to take into account unobserved individual characteristics that do not vary over time, such as "accident-proneness" or "cool-headness", which may be correlated with the coverage status (Section 3.5). The empirical results are discussed in section five.

[5] Alternatively indicated in this study as "union coverage" or "union representation".

3.1 Baseline Specification

The probability of injury is specified as a response probability $P(y_{it} = 1|CBA_{it}, \mathbf{x}_{it})$ where the binary outcome variable y_{it} is a work-related injury episode at the most recent/current job. The outcome variable takes a value equal to one irrespective of the number of lost work-days. The baseline specification is a probit model for the probability of injury, which can be written as:

$$P(y_{it} = 1|CBA_{it}, \mathbf{x}_{it}) = \Phi(\beta_0 + \beta_1 CBA_{it} + \mathbf{x}_{it}\boldsymbol{\beta}) \tag{1}$$

where Φ is the cumulative normal distribution function, CBA_i is the dummy variable for union coverage, $\mathbf{x}_{it}$ is a vector which contains demographic controls (age, gender, race, health and years of schooling); controls for respondents' work characteristics (occupation, detailed industry of employment, industry injury rate, training, weekly hours worked, tenure and the presence of a second job); state dummies to capture local labor market conditions; and time dummies to capture changes in OSHA regulations and advances in technology which reduce job-related hazards.

A preliminary approach to account for firm-specific risks is to include controls for physical effort. In two surveys, respondents are asked how often their jobs require various types of physical effort. In this case, the perception of the individual is unlikely to be correlated with her union status. The frequency of these activities is a good proxy for work-related risks that cause strains and back pains, which normally represent more than 50% of the total number of injury cases[6]. The basic specification is modified by including this set of dummies and estimated for those years where the survey contains the questions about physical effort.

3.2 Injury Status and Lost Work-Days

If covered workers are better trained than uncovered workers to identify even minor work-related injuries, the coefficient of union coverage will be biased upward. One way to deal with the subjective bias in self-reporting is to limit the analysis only to injuries which involve a certain number of lost work-days. This approach is based on the idea that some types of injuries may necessarily require some time away from work. In this

[6] Non-fatal injury statistics for the 2000 show that the 1,664,000 reported cases are caused by sprains and strains (728,200), tendonitis and carpal tunnel syndrome (42,000), back pain and other pain (118,000), multiple traumatic injuries with sprains and bruises (21,700), bruises (151,700) and other sources.

setting, the reporting of an injury should be less affected by union training or subjective perception. For example, while a union covered worker may be better trained to recognize a work-related strain, it is plausible that covered and uncovered workers are equally able to identify a work-related fracture and take some time away from work. As described earlier, the potential drawback of this approach is that equally severe injuries could involve a different number of lost work-days for covered and uncovered workers. On the one hand, covered workers may take more days off than necessary, as they are granted protection by the unions. On the other hand, uncovered workers may return to work earlier for fear of retaliation. Consequently, this approach is more likely to assign an injury event to a covered worker. However, the evidence on the effect of union coverage on the time until an injured worker returns to work is mixed. Campolieti (2005) finds that union members have shorter injury durations, thanks to the union's ability to negotiate job accommodations for disabled workers. Other authors, however, have found that union members spend more days away from work after an injury. In particular, unions can provide additional disability benefits and therefore encourage longer durations (Johnson and Ondrich, 1990). Given these controversial results, it is worth investigating how the coverage effect changes under different scenarios. The outcome variable is now equal to one *only if* the time away from work is *greater* than a given threshold (zero days, two days, and five days). The probit model (1) is estimated under each of these scenarios. If the true effect of union coverage on the probability of injury was confounded by the potential measurement error, these results would however shed light on whether covered workers are more likely to take time away from work. This is a relevant question, as lost work-days may involve a loss of productivity and result in an economic cost for the firm and the injured worker.

3.3 Instrumenting for Union Coverage

The positive association between injury rate and union coverage could be the result of reverse causality. It may be argued that unions or other forms of workers' associations tend to organize in dangerous workplaces. If union coverage is endogenous, estimates will be biased.

A possible solution to this problem is to use an instrumental variables (IV) approach, where the instrument for union coverage are interaction dummies between detailed industry of employment and right-to-work state.

The underlying assumption is that the probability of being unionized at the workplace is likely to be affected by the effect that RTW laws have on the unionization of the industry of employment. It is plausible that RTW laws will not have the same impacts across industries, as some industries are traditionally more resistant to the typical consequences of non-compulsory union membership, namely free riding and more opportunities for the employer to discourage unionism. The literature (see Chaison and Dhavale, 1992, and Davis and Houston, 1993) has widely investigated the extent to which RTW laws affect union membership and, in turn, the strength and presence of unions in the workplace. Delaney (1998), describing the historical justifications for union security, writes that compulsory unionism "discourages employer efforts to undermine support for the union. If all represented employees must pay dues, employers have a lower incentive to fire union members in hope of replacing them with others who may oppose the union". From a different perspective, Ichniowski and Zax (1991) explain how the free rider problem causes workers to oppose the formation of bargaining units in RTW states. Other studies (Farber, 1984) indicate that RTW laws could simply reflect preexisting preferences of workers against union representation. Also in this case, different industries may be characterized by a different degree of aversion to union representation.

The case of a probit model with a binary endogenous explanatory variable is considered in Wooldridge (2002). The model can be written as:

$$\begin{aligned} y_i &= 1[\mathbf{z}_{1i}\boldsymbol{\delta}_1 + \alpha_1 CBA_i + u_{1i} > 0] \\ CBA_i &= 1[\mathbf{z}_i\boldsymbol{\delta}_2 + v_{2i} > 0] \end{aligned}$$

where y_i and CBA_i were previously defined, (u_1, v_2) is independent of $\mathbf{z}$ and distributed as bivariate normal with mean zeros, each has variance equal to one; and $\rho_1 = corr(u_1, v_2)$. If $\rho_1 \neq 0$, then u_1 and v_2 are correlated, and the estimates of $\boldsymbol{\delta}_1$ and of α_1 are inconsistent. The model can be estimated by maximum likelihood methods (Evans and Schwab, 1995). The vector $\mathbf{z}_1$ contains the usual controls and a dummy variable for RTW state. The vector $\mathbf{z}$ contains $\mathbf{z}_1$ and the instrumental interaction dummies between detailed industry of employment and right-to-work state. Since the main equation controls for the injury rate of the detailed industry of employment and includes dummy variables for RTW laws and the detailed industry of employment, the interaction between RTW laws and industry of employment is likely to be exogenous with respect to the firm's specific hazards. If that was not the case, it would mean that dangerous firms *within*

an industry are distributed differently between RTW states and non-RTW ones.

3.4 Union Effect within the workplace

An alternative way to control for potential union endogeneity is to consider workers whose coverage status changes over time while remaining employed in the same occupation and with the same employer. In this way, workplace specific hazards can be considered fairly constant over time and different coverage status. Moreover, controlling for occupation rules out the effects of changing job type within the firm. However, it may be argued that union representation is often the response to a change in working conditions, caused by new workplace practices, different management or production scope. This scenario cannot be analyzed with the dataset in use, however it is plausible that the frequency and relative influence of these events is low over the short period of time considered in this study. Another empirical issue is the possibility of measurement error, as workers may incorrectly report their coverage status. The problem can be mitigated by considering only those workers whose change in status persists for more than one period.

The analysis is based on three different samples. The first sample includes the observations of two adjacent periods characterized by different coverage status. In this way, it is possible to asses the immediate effect of the change in status. The potential measurement error in the reported status should decrease in the second sample, which consists of individuals who remain in the new coverage status for two consecutive periods. For example, a possible sequence is: uncovered, covered, and covered. The sample includes only the first period (old status) and the third period (new status). In this way, it is also possible to assess whether a change in workplace rights takes time to produce its effects. The third sample includes all the observations associated with an employer for which there is a status change.

Two different strategies are suggested to assess the coverage effect. The first strategy is to estimate the baseline specification (1) in order to obtain the effect of a change in coverage status on the probability of injury. The second strategy is to compute a test statistic for the difference in group means, where the two groups are covered and uncovered workers. *For each job*, one must compute the difference between the probability of injury with union coverage and the probability of injury without union coverage. In this way, the specific employer "fixed" risk is taken into consideration[7].

[7] It was not possible to estimate a hazard equation controlling for employer fixed effects because when the outcome does not

3.5 Unobserved Heterogeneity

One way to account for unobserved heterogeneity is to use an unobserved effects probit model, where an unobserved individual effect is added to the regressors[8]. The subject-specific unobserved effect is not the health status, which can be captured by the health dummies, but rather the unobserved risk-attitude of the respondent. For example, some workers might be more "absent-minded", and therefore less careful, in the performance of their tasks. The drawback to this approach is that it is not able to control for the unobserved firm-specific risks, which potentially represent the major source of bias of the estimated coefficient for union coverage[9].

The estimation of the model relies on the assumption that $\mathbf{x}_{it}$ is strictly exogenous conditional on the unobserved effect. However, the exogeneity assumption would be violated if coverage status (or any other variable) was correlated with the individual unobserved effects. Union coverage entails not only benefits (e.g. a union premium and better provisions in case of an injury), but also costs (e.g. union dues and the possible negative implications of a seniority system). As a consequence, high risk individuals are more willing to sustain these costs and select themselves into bargaining units. Wooldridge (2002) suggests a test for strict exogeneity, where the regressors are added with the leads of the variables which are suspected to be correlated with the unobserved component. The test fails to reject the null hypothesis of no endogeneity of union coverage. As a consequence, it is reasonable to assume that bargaining units should not be characterized by a higher proportion of high risk individuals.

4 Data

The data come from the National Longitudinal Survey of Youth (NLSY79), a sample of 12,686 youth originally surveyed in 1979 (when the participants were 14 to 21 years old) with the participants being resurveyed

vary (i.e. an injury does not occur) the observations are dropped from the analysis.

[8] The equation can be written as: $P(y_{it} = 1|\mathbf{x}_i, c_i) = P(y_{it} = 1|\mathbf{x}_{it}, c_i) = \Phi(\mathbf{x}_{it}\beta + c_i)$, where $\mathbf{x}_{it}$ is strictly exogenous conditional on c_i.

[9] One way to account for both sources of risk could be to use an IV approach similar to the one described before. Unfortunately, this approach could be applied only in the setting of a linear probability model. The model was estimated with fixed and random effects. The coefficient of the union status remained positive and significant.

every year until 1994 and every 2 years thereafter. The 1991 survey is excluded, as the respondents were not administered the health report containing the questions about occupational injuries. Survey weights are available and are used to draw nationally representative inferences. The sample shows low attrition: follow-up rates ranged from 85% to 90% by 1998. Data from 1988 through 2000 are used to construct an unbalanced sample of 34,614 observations on individuals with information on the current/most recent job in the private sector[10]. The public sector is excluded from the analysis, as two distinct forms of unionism exist in the local public sector and one of them (associations) does not bargain. Self-employed individuals are excluded from the analysis. There are 5,091 observations where the worker is covered by a union contract over the entire sample period. The NLSY reports individuals' 3-digit census industry and occupation codes. The industry code is used to identify 65 detailed industries of employment, which can be aggregated into eleven main industry categories: mining, transportation, wholesale trade, retail trade, construction, manufacturing, business services, financial services, personal services, professional services and entertainment. The occupation codes allow for the identification of eight main occupation categories. They are managers, technical, sales, clerical, service, craft, and three types of operators. One of the advantages of using the NLSY79 is that it allows one to control for respondent's characteristics such as age, marital status, education level, gender, region of residence, job tenure, work shift, hourly rate of pay, weekly hours of work, having a second job, time in the workforce. Descriptive statistics for the sample are presented in Table 1.

The main advantage of using the NLSY79 is that, being based on an individual's report, it allows for the identification of less severe work-related injuries which did not involve days away from work, restricted work activity or job transfer, or a compensation procedure. Specifically, the relevant question in the questionnaire is "*Any work-related injury/illness in past 12 months/since the date of last interview? [Answer 1: an injury occurred]*". The total number of injuries at the current/most recent job, irrespective of the amount of lost work-days, is 2,128 over the total sample period. The average reported injury rate in covered jobs is 10.3%, while it is 5.4% in uncovered jobs. Other authors (Leigh, 1981, Robinson, 1988, Garen, 1988, and Leigh,1995) have preferred to integrate PSID data with combined BLS industry-occupation rates of fatality and nonfatal

[10] Year 1988 is dropped from the sample, as it was the first year containing infomation on occupational injuries and therefore it is not possible to know whether the individual suffered previous injuries. The lagged injury status will be included in all the regressions.

injuries (Survey of Occupational Injuries and Illnesses (SOII)). These measures may suffer from aggregation problems and are based on the monitoring activities of third parties[11], where nonunion employers may underreport minor accidents for fear of employer's retaliation (Olson, 1981). The problem of underreporting is present in the NLSY79 only in an indirect way, as covered workers may be more likely to *recall* an injury either because it was officially acknowledged or because they filed a compensation claim. Some could argue that the NLSY79 measure of risk is rather subjective, as it is partly formed by the worker's perception and knowledge, yet this issue also affects the reporting to the employer or workers' representatives in the SOII. Another potential advantage of using the reported injury status is that it allows for an assessment of the importance of state dependence in injury events. Respiratory disorders like occupational asthma or skin diseases tend to occur more frequently if the worker has already suffered a similar condition in the past. In the present study, the lagged injury status will be used as proxy to control for unobserved factors, such as unobserved health status or other unobserved risk factors.

In 1998 and 2000, respondents are asked how frequently their jobs require "*lots of physical effort*" and involve "*lifting heavy loads, stooping, kneeling, crouching, walking, or other types of physical effort*". The available answers were "Rarely/None of the time/1 Day", "Some/A little of the time/1-2 Days", "Occasionally/Moderate amount of the time/3-4 Days", "Most/All of the time/5-7 Days". The total number of pooled observations is 7,079. Descriptive statistics are presented in Table 2 and show that covered workers are more likely to work in jobs which require intensive physical effort.

Lost-work days are identified through the question "*Not counting the day of the incident, how many days were missed due to the work-related injury?*". Table 1 reports descriptive statistics for the cases where the threshold is zero, two and five days. The injury rates of covered workers are, respectively, 6%, 4.9% and 3.8%, about twice that of uncovered workers. The question "*Do you work for the same employer you were working for at the time of the last interview?*" allows for the identification of different groups of continuing

[11] The Survey of Occupational Injuries and Illnesses (SOII) uses a scientific sampling approach to select employers to represent all industries and all sizes of establishments. Recordable cases include work-related injuries and illnesses that result in death, loss of consciousness, days away from work, restricted work activity or job transfer, medical treatment (beyond first aid), significant work related injuries or illnesses that are diagnosed by a physician or other licensed health care.

Table 1: Descriptive Statistics

	Uncovered	Covered	Total
Injury rate (NLSY79)	5.43	10.3**	6.15
Injury rate (NLSY79) Days > 0	2.84	5.99**	3.31
Injury rate (NLSY79) Days > 2	2.11	4.87**	2.52
Injury rate (NLSY79) Days > 5	1.47	3.81**	1.87
Industry injury rate (BLS)	7.94	9.98+	8.24
Second job (%)	7.79	6.87	7.66
Age	32.6	32.7	32.6
Health limitations (%)	2.42	2.04	2.37
Male (%)	51.9	65.9**	54.0
Black (%)	25.5	35.0**	23.5
Other race (%)	4.90	5.91+	5.05
Years of school	12.9	12.5	12.9
Training (%)	15.6	14.9	15.5
Days of tenure	208.9	286.6**	220.3
Weekly hours	40.8	41.4	40.9
Mining (%)	0.68	1.24	0.76
Transportation (%)	6.99	17.4	8.51
Wholesale (%)	3.35	2.79	3.27
Retail Sale (%)	19.5	11.7**	18.4
Construction (%)	7.77	11.5	8.32
Manufacturing (%)	22.7	35.2**	24.5
Business services (%)	9.98	4.75**	9.21
Finance (%)	7.78	1.87**	6.91
Personal services (%)	3.57	2.00**	3.34
Entertainment (%)	1.11	1.24	1.13
Professional services (%)	16.6	10.3+	15.7
Managerial (%)	22.3	8.43**	20.3
Clerical (%)	17.0	10.4**	16.0
Technical (%)	4.20	3.34*	4.08
Sales (%)	10.8	6.29*	10.2
Service (%)	13.9	12.0	13.6
Craft (%)	12.3	19.2**	13.3
Operator machine (%)	9.02	19.3**	10.5
Operator transportation (%)	4.93	9.92**	5.67
Operator handler (%)	5.45	11.1**	6.29
Right-To-Work States (%)	42.6	29.6**	40.7
Observations	29,523	5,091	34,614

$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$ indicate significant differences in proportions. The table reports means and percentages. Covered workers are defined as those working in a bargaining unit with union representation. Uncovered workers are those not covered by a CBA.

employers and the construction of three different samples[12]. Sample I includes the observations for two adjacent periods characterized by different coverage status (972 observations, i.e. 486 two-period groups with an equal number of covered and uncovered members). Sample II consists only of the individuals who are in the new coverage status for two consecutive periods (316 observations, as only the first and third periods are considered). Sample III includes all observations associated with an employment group for which there is a status change. Descriptive statistics for the three samples are reported in Table 3.

Despite its possible drawbacks, the use of self-reported injuries can therefore shed some light on the relationship between union coverage and nonfatal work-related injuries. In this study, the injury rate of the detailed industry of employment will be used as an additional control in the hazard equation. This variable is constructed using BLS data on nonfatal occupational injury and illness incidence rates per full-time workers by industry (based on the SIC code). The NLSY79 provides the census code (1980) for the detailed industry of employment. A precise matching is possible in most cases, except for a few industries in the finance sector. The industry injury rate is, on average, 1.5% higher than the one reported in the NLSY79.

[12] A detailed example is presented in Appendix.

Table 2: Descriptive Statistics for physical effort measures (years 1998-200)

	Uncovered	Covered	Total
Physical Effort (Always)	20.7	35.4**	22.9
Physical Effort (Often)	16.1	22.1*	17.0
Physical Effort (Sometimes)	28.2	26.9	28.0
Physical Effort (Never)	34.9	15.6**	32.0
Lifting heavy loads, etc. (Always)	30.9	50.7**	33.8
Lifting heavy loads, etc. (Often)	9.57	9.97	9.63
Lifting heavy loads, etc. (Sometimes)	15.4	15.8	15.4
Lifting heavy loads, etc. (Never)	44.2	23.5**	41.1
Observations	6,016	1,063	7,079

$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$ indicate significant differences in proportions. The table reports percentages. Covered workers are defined as those working in a bargaining unit with union representation. Uncovered workers are those not covered by a CBA.

Table 3: Summary Statistics for Same Employer samples: Sample Means by Coverage Status

	(Sample I)			(Sample II)			(Sample III)		
	Uncovered	Covered	Total	Uncovered	Covered	Total	Uncovered	Covered	Total
Injury rate (NLSY79)	7.20	8.85*	8.02	5.70*	10.8	8.23	5.83	9.18*	7.20
Injury rate (NLSY79) Days > 0	3.70	4.94*	4.32	3.80	6.33	5.06*	2.65	4.85**	3.55
Injury rate (NLSY79) Days > 2	2.88	4.12*	3.50	3.80	5.06*	4.43	2.12	3.95**	2.87
Injury rate (NLSY79) Days > 5	2.47	3.29^{+}	2.88	3.16	3.80	3.48	1.68	3.19*	2.30
Industry injury rate (BLS)	9.09	9.08	9.09	9.28	9.81	9.54	8.67	9.40	8.97
Observations	486	486	972	158	158	316	1,132	784	1,916

$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$ indicate significant differences in proportions.
The table reports percentages. Covered workers are defined as those working in a bargaining unit with union representation. Uncovered workers are those not covered by a CBA.

5 Empirical Results

Column (1) of Table 4 presents the results for the baseline specification. The coefficient for CBA status is positive and significant, and implies a marginal effect of 2.2% and an odds-ratio of about 1.5. In other words, covered workers are fifty per cent more likely to suffer an injury compared to uncovered workers. As found in Larkin et al. (2005), the probability of injury decreases for black workers and more educated people. The latter are probably able to select themselves into less hazardous tasks within occupations or are more vigilant in avoiding dangerous situations. Pre-existing health conditions significantly increase the probability of injury. Blue-collar occupations imply a higher risk of injury than clerical ones (the base group). When industries are aggregated, the financial sector is the one with the lowest probability of injury with respect to the base group (business services). The coefficient for attending a training program is unexpectedly positive and significant (marginal effect of about 1%), indicating that trained workers are either: 1) employed in more hazardous tasks; 2) receive general training which is not adequate for the assigned jobs (while co-workers without training are trained on the job); or 3) the training programs teach workers how to identify a work-related injury. The marginal effect of the lagged injury status is about 8%. As said before, this variable is controlling for unobserved factors, rather than capturing state dependence in injury status[13]. The general findings do not change when the dependent variable takes a positive value only if a work-related injury (and not an illness) has occurred.

Column (2) of Table 4 presents the results for the case where the full set of "effort" dummies is added to the baseline specification. The marginal effect of union coverage is about 1.6% and it is very similar to the one obtained estimating the baseline specification for 1998-2000 only (1.8%). As it was reasonable to expect, the probability of injury increases for those jobs requiring frequent physical efforts.

Columns (3) - (5) of Table 4 presents the results for the case where the outcome variable is redefined according to the amount of time away from work after an injury. The marginal effect of union coverage decreases from 1.4% to 0.8% as the minimum number of lost work days increases from one to five. However,

[13] If one wanted to estimate state dependence, it would be necessary to take into consideration the endogeneity of the lagged variable. In this case, a random effects dynamic probit (Heckman adjusted) could be employed. Preliminary results indicate that the state dependent effect is about 3%.

the reduction in the size of the coefficient must not be misleading, as the covered/uncovered odds ratio actually increases until a value of about 1.9. The results therefore suggests that the marginal effect of union coverage remains positive and significant also when the injury status is redefined according to the amount of lost work-days.

Table 4: Probit Results for the Probability of Injury

	(1)	(2)	(3)	(4)	(5)
	Baseline	Effort	Lost work-days		
			> 0	> 2	> 5
CBA	0.021**	0.017*	0.014**	0.011**	0.008**
	(0.004)	(0.008)	(0.003)	(0.002)	(0.002)
Industry Injury rate	0.003	2.571*	0.049	0.043	0.001
	(0.134)	(1.030)	(0.078)	(0.060)	(0.045)
Lag Injury	0.075**	0.040**	0.044**	0.029**	0.019**
	(0.008)	(0.013)	(0.006)	(0.005)	(0.004)
Second Job	0.002	-0.023**	-0.005^{+}	-0.003	-0.001
	(0.005)	(0.005)	(0.003)	(0.002)	(0.002)
Age	-0.000	0.002^{+}	-0.000	-0.000	-0.000
	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)
Health	0.016	0.045^{+}	0.013^{+}	0.012*	0.009^{+}
	(0.010)	(0.023)	(0.007)	(0.006)	(0.005)
Male	-0.002	-0.006	-0.003	-0.003	-0.002
	(0.003)	(0.006)	(0.002)	(0.002)	(0.001)
Black	-0.005	-0.001	0.003	0.004*	0.004*
	(0.003)	(0.007)	(0.002)	(0.002)	(0.002)
Other race	0.001	-0.014	0.003	0.003	0.002
	(0.006)	(0.012)	(0.004)	(0.003)	(0.002)
Years of School	-0.005**	-0.003*	-0.004**	-0.003**	-0.002**
	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)
Training	0.012**	0.017*	0.001	-0.002	-0.000
	(0.004)	(0.008)	(0.002)	(0.002)	(0.001)
Tenure	0.000^{+}	0.000	-0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Weekly Hours	0.001**	0.001**	0.000**	0.000**	0.000**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	34573	6397	34505	34403	34212

Standard errors in parentheses, $^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$
The table reports marginal effects. All the regressions include controls for occupation, detailed industry of employmemt, state of residence, year effects and a constant term.

Column (1) of Table 5 presents the results for the IV estimation. The marginal effect of union coverage is about 6% and is greater than the one estimated with the baseline specification (0.216). This finding seems

to indicate that union endogeneity is not as serious as other studies seem to suggest. On the contrary, the increase in the size of the coefficient would indicate that unionized workplaces are actually less dangerous. The validity of this instrument is tested in the setting of a linear probability model (LPM). The incremental F-statistic from the first stage has a value of 7.9 (9.2 is sample weights are not used) and indicates that the chosen instruments explain a reasonable fraction of the union coverage variability. On the other hand, a Sargan test indicates that the null hypothesis for exogenous instruments cannot be rejected only at 5% level of significance (p-value=0.08). Given the results of these tests, the estimated coverage effect will be interpreted with caution. Columns (2) and (3) of Table 5 present the results for the analysis of the probability of injury within the same employer. The marginal effect of union coverage is positive but no longer significant when two adjacent periods are considered[14]. It is worth pointing out that, when separate regressions are estimated for different original status, the marginal effect is positive and significant at the 10% level for those workers who become covered Furthermore, the marginal effect is 1.2% when the model is estimated for Sample II, where measurement error may be mitigated[15]. Although facing the same job-specific risk, workers will be more likely to suffer an injury after they become unionized. In particular, the effect of a change in coverage manifests itself when the worker remains in the new status for more than one period. This finding will be further discussed in section six. The test for the difference in means within job strengthens the previous result. The value of the t-statistic for a one-tail test is 4.1 and confirms that a worker is significantly more likely to suffer an injury when the workplace becomes unionized.

5.1 Discussion

The findings of this section show that working in a job covered by a CBA significantly increases the probability of nonfatal occupational injuries and illnesses. These findings are robust to alternate specifications and alternate samples. The interpretation of the effect, however, is not so straightforward. On the one hand, if

[14] As explained in the Appendix, the sample consists of individuals who are in each coverage status an equal number of times, while remaining employed in the same job. Some observations were dropped in order to obtain this equal proportion. If the sample included all the observations associated with a job, the marginal effect of union coverage would be positive and significant. However, this approach would not eliminate the problem of potential endogeneity of union coverage.

[15] Many observations are dropped from the probit estimation, as the outcome variable does not vary for some regressors. When a LPM model is estimated, the effect of union coverage is positive (0.053) and significant at 10% level.

Table 5: Probit Results for the Probability of Injury

	(1)	(2)	(3)
	(IV)	Same Employer (I)	Same Employer (II)
CBA	0.061**	0.019	0.011**
	(0.01)	(0.018)	(0.014)
Industry Injury rate	0.072	0.099	0.240
	(0.075)	(0.294)	(0.319)
Lag Injury	0.076**	0.102*	0.072
	(0.002)	(0.049)	(0.085)
Second Job	0.005	0.024	0.200
	(0.002)	(0.038)	(0.153)
Age	0.000	0.004	0.001
	(0.003)	(0.004)	(0.002)
Health	0 .022**	-0.011	
	(0.01)	(0.070)	-
Male	-0.001	-0.021	0.018
	(0.003)	(0.023)	(0.021)
Black	-0.009**	-0.013	-0.021
	(0.001)	(0.023)	(0.022)
Other race	0.008	-0.039	0.021
	(0.005)	(0.026)	(0.041)
Years of School	-0.004**	-0.006	0.000
	(0.001)	(0.005)	(0.001)
Training	0.0136**	-0.013	0.277
	(0.002)	(0.025)	(0.169)
Tenure	0.000	-0.000	0.000
	(0.000)	(0.000)	(0.000)
Weekly Hours	0.000**	0.001	-0.000
	(0.001)	(0.001)	(0.000)
Observations	34614	846	162

Standard errors in parentheses, $^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$
The table reports marginal effects. The coefficient for CBA in column (3) is 1.56 and the standard error is 0.6, which imply a t-statistic of 2 (p-value=0.006). All the regressions include controls for occupation, industry of employmemt, year effects and a constant term.

one believes that self-reported injuries are not an accurate measure of actual injuries, the possible conclusions are twofold. First, covered workers are more likely to identify and report work-related injuries. Second,

covered workers are also more likely to take days off when an injury occurs. In this case, unionized firms may be more penalized than non-unionized ones. When the worker takes time off, there might be a direct cost in terms of reduced firm productivity. Moreover, during long periods of recovery, the worker could suffer a loss in human capital which will decrease her future productivity. The consequences of lost work-days certainly deserve further investigation.

On the other hand, if one believes that self-reported injuries adequately reflect actual injuries, the positive effect of union coverage seems to contradict the belief that unions help to successfully establish a safer workplace. A possible explanation for these results is that the work environment is not the sole determinant of injury rates. One additional factor is the unobserved worker's individual effort to avoid and minimize work-related hazards. This cautious behavior can be considered a hidden action and modeled within a general moral hazard framework, as explained in the next section.

6 The Moral Hazard Problem

6.1 Theoretical Framework

Avoiding or minimizing work-related risks requires a certain degree of caution, which is often not observable by the employer or a supervisor. As observed by Kahn (1990) "workers may choose to be more or less careful". Examples of these accident-prevention activities are numerous: wearing a helmet when it is required, not using headphones while working near vehicles; etc. When these activities cannot be monitored, a moral hazard problem arises if the employee does not face the correct system of incentives. On the one hand, the effort devoted to safety reduces the probability of suffering an injury and its consequences, which can be physical, mental or monetary. On the other hand, these safety related activities can imply a disutility for the worker. In a static moral hazard model, Krueger (1991) expresses this effort as a function of the wage and of a fixed compensation insurance benefit. Hirsh et al. (1997) find that union members are more likely to receive workers' compensation benefits than are similar nonunion workers. The authors suggest that, among other causes, covered workers are less likely to fear being penalized for filing claims. Chelius and Kavanaugh (1988) use quasi experimental data to show that lower benefit levels are associated with a significantly lower frequency of injury rates.

An income loss for lost work-days, when it is not totally compensated for by the worker's insurance, is not the only monetary cost of an injury. There are other work consequences which can cause a loss or reduction of earnings. For example, an employer may fire or lay-off an injured worker for retaliation for filing a workers' compensation claim[16] or the inability of the employee to perform her former duties. In this case, the individual will incur a wage loss for the duration of the unemployment period. In the same way, an injured worker can quit when the firm does not favor reassignment to a different task, occupation or work schedule. For example, a part-time position involves a reduction in earnings proportional to the reduced number of hours of work. These post-injury outcomes will also have an impact on future earnings when they cause any loss in general or specific human capital. The probabilities of each of these events and the associated payoffs determine the expected income loss associated with an injury and, indirectly, the level of effort devoted by the worker to safety.

[16] A single accident — or even a notice of a workers'compensation claim — can raise the premium paid by the employer.

It is reasonable to believe that the expected income loss depends on the coverage status of the worker. As described in section two, a CBA usually guarantees a degree of protection against job dismissal in the case of an injury and favors the accommodation of injured workers. Robinson (1998) describes the instruments (rate retention, job transfer, and seniority rights) which allow the unionized workers, who are unable to do their former jobs due to accident or illness, to do some other kind of work. In other words, there are less pecuniary and psychological penalties associated with an injury for union workers. Adaptive behavior theory implies that an individual is expected to "know" or to have learned the likelihood of a post-injury outcome under a coverage status. This rational expectation can be formed by a combination of direct past experience and information received from coworkers and union representatives. In this regard, the findings in section 5.2 indicate that workers may take some time to assimilate the advantages of a CBA and change their preventive behavior towards work-related hazards. Given these considerations, the objective of this section is to investigate how the worker's unobservable effort to safety depends on coverage status.

Assume an equilibrium situation, where the wages have already been exogenously set. The probability of an injury $p(e)$ is negatively related to the effort level e, i.e. $p' < 0$ and $p'' > 0$. Workers are all equally risky (*homogeneous workers*), that is the probability function $p(.)$ is unique and depends only on the effort level. The cost of this effort is $c(e)$ and is increasing in e, i.e. $c'(e) > 0$. The two states of the world are injury and no injury, with probability $p(e)$ and $1 - p(e)$ respectively. If the worker does not suffer any injury, her payoff will be $W = w * N_{ft}$, where w is the hourly wage and N_{ft} is the amount of hours of work. Subsequent to the event of an injury, the worker can be in different sub-states with different payoffs. For simplicity, consider the following four sub-states: dismissal, quitting, and continuing with the same job, either working "fewer hours" or the same amount as before. The associated payoffs are respectively: $(0, 0, W_{pt}, W)$, where $W_{pt} = w * N_{pt}$, with w and N_{pt} indicating, respectively, the hourly wage (same as pre-injury) and the amount of hours of work under the reduced shift. The probabilities of these events are, respectively, p_f^j (dismissal), p_q^j (quitting), p_{pt}^j (part-time), where $j = C, NC$ indicates whether the job is covered or uncovered. Therefore, the expected payoff B in case of an injury is:

$$B^j = p_{pt}^j(W_{pt}^j) + (1 - p_f^j - p_q^j - p_{pt}^j)(W^j)$$

If the worker does not suffer an injury after providing e units of safety effort, her utility is given by

$U(W^j) - c(e^j)$, and if a worker is disabled her utility is $V(B^j) - c(e^j)$, where $U(\cdot)$ and $V(\cdot)$ are twice-differentiable, increasing , concave functions. For simplification, the superscript j is dropped in the discussion that follows. Consider the following static Expected Utility maximization problem, where the worker chooses a level of effort e in order to maximize the expected utility:

$$\underset{e}{Max}(1 - p(e))U(W) + p(e)[V(B)] - c(e)$$

Maximizing with respect to the effort level:

$$p'(e)[V(B) - U(W)] = c'(e) \tag{2}$$

At the optimum, the marginal gain from being more cautious must be equal to its marginal cost. Assume that $c(e) = e$. By using the implicit function theorem and the chain rule, it can be shown that the effort expended on safety will have the following properties:

$$\partial e/\partial p_f = \partial e/\partial p_q = (-W)[p'V'/p''(U - V)] > 0 \tag{3}$$

$$\partial e/\partial p_{pt} = (W_{pt} - W)[p'V'/p''(U - V)] > 0 \tag{4}$$

$$\partial e/\partial W = p'[(1 - p_f - p_q - p_{pt})V' - U']/p''(U - V) > 0 \tag{5}$$

where the arguments of the functions are suppressed.

Therefore, the higher the wage and the probabilities of being fired or quitting or working fewer hours, the higher the effort level[17]. Intuitively, a lower expected income loss reduces the cost of incurring an injury and therefore leads the employee to devote less effort to avoiding injuries.

The implications for this study are the following. On the one hand, covered workers usually enjoy a *wage premium* which, *ceteris paribus*, should encourage them to be more careful than uncovered employees. On the other hand, this effect may be counteracted by a substantial *between-sector* difference in the probability of certain post-injury outcomes. The next section investigates whether this difference exists.

6.2 Empirical Analysis

The NLSY79 contains information on a wide range of work consequences of an injury. Injured workers are asked whether the injury/illness caused them "*to be fired*" (event 1), "*to quit*" (2), "*to work less than*

[17] Sufficient conditions for these results to hold are: $U_{We} \geq 0$ and $U_{Be} \leq 0$.

full-time" (3), "*to be assigned to another job on a temporary basis*" (4), "*to be unable to do all of the normal duties*" (5), and "*to change occupation*" (5). The number of observations is increased by including the

Table 6: Descriptive Statistics for Injured Workers

	Uncovered	Covered	Total
Fired	2.65	0.87	2.24
Quit	4.38	2.31	3.91
Work less	14.5	14.2	14.4
Lay-off	6.25	5.35	6.04
Temporary Reassignment	11.2	18.5**	12.9
Same work, different duties	29.1	29.2	29.1
Change of Occupation	5.64	4.34	5.34
Observations	2,304	692	2,996

+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$ indicate significant differences in proportions. The table reports percentages. Covered workers are defined as those working in a bargaining unit with union representation. Uncovered workers are those not covered by a CBA.

injuries reported for 1988 and the concomitant or previous job. The total number of injury cases becomes 2,996. Summary statistics are reported in Table 6 and indicate that the frequencies of being fired, laid-off, quitting and being reassigned to a different job are significantly different for covered and uncovered jobs. In particular, uncovered workers are more likely to be fired or to quit the job. On the other hand, covered workers are more likely to be temporarily reassigned to a different task.

Using the observations on injured workers, a probit equation is estimated for the probability of each of the post-injury outcomes. The proposed specification is the following:

$$P(event(j)_{it} = 1|CBA_{it}, \mathbf{x}_{it}) = \Phi(\beta_0 + \beta_1 CBA_{it} + \mathbf{x}_{it}\boldsymbol{\beta}) \tag{6}$$

where $j = \{1, 2, 3, 4, 5\}$, CBA_i is a dummy variable for union coverage, and $\mathbf{x}_{it}$ is a vector containing the

usual controls[18]. Tables 7 and 8 report the average out-of-sample predicted probability of each outcome for the two groups of workers. Although the marginal effect of coverage status is never significantly different from zero, the pool of uncovered workers is approximately 50% more likely to be fired than the one of covered workers, although the former are 20% less likely to be laid off. Uncovered workers have also a higher probability of quitting; one possible reason is that covered workers have twice the probability to be reassigned to a different task and they are more likely to keep their jobs even when unable to perform the normal duties.

Finally, both types of workers have approximately the same probability of working fewer hours and changing occupation. These findings provide preliminary evidence that the work consequences of an injury are often different for covered and uncovered workers. In particular, covered workers have higher chances of keeping their jobs after an injury. As a result, if the probabilities of these outcomes are correctly anticipated, they may induce, *ceteris paribus,* different levels of effort in accident-prevention activities.

[18] A better approach would be to estimate two separate equations for covered and uncovered workers, in order to allow for different coverage-specific mechanisms. Unfortunately, this approach is not doable, given the general scarcity of positive outcomes for the events of "being fired" and "quit". In this case, the probit equation should include only few demographic controls in order to avoid dropping too many observations when the outcome does not vary. Separate equations were estimated for the other events, finding that the marginal effects of tenure and age are usually different for the two groups of workers. However, the out-of-sample predicted probabilities do not significantly change.

Table 7: Probit estimates of post-injury outcomes

	(1) Dismissal	(2) Quitting	(3) Working less	(4) Layoff
CBA	-0.001	-0.003	0.010	0.011
	(0.004)	(0.007)	(0.020)	(0.009)
Age	0.001**	0.002**	0.007**	0.004**
	(0.000)	(0.001)	(0.002)	(0.001)
Health	0.025	0.011	0.158**	-0.007
	(0.016)	(0.017)	(0.054)	(0.011)
Married	-0.001	0.004	-0.021	0.006
	(0.002)	(0.006)	(0.015)	(0.006)
Weekly Hours	0.000	0.000	-0.000	0.000
	(0.000)	(0.000)	(0.001)	(0.000)
Tenure	-0.000**	-0.000*	-0.000	-0.000**
	(0.000)	(0.000)	(0.000)	(0.000)
Male	0.001	-0.022*	-0.029	-0.007
	(0.003)	(0.009)	(0.019)	(0.008)
Black	0.012^{+}	0.021*	0.012	0.041**
	(0.007)	(0.010)	(0.021)	(0.014)
Other race	-0.004^{+}	0.005	-0.008	0.039
	(0.002)	(0.013)	(0.032)	(0.024)
Years of School	-0.002*	-0.005**	0.003	-0.003
	(0.001)	(0.002)	(0.004)	(0.002)
Observations	2672	2694	2912	2897
Predicted Probability CBA=0	0.031	0.044	0.155	0.054
Predicted Probability CBA=1	0.023	0.036	0.155	0.074

Standard errors in parentheses, $^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$
The table reports marginal effects, Out-of-sample predicted probabilities are reported at the end of the table. All the regressions include controls for occupation, industry of employmemt, year and state effects, and a constant term.

Table 8: Probit estimates of post-injury outcomes

	(1) Reassignment	(2) Change Duties	(3) Change Occupation
CBA	0.074**	0.056*	0.007
	(0.020)	(0.027)	(0.009)
Age	0.004*	0.007**	0.003**
	(0.002)	(0.002)	(0.001)
Health	0.040	-0.045	0.042
	(0.042)	(0.048)	(0.026)
Married	-0.027*	-0.048*	-0.006
	(0.013)	(0.021)	(0.007)
Weekly Hours	-0.000	0.002^{+}	0.001*
	(0.001)	(0.001)	(0.000)
Tenure	-0.000	-0.000	-0.000^{+}
	(0.000)	(0.000)	(0.000)
Male	-0.052**	-0.075**	-0.025**
	(0.018)	(0.026)	(0.010)
Black	0.011	-0.002	0.016
	(0.018)	(0.027)	(0.012)
Other race	0.009	-0.058	-0.006
	(0.031)	(0.039)	(0.013)
Years of School	-0.001	0.001	-0.001
	(0.004)	(0.006)	(0.002)
Observations	2927	2970	2816
Predicted Probability CBA=0	0.109	0.293	0.057
Predicted Probability CBA=1	0.206	0.331	0.065

Standard errors in parentheses, $^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$
The table reports marginal effects, Out-of-sample predicted probabilities are reported at the end of the table. All the regressions include controls for occupation, industry of employmemt, year and state effects, and a constant term.

7 Conclusions

This study has provided new evidence on the effect of union coverage on the probability of nonfatal work-related injuries and illnesses. The main finding is that union covered workers are about 50% more likely to suffer an injury than similar uncovered workers. This positive effect is also found for workers who change coverage status while remaining in the same job over the years. This result is surprising, as it contradicts the common belief that unions serve to establish a safer work environment.

A possible explanation for the positive relationship between injuries and union coverage is that the work environment is not the sole determinant of injury rates. One additional factor is the worker's effort to avoid and minimize work-related hazards. The level of this accident-prevention activity is unobservable and depends on the expected work consequences of an injury. On the one hand, uncovered workers are found to be twice as likely to quit their job or be fired. On the other hand, covered employees are more likely to be reassigned to different jobs on a temporary basis or to work at their regular jobs, even when they are unable to perform all the normal duties. These findings suggest that union covered workers may choose to devote low levels of effort to safety because they do not face the correct system of incentives. More research is clearly needed to develop optimal enforceable contracts that encourage workers to minimize work-related hazards. The analysis of fatal work-related injury rates would provide a further understanding of the individual's responsiveness to job hazards.

Another relevant finding is that covered workers are more likely to take days off when an injury occurs. In this case, unionized firms may experience larger productivity losses. Furthermore, preliminary results indicate that injured workers may be more likely to suffer other injuries in the future. This state-dependence in injury should call for the introduction of firm policies that accommodate injured workers to different occupations or tasks.

References

[1] Campolieti, Michele. "Unions and the duration of workers' compensation claims." *Industrial Relations,* 44(4), 2005, pp. 625-653.

[2] Chaison, G., and D.G. Dhavale. "The Choice Between Union Membership and Free-Rider Status." *Journal of Labor Research*, 13(4), 1992, pp. 355-369.

[3] Chelius, J.R., and K. Kavanaugh. "Workers' Compensation and the Level of Occupational Injuries." *The Journal of Risk and Insurance,* 55(2), 1988, pp. 315-323.

[4] Cousineau, J-M., R. Lacroiz, and A-M. Girard. "Occupational Hazard and Wage Compensating Differentials." *The Review of Economics and Statistics*, 74(1), 1992, pp. 166-169.

[5] Davis, J. C., and J. H. Huston. "Right-to-work laws and union density: New evidence from micro data." *Journal of Labor Research,* 16(2), 1995, pp. 233–40.

[6] Delaney, J. T. "Redefining the right-to-work debate: Unions and the dilemma of free choice." *Journal of Labor Research*, 19(3), 1998, pp. 425–43.

[7] Dickens, William T. "Differences between Risk Premiums in Union and Nonunion Wages and the Case for Occupational Safety Regulation." *The American Economic Review,* 74(2), 1984, pp. 320-23.

[8] Dorman, P., and P. Hagstrom. "Wage Compensation for Dangerous Work Revisited." *Industrial and Labor Relations Review,* 52(1), 1998, pp. 116-135.

[9] Dorsey, S., and N. Walzer. "Workers' Compensation, Job Hazards, and Wages." *Industrial and Labor Relations Review*, 36(4), 1983, pp. 642-654.

[10] Fairris, David. "Compensating Wage Differentials in the Union and Nonunion Sectors." *Industrial Relations,* 28(3), 1989, pp. 356-372.

[11] _____. "Compensating Payments and Hazardous Work in Union and Nonunion Settings." *Journal of Labor Research,* 13(2), 1992, pp. 205-221.

[12] Farber, Henry S. "Right-to-Work Laws and the Extent of Unionization." *Journal of Labor Economics*, 2(3), 1984, pp. 319-352.

[13] Garen, John. "Compensating Wage differentials and the Endogeneity of Job Riskiness." *The Review of Economics and Statistics*, 70(1), 1988, pp. 9-16.

[14] Gegax, D., S. Gerking, and W. Schultze. "Perceived Risk and the Marginal Value of Safety." *The Review of Economics and Statistics,* 73(4), 1991, pp. 589-96.

[15] Herzog, H.W., and A.M. Schlottmann. "Valuing Risk in the Workplace: Market Price, Willingness to Pay, and the Optimal Provision of Safety." *The Review of Economics and Statistics,* 72(3), 1990, pp. 463-470.

[16] Hirsch, B.T., D. A. Macpherson, and J. M. DuMond. "Workers' Compensation Recipiency in Union and Nonunion Workplaces." *Industrial and Labor Relations Review,* 50(2), 1997, pp. 213-236.

[17] Ichniowski, C., and J.S. Zax. "Right-to-Work Laws, Free Riders, and Unionization in the Local Public Sector." *Journal of Labor Economics,* 9(3), 1991, pp. 255-275.

[18] Johnson, W.G., and J. Ondrich. "The Duration of Post-injury Absences from Work." *The Review of Economics and Statistics,* 72(4), 1990, pp. 578-586.

[19] Kahn, Shulamit. "What Occupational Safety tells Us about Political Power in Union Firms." *The RAND Journal of Economics,* 21(3), 1990, pp. 481-496

[20] Krueger, Alan. "Incentive effects of workers' compensation insurance." *Journal of Public Economics,* 41(1), 1990, pp. 73-99.

[21] Leigh, Paul J. "Are Unionized Blue Collar Jobs More Hazardous Than Nonunionized Blue Collar Jobs?" *Journal of Labor Research*, 3(3), 1982, pp. 349-357.

[22] _____ . "Compensating Wages, Value of a Statistical Life, and Inter-industry Differentials. " *Journal of Environmental Economics and Management,* 28(1), 1995, pp. 83-97.

[23] Levine, David I. “Just-Cause Employment Policies in the Presence of Worker Adverse Selection.“ *Journal of Labor Economics*, 9(3), 1991, pp. 294-305.

[24] Martinello, F., and R. Meng. "Workplace Risks and the Value oh Hazard Avoidance." *The Canadian Journal of Economics*, 25(2), 1992, pp. 333-45.

[25] Olson, Craig A. "An Analysis of Wage Differentials Received by Workers on Dangerous Jobs." *The Journal of Human Resources,* 16(2), 1981, pp. 167-185.

[26] Robinson, J.C. “Hazardous Occupation Within the Job Hierarchy." *Industrial Relations,* 27(2), 1988.

[27] _____. “Labor Union Involvement in Occupational Safety and Health 1957-1987." *Journal of Health Politics*, Policy and Law, 13(3), 1998, pp. 453-468.

[28] Strong, L., and F. J. Zimmerman. “Occupational Injury and Absence From Work Among African American, Hispanic, and Non-Hispanic White Workers in the National Longitudinal Survey of Youth.” *American Journal of Public Health,* 95(7), 2005, pp 1226–1232.

[29] Viscusi, W. Kip. "Employment Hazards: An Investigation of Market Performance." Cambridge, MA: Harvard University Press, 1979.

[30] _____."Imperfect Job Risk Information and Optimal Workmen’s Compensation Benefits." *Journal of Public Economics,* 14(3), 1980, pp 319-337.

[31] Worral, J.B., and J.D. Butler. “Health conditions and Job Hazards: Union and Nonunion Jobs." *Journal of Labor Research*, 4(4), 1983, pp. 339-347.

Appendix

Workplace Identification

The following table illustrates a possible path of employment and coverage status for a worker:

Year	Same Employer	Employer Group	CBA	CBA Change
1988	0	1	1	0
1989	1	1	0	0
1990	1	1	1	0
1991	0	-	0	0
1992	0	2	0	0
1993	1	2	1	1
1994	1	2	1	0
1996	0	-	1	0
1998	0	3	1	0
2000	1	3	0	1

The dummy variable "Employer" (whose related question is "Do you work for the same employer you were working for at the time of the last interview? ") identifies three groups of continuing employers. Note that an employer identifier is also assigned to the survey which precedes the one in which the dummy takes a value equal to one (for example, in 1992 the worker was already working for the same employer in the years 1993-1994). Based on these sequences, two different samples are constructed.

Sample I includes the observations for two adjacent years, where the individual reports a change in coverage status in the second period (e.g.. years 1988-1989, 1992-1993 and 1998-2000). If an individual stays with an employer for three years and changes coverage status twice (e.g. 1988-1990), only the first two years are considered. In this way, an individual is observed in each status an equal number of times. If this was not the case, there could be a correlation between “dominant”coverage status and firm specific risk. In other words, the potential endogeneity of union coverage would not be eliminated. If the individual stays with the

employer an even number of years, the observations will be kept as long as there are an equal number of covered and uncovered periods. The number of observations in Sample I is 972.

Given the possibility of measurement error due to incorrect reporting, Sample II consists only of the individuals who, after the change, remain in the new coverage status for at least two consecutive surveys (e.g. years 1992-1994). For the same reason explained above, only two periods (out of three or more) associated with different status are considered. Specifically, the sample consists of the first (old status, i.e. 1992) and third (new status, i.e. 1994) periods. In this way, it is also possible to capture the long run effects of change in coverage status. The number of observations is 316.

CHAPTER II

Injuries, Earnings and Unions

1 Introduction

This paper investigates whether union coverage is able to mitigate the labor market consequences of work-related injuries. Injured workers may experience a reduction in earnings for multiple reasons. First, injured workers may experience a temporary or permanent decrease in work hours. Second, the wage of the worker may decrease because of lower post-injury productivity, caused by any loss in general, specific or health human capital. In particular, the impact of these events will be greater when the injured worker is forced to change firm, occupation or industry. In this setting, union coverage at the time of the injury may play an important role in reducing the size of the earning losses. Unions provide protection against dismissal without just cause and may favor the assignment of an injured worker to a different job or work schedule within the firm, therefore decreasing the loss of human capital, due to inactivity, and the probability of quitting. Faster reassignment is particularly possible in larger firms, where the union presence is stronger. In reducing injury-related losses, unions can be assisted by firm-specific policies (e.g. incentives for injured workers to return to work) or local labor market conditions (accommodation should be higher in tight labor markets). However, union coverage at the time of the injury may well increase wage losses in the long run if the covered worker can easily obtain compensation benefits and is granted a greater time away from work to recover from the injury. When a worker suffers an injury on the job, income loss and medical expenses are covered by insurance provided by the Workers' Compensation (WC) System. Each state has different compensation laws, yet a common feature is that the worker is entitled to receive a certain reimbursement based upon fixed maximums set by the states. Hirsch et al. (1997) find that union members are more likely to apply for and receive workers' compensation benefits than are similar nonunion workers. The authors suggest that, among other causes, covered workers are less likely to fear being penalized for filing claims. Similar conclusions are reached by Lakdawalla et al. (2007) and Woock (2009). If compensation benefits are easier to obtain, the covered worker may remain away from work for longer periods and experience a significant loss of human capital. As a conequence, he may suffer greater earnings losses in the future, especially if a separation from the current employer eventually occurs. However, longer time away from work may guarantee a better recovery of recurrent injuries (e.g. strains) and reduce future earnings losses.

While the focus of this study is the short- and long-run impact on earnings of union coverage at the

time of the injury, some of the most recent studies have mostly focused on the effects of gender (Boden and Galizzi, 2003) and change of employer (Campolieti and Krashinsky, 2006) on the workers' post-injury earnings. The results of these studies indicate that despite WC and other firm-specific policies injured workers suffer substantial immediate earnings losses and that they are unable to return to their previous earnings path. Boden and Galizzi (2003) use a survey administered in Wisconsin (1989-1990) to investigate the impact of gender on earnings losses. They apply difference-in-difference methodology to compare two groups of workers who both suffer injuries of different severity. They show that show that individuals experience a significant earnings loss in the year following a severe injury, with estimates of about 6% of annualized earnings. Moreover, there is a certain persistence in these losses, which remains about 3% five years after the injury. Campolieti and Krashinsky (2006) apply the same methodology to data from Ontario (1989-1990) and show that earnings losses are 27% more severe for workers who did not return to the employer where the injury occurred. The present study considers a richer set of data from the National Longitudinal Survey of Youth (NLSY79) and a longer period of time (1988-2000). A standard version of the difference-in-difference methodology is used to investigate whether union coverage at the time of the injury is able to reduce the earnings losses caused by the injury. Woock (2009) uses the same data to study the impact of union coverage for the group of blue-collar workers. In his study, a worker is defined as injured only if the injury involves a minimum amount of days off. However, this definition is likely to exclude several uncovered workers who often underreport injuries and do not take time off for fear of employer's retaliation.

Robinson (1998) describes the instruments (rate retention, job transfer, and seniority rights) which allow the unionized workers who are unable to do their former jobs due to accident or illness to do some other kind of work. The effect of unions on the time away from work after an injury, however, is mixed. Campolieti (2005) finds that union members have shorter injury durations, thanks to the union's ability to negotiate job accommodations for disabled workers. Other authors, however, have found that union members spend more days away from work after an injury. In particular, unions can provide additional disability benefits and therefore encourage longer durations (Johnson and Ondrich, 1990). Moreover, unionized workplaces are usually safer, implying fewer but more sever injuries (Ben-Ner and Park, 2003). Longer time away from paid work, although partially covered by WC, may involve a greater loss in human capital and higher earnings

losses, especially in the long run.

Olson (1981) and Freeman and Medoff (1984) indicate the important "voice effect" of unionization. Specifically, unions negotiate explicit benefits which can include supplemental injury/disability insurance or long term disability insurance. However, the covered worker may be negatively affected by the "voice effect" under the following two scenarios. First, unions usually guarantee higher compensating differentials for risk. Therefore, earnings losses will be higher if the injured worker is accommodated to a less risky job. Second, union contracts may contain a fixed wage scale for injured workers (Woock, 2008). Again, this provision will reduce the compensating differential for injured workers. However, the findings of the literature are controversial about the size and the direction of compensating differentials. On the one hand, many studies indicate that union members receive higher compensating differentials for both fatal and nonfatal injuries (Olson (1981), Fairris (1992), Garen (1988), Cousineau and Girard (1992)). On the other hand, notable exceptions are represented by Fairris (1989), Martinello and Meng (1992), and Herzog and Schlottmann (1990). One of the most recent studies, Dorman and Hagstrom (1998), shows how including industry-level variables and using alternative risk measures dramatically affects the measure of wage compensation. Their results "cast doubt on the existence of compensating differentials for risk" and suggest the strong conclusion that "negative compensation- relatively high risk and low wages – is present for nonunion workers". The possible presence of compensating differentials may confuse the effects of coverage at the time of the injury and shall be considered in this study.

The work is organized as follows: section two describes the institutional setting; section three illustrates the estimation strategy; section four describes the data in use; and section five presents the empirical results. Conclusions are presented in section six.

2 The Institutional Setting

2.1 Unions and Bargaining Units

A bargaining unit is a group of job classifications and positions that have a commonality of work, skills, working conditions and job duties. It cannot include supervisors or managers. There are two general types

of bargaining units. The first is a comprehensive, or *vertical*, bargaining unit, which usually includes all "production and maintenance employees" regardless of their skills or classification. The second type is an inclusive, or *horizontal,* bargaining unit, which may be defined very specifically (e.g., nurses, flight attendants, engineers).

The employees in the bargaining unit are represented by a labor union in their dealings with firm's management. Bargaining unit status (that is, whether the position is in or out of the unit) pertains solely to the employee's position in the bargaining unit– it does not take into consideration whether the employee is a dues paying union member. As such, these are two distinct groups. Bargaining unit members are employees whose positions are included in the defined bargaining unit while union members are employees who pay dues to the labor organization.

Whether or not workers must join the union to work in a bargaining unit depends on what type of *shop* is present in their workplace. There are three types of shops: union shop, agency shop, and open shop. The union shop requires that employees in a bargaining unit join the union after hiring. In an agency shop workers must pay union dues whether they are members of a union or not. On the other hand, in an "open shop" the union represents the entire bargaining unit regardless of whether or not all employees are members of the union or pay union dues.

Once a union has been certified as the exclusive representative of a bargaining unit, it must represent all its workers equally, regardless of their membership status. In other words, when the union and management negotiate a collective bargaining agreement (CBA), its terms and conditions cover all employees in the bargaining unit irrespective of their membership status. A CBA may include provisions regarding wages and working hours, job termination, working conditions and health insurance benefits. Specifically, a CBA generally limits the employer's ability to fire employees: the employer must have a *just cause* (defined by the CBA) in order to terminate the employment relationship. In the case of employment-at-will, either the employer or the employee can end the employment relationship at any time without notice or reason (so long as the reason is not illegal)[19]. Injured workers are therefore granted more protection under a CBA, as employers are aware that termination may create a lawsuit (absent just cause) or, at best, make a

[19] Illegal reasons: race, sex, age, religion, nationality, jury duty, or disability.

Workers' Compensation[20] case stay open much longer. Additionally, a CBA usually makes available a set of instruments (rate retention, job transfer, and seniority rights) which allow injured workers, who are unable to do their former jobs, to do some other kind of work.

2.2 Unions and Occupational Safety

In 1971 the Occupational Safety and Health Administration (OSHA) was established with a mission of preventing work-related injuries, illnesses, and deaths through the development and enforcement of standards for workplace safety and health. Statistics compiled by the National Center for Health Statistics and the Bureau of Labor Statistics (BLS) show that the overall job fatality rate has been cut by 78 percent since 1970. The injury rate has also fallen (11 injuries and illnesses per 100 full-time workers in 1973; by 2007, the rate was 4.2) and the declines in workplace fatalities and injuries have been much greater in those industries, such as manufacturing and construction, where OSHA has targeted its standards and enforcement activities. Trade unions claim part of the credit for these achievements by arguing that without their involvement some of these standards would not have been issued. For instance, this has been the case with the Cotton Dust Standard (1978), defended in court by the AFL-CIO, and the Protective Lead Standard (1978, Steelworkers and United Auto Workers). Today, trade unions promote the establishment of safe work environments through union representation by challenging power during OSHA inspections, and by advising on bargaining strategies over health and safety issues.

3 Empirical Strategy

The objective of this study is to obtain an estimate of the effect of union coverage on the earnings losses caused by a work-related injury. As described in section two, the terms and conditions of a CBA cover all employees in the bargaining unit irrespective of their membership status. Therefore the relevant status for

[20] The Workers' Compensation System provides insurance against income loss and medical expenses incurred by the injured worker. Each state has different compensation laws, yet a common feature is that they are "No-fault" systems, meaning that: 1) the employee gives up the right to go to court and sue his employer for on-the-job injuries, instead, the worker is entitled to receive a certain reimbursement, based upon fixed maximums set by the various states; and that 2) the employers give up the right to challenge a possible employee's negligence.

the analysis is the worker's union coverage[21] rather than her union membership.

The empirical strategy is based on a standard difference-in-difference methodology, which is applied to the sample of injured workers. The model for the log earnings can be written as:

$$\log y_{it} = X_{it}\beta + \theta_1 I_{it} + \theta_2 CBA_i + \theta_3(CBA_i * I_{it}) + \gamma T_{it} + e_{it} \tag{7}$$

where I_{it} is equal to one in the post-injury periods (including the time of the injury) and zero otherwise; CBA_i is equal to one if the worker is covered *at the time of the injury*; and $(CBA_i * I_{it})$ is equal to one in the post-injury periods for a worker covered at the time of the injury. The coefficient θ_1 captures the effect of an injury on earnings, θ_2 captures possible differences between the two groups of workers prior to the injury event, and θ_3 captures the effect of coverage status at the time of the injury in the post-injury periods. The vector X_{it} includes the following controls for each period t: coverage status (to capture any other coverage effect on earnings), gender, race, age, state of residence, marital status, occupation, detailed industry of work, training, days of tenure, days of tenure squared, the size of the firm, the presence of a second job, annual hours of work. T_{it} is a calendar dummy variable which is meant to capture the effects of the economy on earnings.

The model is estimated by ordinary least squares method[22] over different time intervals. The first specification includes observations from four periods[23] before the injury and the year of the injury. In this way, θ_1 and θ_3 capture respectively the immediate effects of the injury and the coverage status on the worker's earnings. θ_1 is expected to be negative and θ_3 is expected to be positive, given the policies described in section one. The second specification includes the same number (four) of pre-injury periods and an equivalent number of post-injury periods. A negative θ_1 could indicate that an injury has long run effects on earnings. However, the coefficient would capture the average effect over four periods; therefore the model will also be estimated comparing separately each post-injury period to the four pre-injury periods. The direction of θ_3 is uncertain, as the instruments of union coverage at the time of the injury may prove to be both beneficial

[21] Alternatively indicated in this study as "union coverage" or "union representation".

[22] Given the presence of within group autocorrelation and heteroscedasticity, the standard error is calculated using the clustered sandwich estimator.

[23] The model was also estimated using smaller time intervals for the pre-injury period. The findings were generally similar to those obtained for the larger interval. An exception occurs when the pre-injury interval includes only one year before the injury. However, this sample may be subject to measurement error as will be explained in section four.

and detrimental for future earnings. The same model will be used to estimate the impact of the coverage status at the time of injury on log hourly wage. In this case, equation (7) includes the same controls except for the annual hours of work.

4 Data

The data come from the National Longitudinal Survey of Youth (NLSY79), a sample of 12,686 youth originally surveyed in 1979 (when the participants were 14 to 21 years old) with the participants being resurveyed every year until 1994 and every 2 years thereafter. The 1991 survey is excluded, as the respondents were not administered the health report containing the questions about occupational injuries. Survey weights are available and are used to draw nationally representative inferences. The sample shows low attrition: follow-up rates ranged from 85% to 90% by 1998. Data from 1988 through 2000 are used to construct an unbalanced sample of 34,466 observations on individuals with information on the current/most recent job in the private sector. The public sector is excluded from the analysis, as two distinct forms of unionism exist in the local public sector and one of them (associations) does not bargain. Self-employed individuals are excluded from the analysis. The NLSY reports individuals' 3-digit census industry and occupation codes. The industry code is used to identify 65 detailed industries of employment, which can be aggregated into eleven main industry categories: mining, transportation, wholesale trade, retail trade, construction, manufacturing, business services, financial services, personal services, professional services and entertainment. The occupation codes allow for the identification of eight main occupation categories, which are managerial, technical, sales, clerical, service, craft, and three types of operators. One of the advantages of using the NLSY79 is that it allows one to control for respondent's characteristics such as age, marital status, education level, gender, state of residence, job tenure, work shift, having a second job, time in the workforce. In particular, the dataset contains information on annual earnings, annual hours of work and a constructed hourly wage variable for the current/most recent job.

The main advantage of using the NLSY79 is that, being based on an individual's report, it allows for the identification of less severe work-related injuries which did not involve days away from work, restricted work activity or job transfer, or a compensation procedure. Specifically, the relevant question in the questionnaire

is "*Any work-related injury/illness in past 12 months/since the date of last interview? [Answer 1: an injury occurred]*". The sample excludes workers who reported multiple injuries over time, so that the analysis can ignore different coverage-injury effects. Other authors (Leigh, 1982, Robinson, 1988, Garen, 1988, and Leigh,1995) have preferred to integrate PSID data with combined BLS industry-occupation rates of fatality and nonfatal injuries (Survey of Occupational Injuries and Illnesses (SOII)). These measures may suffer from aggregation problems and are based on the monitoring activities of third parties[24], where nonunion employees may underreport minor accidents for fear of employer's retaliation (Olson, 1981). The problem of underreporting is present in the NLSY79 only in an indirect way, as union workers may be more likely to *recall* an injury either because it was officially acknowledged or because they filed a compensation claim. Some could argue that the NLSY79 measure of risk is rather subjective, as it is partly formed by the worker's perception and knowledge, yet this issue also affects the reporting to the employer or workers' representative in the SOII.

Lost-work days are identified through the question "*Not counting the day of the incident, how many days were missed due to the work-related injury?*". Other studies (Woock, 2009) have identified the worker as injured only if the injury involved a certain number of lost work-days. This approach can deal with the subjective bias in self-reporting, which arises if covered workers are trained to identify even minor work-related injuries. The idea is that some types of injuries may necessarily require some time away from work. In this setting, the reporting of an injury should be less affected by a worker's knowledge or subjective perception. For example, while a union covered worker may be better trained to recognize a work-related strain, it is plausible that covered and uncovered workers are equally able to identify a work-related fracture and take some time away from work. However, the potential drawback of this approach is that equally severe injuries could involve a different number of lost work-days for covered and uncovered workers. On the one hand, covered workers may take more days off than necessary, as they are granted protection by the unions. On the other hand, uncovered workers may not take days off or may return to work earlier for

[24] The Survey of Occupational Injuries and Illnesses (SOII) uses a scientific sampling approach to select employers to represent all industries and all sizes of establishments. Recordable cases include work-related injuries and illnesses that result in death, loss of consciousness, days away from work, restricted work activity or job transfer, medical treatment (beyond first aid), significant work related injuries or illnesses that are diagnosed by a physician or other licensed health care.

Table 1: Descriptive statistics for injured workers by coverage status

	Any lost work-days		At least four lost work-days	
	Uncovered	Covered	Uncovered	Covered
Injury rate (NLSY79) Days > 3	0.33	0.40*	-	-
Industry injury rate (BLS)	0.091	0.11**	0.092	0.11**
Second job (%)	0.074	0.091	0.076	0.038
Age	31.2	31.5	31.4	31.5
Health limitations (%)	0.028	0.027	0.033	0.057
Male (%)	0.58	0.69**	0.58	0.66
Black (%)	0.23	0.30*	0.28	0.36
Other (%)	0.051	0.064	0.068	0.047
Years of school	12.3	12.3	12.0	11.9
Training (%)	0.17	0.15	0.13	0.12
Days of tenure	186.3	266.7**	178.8	240.2**
Weekly hours	42.6	41.6	42.6	40.6
Mining (%)	0.0081	0.011	0.014	0.0094
Transportation (%)	0.066	0.16**	0.071	0.16**
Wholesale (%)	0.050	0.023	0.057	0.028
Retail Sale (%)	0.19	0.11**	0.17	0.13
Construction (%)	0.12	0.15	0.13	0.12
Manufacturing (%)	0.26	0.37**	0.23	0.37**
Business services (%)	0.071	0.034*	0.11	0.028*
Finance (%)	0.042	0.0076**	0.052	0*
Personal services (%)	0.032	0.023	0.030	0.019
Entertainment (%)	0.012	0.0076	0.014	0.0094
Professional services (%)	0.15	0.11	0.13	0.12
Managerial (%)	0.16	0.064**	0.12	0.038*
Clerical (%)	0.11	0.064*	0.11	0.075
Technical (%)	0.030	0.023	0.016	0.038
Sales (%)	0.068	0.042	0.084	0.038
Service (%)	0.16	0.12	0.16	0.13
Cratf (%)	0.18	0.22	0.19	0.17
Operator machine (%)	0.13	0.23**	0.13	0.24*
Operator transportation (%)	0.069	0.13**	0.10	0.17
Operator handler (%)	0.086	0.11	0.093	0.10
Observations	1112	264	368	106

$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$ indicate significant differences in means or proportions.
The table reports means and percentages. The individual is observed when the injury is reported. Covered workers are defined as those working in a bargaining unit with union representation at the time of the injury. Uncovered workers are those not covered by a CBA.

fear of retaliation. Consequently, this approach is more likely to assign an injury event to a covered worker. Given these controversial effects and the ambiguous findings in the literature, it is worth investigating how the coverage effect changes under different scenarios. In the present study, the two thresholds used to define a worker as injured are: 1) any amount of lost work-days (definition 1); and 2) at least four lost work-days (definition 2). The total number of injuries at the current/most recent job is respectively 1,375 (1,112 uncovered workers and 264 covered workers) and 474 (368 uncovered workers and 106 covered workers).

Injured workers are observed up to four years before the injury and up to three years after the injury, for a total number of observations respectively of 4,394 and 1,442. In this way, the difference-in-difference methodology can exploit a larger pool of observations from two time intervals with the same length[25]. Moreover, a larger interval can reduce the effects of measurement error, which occurs when some workers erroneously recall the date of the injury. It is reasonable to believe that most of these mistakes would assign an injury event to a year close to the actual year of the injury. If the analysis was including only the the first pre-injury period, the average value of pre-injury earnings could be severely biased by some observations which actually pertain to the year of the injury. Therefore, a better measure of pre-injury average earnings can be obtained by including several pre-injury periods. Table 1 reports summary statistics for the two groups of workers observed at time the injury is reported. Covered workers are more likely to work in industries with a higher injury rate (BLS data), namely mafacturing and transportation. They have more tenure and predominantly work in blue-collar jobs. Uncovered workers are more likely to work in the services industry and have managerial positions. Charts 1-2 show the average annual earnings, hourly wages and hours of work by coverage status of the injured worker. Annual values are computed for pre-injury ($k = -1... - 4$) and post-injury ($k = 0...3$) periods, where $k = 0$ is the year of the injury. The relevant coverage status of the worker is the one held at the time of the injury. The charts also include average annual values for 30,072 uninjured workers. As the same k period is associated with different calendar years, the dash line shows the average values across those years for the uninjured group[26]. Under definition 1, it can be seen that only covered workers experience a drop in earnings at the time of the injury. The post-injury earnings path of covered worker is rather erratic, with significant decreases in the second and fourth year. On the contrary, uncovered workers show increased earnings every period after the injury. Both groups of workers suffer a wage loss in the year of the injury, with a larger decrease for covered workers. Covered workers experience additional declines in the subsequent periods and, as a result, receive an average wage level lower than that

[25] The post-injury period includes the year of the injury. Some workers can be observed up to five years and more from the the time of the injury. However these observations were excluded in order to have observations on worker's earnings and characteristics relatively closer to the date of the injury and to minimize the incidence of changes in unobserved variables which can occur over a long period of time.

[26] For example, say that only two injuries occur. One injury occurs in 1990 and the other occurs in 1994 (these events occur in $k = 0$). The dash line will show the two-year average earnings, wages and hours of uninjured workers.

of pre-injury periods. Hours of work decrease for covered workers and return to pre-injury levels only in the second year after the injury. On the contrary, uncovered workers increase their hours of work in the year of the injury and afterwards. When compared to uninjured individuals, injured workers, who are covered at the time of the injury, usually receive higher earnings and work more hours. Their wages, however, fall below average after the injury. On the contrary, uncovered workers always receive earnings and wages which are significantly lower than those of uninjured individuals. Under definition 2, the statistics change significantly . Specifically, both groups of injured workers already earn less than uninjured ones in the majority of the years preceding the injury and experience a fall in earnings and wages when they get injured. The wage differential suggests that these injured workers are probably concentrated in low-paying blue-collar jobs. In particular, uncovered workers suffer a $1/hour wage loss in the year of the injury, while working the same number of hours. However,one year after the injury, the wage level returns to its original level and hours contemporaneously increase. On the contrary, covered workers suffer a significant wage loss in the second year after the injury, which is partially offset by an immediate increase in hours of work.

Under both scenarios, workers who were covered at the time of the injury earn on average more than uncovered workers in each period. This differential can be explained by the fact that there is a certain path dependency in union coverage and therefore in the recipient of the union premium. Another reason may be that injured covered workers are able to preserve their human capital when an injury occurs so that they are consistently able to work in dangerous jobs which guarantee high compensating differentials even when they become uncovered.

Figure 1: Average Earnings, Wages and Hours by Coverage Status (Any lost work-days)

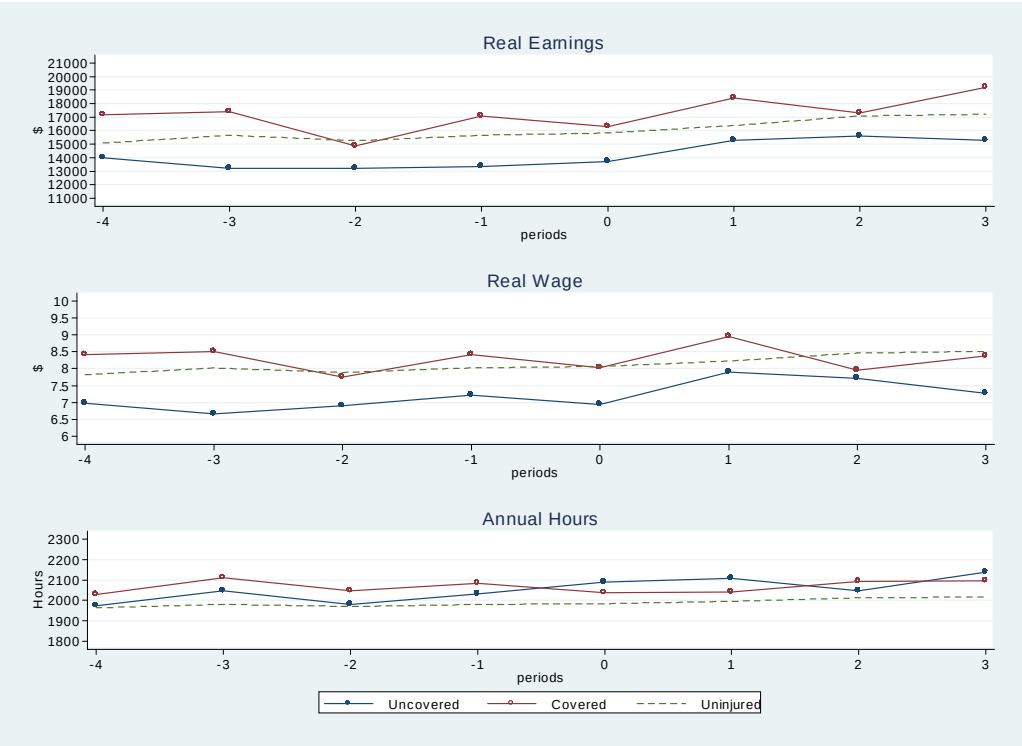
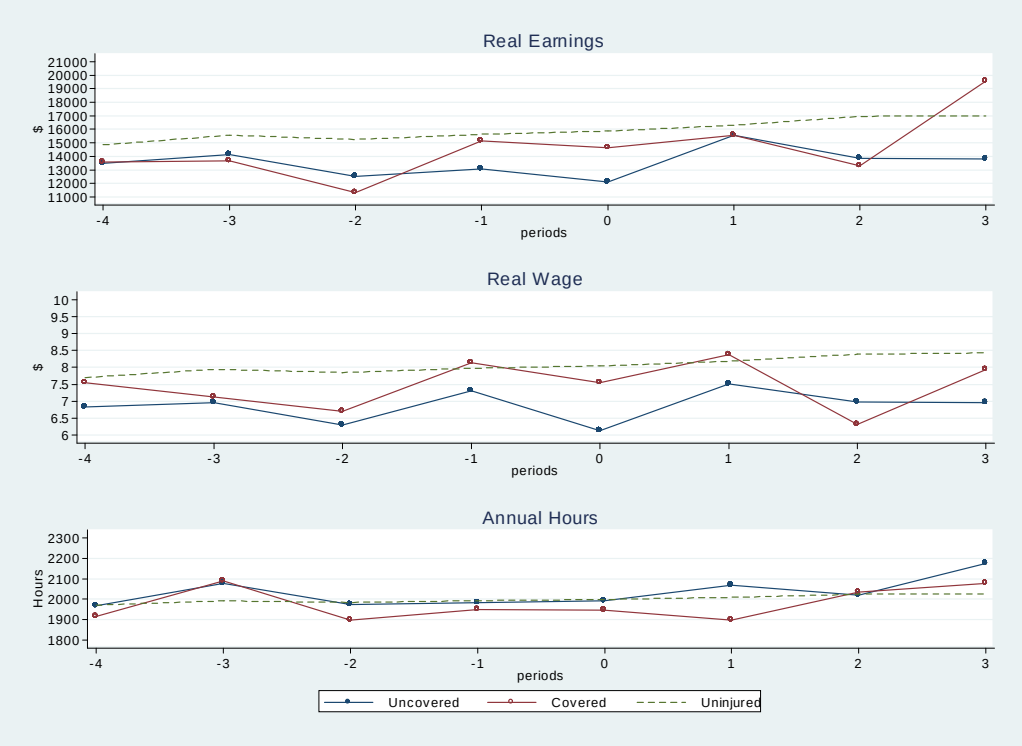


Figure 2: Average Earnings, Wages and Hours by Coverage Status (at least four lost work-days)



5 Empirical Results

Tables 2 to 5 report the regression results of the earnings and wage equations under the two different specifications and for separate post-injury periods. The reported coefficients are θ_1 (post-injury period), θ_2(covered at the time of the injury) and θ_3 (post-injury period and covered at the time of the injury). The relevant findings will be discussed in section six.

Tables 2 and 3 report the estimated coefficients when the injury status is defined irrespective of the amount of lost work-days. The results show that workers do not suffer any earnings or wage loss at the time of the injury and in the post-injury period as a whole. The separate analysis of each post-injury period confirms these findings.

Tables 4 and 5 report the estimated coefficients when a worker is defined as injured only if the injury involved at least four lost work-days. The results in Table 4 show that uncovered workers experience an immediate 12.6% loss in earnings at the time of the injury. On the contrary, covered workers do not suffer any loss at the time of the injury since union coverage increase earnings by about 24%, which results in a net increase of about 11%. The coverage effect at the time of the injury is probably so large because the variable also captures part of the union premium. The model includes a dummy variable for union coverage in each period but its effect is not significantly different from zero. Furthermore, the results show that there are not any significant differences between the two groups of workers prior to the injury event. When the analysis considers a larger post-injury interval (which includes the time of the injury and the following three years), the negative effect of an injury is about 7%. However, the separate analysis of each post-injury period indicates that the effect of an injury rapidily fades away after the year of the injury. The results in Table 5 indicate that both uncovered and covered workers suffer a loss in hourly wages at the time of the injury. The injury event decreases wages by 7% and the coverage status is unable to offset this loss. The loss is still 5% when the analysis adds the pooled observations from the three years after the injury, but also in this case a separate analysis indicates that that there are no significant losses in each of the periods following the injury.

Table 2: Regression Coefficients - Annual Earnings Equation (any lost work-day)

	(1) Time of the Injury	(2) First period	(3) Second period	(4) Pooled
Post-injury period	-0.013	0.028	0.028	0.015
	(0.028)	(0.037)	(0.038)	(0.024)
Covered at time of injury	0.004	-0.010	0.003	-0.023
	(0.061)	(0.057)	(0.062)	(0.055)
Post injury period and covered at time of injury	0.031	0.028	-0.000	0.038
	(0.057)	(0.068)	(0.091)	(0.049)
Observations	3083	2813	2686	4391

Standard errors in parentheses
$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$

Table 3: Regression Coefficients - Wage Equation (any lost work-day)

	(1) Time of the Injury	(2) First period	(3) Second period	(4) Pooled
Post-injury period	-0.007	0.017	0.004	-0.001
	(0.019)	(0.026)	(0.031)	(0.016)
Covered at time of injury	-0.035	-0.036	0.000	-0.010
	(0.046)	(0.049)	(0.043)	(0.043)
Post injury period and covered at time of injury	-0.015	0.027	-0.053	-0.007
	(0.037)	(0.041)	(0.052)	(0.028)
Observations	3083	2813	2686	4391

Standard errors in parentheses
$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$

Table 4: Regression Coefficients - Annual Earnings Equation (at least four lost work-days)

	(1) Time of the Injury	(2) First period	(3) Second period	(4) Pooled
Post-injury period	-0.128**	-0.027	-0.082	-0.072^{+}
	(0.047)	(0.057)	(0.074)	(0.040)
Covered at time of injury	-0.058	-0.085	-0.058	-0.106
	(0.088)	(0.089)	(0.092)	(0.081)
Post injury period and covered at time of injury	0.245*	0.081	0.157	0.185*
	(0.100)	(0.145)	(0.137)	(0.090)
Observations	1042	935	888	1442

Standard errors in parentheses
$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$

Table 5: Regression Coefficients - Wage Equation (at least four lost work-days)

	(1) Time of the Injury	(2) First period	(3) Second period	(4) Pooled
Post-injury period	-0.063*	-0.040	-0.044	-0.045^{+}
	(0.027)	(0.040)	(0.040)	(0.024)
Covered at time of injury	-0.109*	-0.089^{+}	-0.095^{+}	-0.076
	(0.048)	(0.049)	(0.050)	(0.048)
Post injury period and covered at time of injury	0.010	0.018	-0.069	0.009
	(0.048)	(0.059)	(0.075)	(0.038)
Observations	1042	935	888	1442

Standard errors in parentheses
$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$

6 Discussion

When an injury event is defined irrespective of the amount of lost work-days, the findings indicate that workers do not suffer any earnings losses. This result is due to the inclusion of a large number of injuries which did not involve any time off and therefore did not cause any loss in human capital. Furthermore, the absence of earnings losses also indicate that these were actually minor injuries which were not associated with any important deterioration of health capital. As a consequence, this finding suggests a reconsideration of the idea that uncovered workers may not take days off mainly because they are afraid of a possible retaliation by the employer.

When the analysis considers more serios injuries, the findings suggest that union coverage is able to reduce the earnings losses of injured workers at the time of the injury. However, union coverage is unable to prevent a loss in productivity, which is reflected in lower wages at the time of the injury. The coverage effect captures both the impact of union policies, i.e. the provisions contained in a CBA and the support provided by union representatives, and other unobserved effects (e.g. the type of injury) which may be correlated with the coverage status. The following discussion considers different hypotheses which may help to understand the above findings.

1. Hypothesis: Uncovered workers suffer injuries which are more severe and therefore experience greater loss in their earnings ability.

The severity of an injury can affect the earnings ability of the worker through two channels. First, more severe injuries can involve a greater amount of time away from work, and they are therefore associated with a greater loss in human capital. Second, more severe injuries can have an impact on the health of the worker. Both human capital and health capital are important determinants of the earnings ability of the individual.

Table 8 in Appendix reports the frequencies of various types of injuries suffered by workers and the amount of lost work-days. Certai types of injuries are more severe than others, although different degrees of severity are possible within injury type and the same type of injury can have a different impact . For example, a leg strain can be categorized from mild to severe and it will be more impairing for the work of a janitor than for the activities of a clerical worker. A test for differences in means and proportions fails to

reject the null hypothesis of equal average values between the two groups of workers[27]. A simple reading of the statistics indicate the following fact. On the one hand covered workers experience more fractures of the skull, spine, trunk, and limbs (12% of the injury cases for covered workers, while only 9% for uncovered workers) and more sprains and strains of joints and adjacent muscles (35% against 31%). In both cases, covered workers spend on average more time away from work after the injury, with a differential of about four days. A possible reason for this difference is that covered workers are less likely to return immediately to work, since a CBA protects them from a possible retaliation by the employer. Another possible reason could be that unobservable firm-specific risks are such that covered workers systematically suffer injuries to specific parts of the body which require longer recoveries. For example, a fractured skull requires more days to recover than a fractured arm. However, the joint distribution of injuries and affected body parts[28] does not seem to support this hypothesis. On the other hand, uncovered workers are largely more prone to suffer open wounds of the head, neck, trunk, and limbs (14% against 6%). In this case uncovered workers spend, on average, 24 days[29] away from work, against only four days for covered workers. On average, covered workers spend about 50 days away from work after an injury - 15 days more than uncovered workers. The difference drops to three days if two extreme and infrequent cases (996 days for "Internal injury of chest, abdomen and pelvis" in the covered group, and 996 days for "Dislocation without fracture" in the uncovered group) are dropped from the analysis. If the different types of injuries are grouped into five broader categories (diseases, fractures, open wounds, superficial injuries, injuries or diseases with a late diagnosis), the tests for differences in means and proportions fail again to reject the null hypothesis of equal average values. A simple reading of the statistics presented in Table 7 indicate the following facts. First, covered and uncovered workers have the same probability of suffering a disease and they spend on average the same amount of time off. Second, covered workers are more likely to suffer a fracture or a crushing injury, and the amount of lost work-days is the same as that taken by uncovered workers. Third, uncovered workers are more likely to suffer an open wound and they spend on average more time (about nine days) away from work. Fourth, uncovered workers are more likely to suffer a superficial wound, yet covered workers spend a substantial larger time away from

[27] For some type of injuries (e.g. "Internal injury of chest, abdomen and pelvis") the tests could not be computed as there was only observation in each group.

[28] Tables are available upon request.

[29] The number of days decreases to 12 if three cases with more than 200 days are dropped from the analsys.

work (about 29 additional days). The overall average difference in days is primarily driven by the difference in lost work-days after a superficial injury[30]. Fractures could be considered a type of injury which is more serious than an open wound, but this view cannot be always justified. Given these findings, it is reasonable to assume that the two groups work in jobs which are characterized by similar dangers.

2. Hypothesis: Uncovered workers spend more time out of the labor force after an injury.

Long periods out of the labor force can partially destroy the human capital of the worker and involve a decrease in her productivity and wage/compensation. An injured worker sometime may not return to her job after she recovered from the injury. As described in section two, a CBA usually guarantees a degree of protection against job dismissal in the case of an injury and favors the accommodation of injured workers. The NLSY79 contains information on a wide range of work consequences of an injury. Injured workers are asked whether the injury/illness caused them "*to be fired*" (event 1), "*to quit*" (2), "*to be laid off*" (3), "*to be assigned to another job on a temporary basis*" (4), "*to be unable to do the previous duties*", and "*to change occupation*" (5). The number of observations is increased by including the injuries reported for a concomitant or previous job and including workers who suffered multiple injuries over the years. The total number of injury cases becomes 2,996. Summary statistics are reported in table 6 and indicate that the frequencies for being fired, laid-off, quitting and being reassigned to a different job are significantly different for covered and uncovered jobs. In particular, uncovered workers are more likely to be fired or to quit the job, although a test for difference in proportions fails to reject the null hypothesis of equal proportions. On the other hand, covered workers are more likely to be temporarily reassigned to a different task.

3. Hypothesis: The replacement of losses by workers'compensation benefits is greater for covered workers.

Table 6 shows that about 65% of covered injured workers have filed a claim for compensation benefits and half have already collected the benefit or part of it at the time of the interview. These frequencies fall in the case of uncovered workers, where only 56% have filed a claim and 44% of them have received the compensation. The usual explanation for the filing behavior differential is that uncovered workers apply less frequently for WC benefits than covered ones, as the latter are more protected against the possible retaliation

[30] The "superficial injury" category includes: "Burns"; "Superficial injury and contusion with intact skin surface"; and "Symptoms, signs and ill-defined conditions". In some cases, burns can be serious and require a long time for recovery. However, it should be noted that covered workers in the sample do not suffer any burn.

Table 6: Descriptive Statistics

	Uncovered		Covered		Total	
Probability of being Fired	1.97		0.37		1.67	
Probability of Quitting	4.21		1.84		3.76	
Probability of Working Less	14.9		14.0		14.8	
Probability of Lay-off	5.67		4.41		5.43	
Probability of Temporary Reassignment	10.9		17.6***		12.2	
Probability of Same Work, Different Duties	27.0		27.9		27.2	
Probability of Change in Occupation	4.89		3.68		4.66	
Probability of filing for WC	56.3		65.1		59.6	
Probability of obtaining WC	44.1		50.4*		47.3	
Probability of Part-Time	10.2		21.9		12.53	
	Pre-Injury	Injury	Pre-Injury	Injury	Pre-Injury	Injury
Probability of Part-Time	7.69	7.84	10.46	16.17	8.33	9.99

$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$ indicate significant differences in proportions.
The table reports means and percentages. Covered workers are defined as those working in a bargaining unit with union representation at the time of the injury. Uncovered workers are those not covered by unions. The bottom part of the table reports the proportions of workers in part-time in the pre-injury and post-injury periods.

of the employer (higher rates of injury involve higher premiums that the employer must pay). The higher success rate for covered workers in obtaining the compensation can be due to two reasons. First, union representatives may help workers to prepare a successful application. Second, covered workers' injuries may be more serious and satisfy the requirements to obtain the compensation. However, the statistics previously discussed do not support this argument.

4. Hypothesis: Both uncovered and covered workers move from full-time to part-time jobs after an injury.

Several studies (Long and Jones, 1981; Ermish and Wright, 1991) show how part-time work reduces the level of wages and the returns to some investments in human capital with respect to full-time workers. The differential is generally explained by lower productivity among part-time workers. In this setting, an injured worker may take part-time employment during the period of recovery or because there is a permanent decrease in her health capital. As in other studies, a job is defined as part-time when it involves less than 35 hours of work in the reference week. Table 6 reports the proportion of workers in part-time employment in the year of the inury and in the year before the injury. There is a sharp increase in part-time employment for covered workers, as 16% of them work part-time in the year of the injury with respect to 10% in the year before the injury. On the contrary, the percentage of uncovered workers in part-time jobs does not chance and remains about 8%.

7 Conclusions

This study has investigated whether union coverage at the time of the injury is able to mitigate the impact of nonfatal work-related injuries on earnings and wages over time. Union contracts typically contain implicit or explicit provisions, such as temporary reassignment and termination for just cause only, which should limit the worker's losses of human capital and health capital following an injury. The main findings are the following. First, uncovered workers suffer substantial earnings losses in the year of the injury, while union coverage is able to eliminate the impact of an injury on earnings. Second, union coverage is unable to prevent a loss in productivity, which is reflected in lower wages at the time of the injury. Third, the effects on earnings of an injury quickly disappear in the years which follow the injury.

In the year of the injury, covered workers need, on average, more time for recovery than uncovered workers. However, the lost earnings are frequently restored by WC benefits as union representatives successfully help workers in obtaining these benefits. Unions are often able to reassign injured workers to different tasks or work schedules. The percentage of covered workers in part-time (less than 35 work-hours in the reference week) increases in the year of the injury and this could be the cause of the fall in hourly wages.

References

[1] Ben-Ner, A., and Y-S Park. “Unions and Time Away from Work After Injury: the Duration of Non-Work Spells in the Workers’ Compensation Insurance System.” *Economic and Industrial Democracy*, 24(3), 2003, pp. 437-453.

[2] Biddle, Jeff. “Estimation and Analysis of Long Term Wage Losses and Wage Replacement Rates of Washington State Workers’ Compensation Claimants.” Olympia, WA: Department of Labor and Industry, 1998.

[3] Boden, L. I., and M. Galizzi. "Measuring Income Losses of Injured Workers: a Study of the Wisconsin System." Cambridge MA: Workers Compensation Research Institute, 1998.

[4] _____. "Income Losses of Women and Men Injured at Work." *Journal of Human Resources*, 38(3), 2003, pp. 722-757.

[5] Bound, J., and R. V. Burkhauser. "Economic Analysis of Transfer Programs Targeted on People with Disabilities." In O. Ashenfelter and D. Card, eds. Handbook of Labor Economics, 51, 1999, pp. 3417-3528.

[6] Butler, R. J., M. L. Baldwin, and W. G. Johnson. “The Effects of Occupational Injuries After Returns to Work: Work Absences and Losses of On-The-Job Productivity.” *The Journal of Risk and Insurance*, 73(2), 2006, pp. 309-334.

[7] _____. W. G. Johnson, and M. L. Baldwin. “Managing Work Disability: Why First Return to Work is Not a Measure of Success.” *Industrial and Labor Relations Review,* 48(3),1995, pp. 452- 469.

[8] Campolieti, M., and H. Krashinsky. "Wage losses of workers with occupational injuries: Effects of remaining with the time-of-accident employer." *Industrial and Labor Relations Review*, vol. 60(1), 2006, pages 120-138.

[9] Campolieti, Michele. “Unions and the Duration of Workers’ Compensation Claims.” *Industrial Relations*, 44(4), 2005, pp. 625-653.

[10] Cousineau, J-M., R. Lacroiz, and A-M. Girard. “Occupational Hazard and Wage Compensating Differentials." *The Review of Economics and Statistics,* 74(1), 1992, pp. 166-169.

[11] Dorman, P., and P. Hagstrom. “Wage Compensation for Dangerous Work Revisited.” *Industrial and Labor Relations Review,* 52(1), 1998, pp. 116-135.

[12] Kerwin, Kofi Charles. "The Longitudinal Structure of Earnings Losses among Work-Limited Disabled Workers." *Journal of Human Resources*, 38(3), 2003, pp. 618-646.

[13] Fan, Z. J., D. K. Bounauto, M. P. Foley, and B. A. Silverstein. “Underreporting of Work-Related Injury or Illness to Workers’Compensation: Individual and Industry Factors.” *Journal of Occupational and Environmental Medicine,* 48(9), 2006, pp. 914-922.

[14] Fairris, David. “Compensating Wage Differentials in the Union and Nonunion Sectors." *Industrial Relations*, 28(3), 1989, pp. 356-372.

[15] Freeman, R.B., and J.L. Medoff. "What do unions do?" New York: Basic Books, 1984.

[16] Garen, John. “Compensating Wage differentials and the Endogeneity of Job Riskiness." *The Review of Economics and Statistics,* 70(1), 1988, pp. 9-16.

[17] Herzog, H.W., and A.M. Schlottmann. “Valuing Risk in the Workplace: Market Price, Willingness to Pay, and the Optimal Provision of Safety." *The Review of Economics and Statistics,* 72(3), 1990, pp. 463-470.

[18] Hirsch, B. T., D. A. Macpherson, and J. M. DuMond. “Workers’ Compensation Recipiency in Union and Nonunion Workplaces.” *Industrial and Labor Relations Review,* 50(2), 1997, pp. 213-236.

[19] Jacobson, L. S., R. J. LaLonde, and D. G. Sullivan. "Earnings Losses of Displaced Workers." *American Economic Review,* 83(4), 1993, pp. 685-709.

[20] Johnson, W. G., and J. Ondrich. “The Duration of Post-Injury Absences from Work.” *The Review of Economics and Statistics*, 72(4), 1990, pp. 578-586.

[21] Lackdawalla, D. N., R. T. Reville, and S. A. Seabury, 2007. “How Does Health Insurance Affect Workers’ Compensation Filing?” *Economic Inquiry*, 45(2), 2007, pp. 286-303.

[22] Leigh, J.P. “Are unionized blue collar jobs more hazardous than nonunionized blue collar jobs?" *Journal of Labor Research*, 3(3), 1982, pp. 349-357.

[23] _____ . “Compensating Wages, Value of a Statistical Life, and Inter-industry Differentials. “ *Journal of Environmental Economics and Management,* 28(1), 1995, pp. 83-97.

[24] Martinello, F., and R. Meng. "Workplace Risks and the Value oh Hazard Avoidance." *The Canadian Journal of Economics*, 25(2), 1992, p. 333-345.

[25] Olson, C. A. "An Analysis of Wage Differentials Received by Workers on Dangerous Jobs." *The Journal of Human Resources,* 16(2), 1981, pp. 167-185.

[26] Reville, Robert T. “The Impact of a Disabling Workplace Injury on Earnings and Labor Force Participation.” In J.C. Haltiwanger et al. eds. The Creation and Analysis of Employer-Employee Matched Data, New York: Elsevier Science, North Holland 1999, pp. 147-173.

[27] _____. and R. F. Schoeni. “Disability from Injuries at Work: The Effects on Earnings and Employment.” Santa Monica, CA: RAND, Labor and Population Program Working Paper Series, 01-08, 2001.

[28] _____. R. F. Schoeni, and C. W. Martin. "Trends in Earnings Losses from Disabling Workplace Injuries in California: The Role of Economic Conditions." Santa Monica, CA: RAND Institute for Civil Justice, 2002.

[29] Robinson, J.C. “Hazardous Occupation Within the Job Hierarchy." *Industrial Relations,* 27(2), 1988, pp. 241-250.

[30] Woock, Christopher. “The Earnings Losses of Injured Men: Accounting for Injuries Outside the Workers’ Compensation System.” *Industrial Relations,* 48(4), 2009, pp. 610–628.

[31] Woock, Christopher. “Unions and the decision to apply for and the receipt of workers’ compensation benefits.” MPRA Paper 14689, University Library of Munich, Germany, 2009.

Appendix

Table 7: Descriptive Statistics: Type of Injury (At least four lost work-days)

	Lost work-days			Percentage		
	Uncovered	Covered	Total	Uncovered	Covered	Total
Diseases	59.12	64.00	60.26	27.86	28.57	28.02
Fractures	47.37	47.53	47.41	43.57	53.57	45.88
Wounds	55.20	46.20	53.68	17.50	11.90	16.21
Superficial	21.40	49.00	25.34	10.71	5.95	9.62
Late Diagnosis	4.00	.	4.00	0.36	.	0.27
Total	49.08	52.17	49.79	30.96	38.63	32.45

$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$ indicate significant differences in proportions
The table reports means and percentages. Covered workers are defined as those working in a bargaining unit with union representation at the time of the injury. Uncovered workers are those not covered by unions. The sample excludes two injury events which required 996 lost work-days.

Table 8: Descriptive Statistics: Type of Injury (Any amount of lost work-days)

	Lost work-days			Percentage		
	Uncovered	Covered	Total	Uncovered	Covered	Total
Burns	10.33	.	10.33	3.20	.	2.46
Crushing injury	27.00	66.25	49.43	1.07	4.71	1.91
Diseases of blood and blood-forming organs	8.00	.	8.00	0.36	.	0.27
Diseases of genitourinary system	6.50	.	6.50	0.71	.	0.55
Diseases of the digestive system	23.71	31.00	24.20	4.98	1.18	4.10
Diseases of the musculoskeletal system and connective tissue	82.38	83.71	82.77	14.23	20.00	15.57
Diseases of the respiratory system	6.91	14.25	8.87	3.91	4.71	4.10
Diseases of the skin and subcutaneous tissue	83.00	.	83.00	0.71	.	0.55
Dislocation without fracture	120.89	73.17	109.44	6.76	7.06	6.83
Effects of foreign body entering through orifice	7.50	.	7.50	0.71	.	0.55
Endocrine, nutritional and metabolic diseases and immunity disorders	30.00	.	30.00	0.36	.	0.27
Fracture of skull, spine, trunk, and limbs	63.81	66.09	64.40	11.03	12.94	11.48
Internal injury of chest, abdomen and pelvis	20.00	996.00	508.00	0.36	1.18	0.55
Intestinal infectious diseases	90.00	.	90.00	0.36	.	0.27
Intracranial injury, excluding those with skull fracture	15.00	.	15.00	0.71	.	0.55
Late effects of injuries, poisoning, toxic effects and other external causes	4.00	.	4.00	0.36	.	0.27
Mycoses	.	7.00	7.00	.	1.18	0.27
Open wound of head, neck, trunk, and limbs	47.90	5.75	42.79	10.32	4.71	9.02
Other diseases due to viruses and Chlamydiae	150.00	.	150.00	0.36	.	0.27
Other infectious and parasitic diseases	.	18.00	18.00	.	1.18	0.27
Rickettsioses and other arthropod-borne diseases	201.00	.	201.00	0.71	.	0.55
Sprains and strains of joints and adjacent muscles	43.18	38.23	41.89	30.25	35.29	31.42
Superficial injury and contusion with intact skin surface	19.38	50.00	24.21	5.69	3.53	5.19
Symptoms, signs and ill-defined conditions	47.80	47.50	47.71	1.78	2.35	1.91
Syphilis and other venereal diseases	19.50	.	19.50	0.71	.	0.55
Viral diseases accompanied by exanthem	10.00	.	10.00	0.36	.	0.27
Total	52.44	63.27	54.96	14.83	19.53	15.66

$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$ indicate significant differences in proportions

The table reports means and percentages. Covered workers are defined as those working in a bargaining unit with union representation at the time of the injury. Uncovered workers are those not covered by unions. The sample includes two injury events which required 996 lost work-days.

CHAPTER III

Gender Differentials in Artists' Earnings: Evidence from the 2000 Census

1 Introduction

The male to female earnings ratio among American artists in 1999 was 60 percent, which is 17 percentage points lower than the 2002 ratio for all employed Americans (U.S. Census 2002). Innumerable studies (Beller 1982, Brown 1976, Gunderson 1978, Macpherson and Hirsh 1995, Rytina 1981, Wolf 1976) have found that women in the United States earn significantly less than men who work in the same occupation. No study, however, has investigated in detail gender earnings differences in the art occupations. The goal of this paper is to analyze the earnings gap between men and women who work in the eleven census occupations categorized by the National Endowment for the Arts (NEA). The analysis uses data from the 2000 Census Public Use Microdata Samples (PUMS) 5-Percent and consists of two parts. In the first part, a variant of the Oaxaca (1973) decomposition is used to determine which proportion of the pay gap can be explained by gender differences in endowments of earnings-related characteristics. The residual, or unexplained, gap is due to gender differences in the returns to characteristcs and, in most studies, is interpreted as evidence of gender discrimination. In particular, discriminatory pay practices have been primarily discussed in the setting of organizational employment. However, the unexplained gap could also be caused by gender differences in unobservable characteristics such as ability and reputation. This kind of interpretation seems more appropriate to understand returns inequality in the case of self-employed artists who independently sell their work. The findings indicate that both factors contribute to the earnings differentials which are observed for the majority of the art occupations. In particular, it is found that the pay gap is partially explained by a different distribution of men and women across industries of work. The further step of the present study is to analyze the gender distribution of artists across industries. The sociological literature (Gatta and Roos 2005, Cotter and al. 1997, Kuliss 1997, England et al. 1988) and the economic one (Pinkston 2006, Blau and Kahn 2000, Sattinger 1998, Goldin 1990, Aigner 1977) have investigated whether some occupations, or jobs within an occupation, are more likely to have a larger percentage of employees of the same gender (or, alternatively, race). A systematic difference in the distribution of employees among high-paying and low-paying jobs may contribute to the overall gender wage gap. The second part of this study uses a decomposition technique proposed by Fairlie (2003) to identify the determinants of *industry segregation* in the art occupations. The analysis of a relative homogenous group of artists can provide insights into whether discriminatory hiring

practices significantly contribute to the observed segregation.

Research into the earnings determination of artists has been undertaken many times over the past twenty years. Several studies have shown that artists do not fit the typical earnings model as well as individuals in other professions (Filer 1986; Withers 1985; Wassall and Alper 1992, 1984). In particular Filer (1986) completed two studies, one comparing the earnings of artists to the overall workforce, and another focusing on artists' returns to education. He found that artists do not adhere to the standard earnings model as closely as the average worker does, and that artists' returns to education tend to be lower than the average worker's. If conventional theories of the labour market are inappropriate in the case of artists, an original contribution is provided by Throsby (1994) who constructs a model of labour supply of multiple job-holding artists. Wassall and Alper (1984) also completed research into the determinants of artists' earnings. They found that education had no or negative impact on artistic earnings, however education was positively correlated with artists' non-artistic earnings. Unfortunately, the Census data do not allow the analysis of moonlighters or artists in transition from organizational employment to self-employment (and vice-versa), given that reported annual hours of work and weeks are not separated by job. Snooks (1983) examined earnings determinants of visual arts in Australia and came to conclusions similar to Filer's. Finally, Rengers and Plug (2001), using a sample of Dutch artists, found that artists earn less than other professions early in their lives as a result of working fewer hours, not due to lower returns to education. In fact their research established that self-educated artists have the same earnings as those who have a formal artistic education. This is nothing like other professions that often require formal education for entry.

Other researchers have used the U.S census data to measure gender discrimination within the analysis of earnings differentials. Sanborn (1964), using the 1950 U.S. Census, calculated that the female/male income ratio was .87. The income ratio was adjusted for occupation, hours of work, education, race, absenteeism, experience and turnover. Similarly, using the data from the 1960 U.S. Census, Fuchs (1971) examined the wages of women relative to men, and found the ratio to be .60. He felt that it was social attitudes about the roles of women that were leading to the discrimination. Adjustments for race, education, age, city size, marital status, class of worker and length of commute were made. He concluded that the entire wage differential could be eliminated if narrow enough occupational categories were chosen. This is significant

because it suggests that in order to get an accurate measure of discrimination, the occupational categories must be wide enough to allow for capturing the impacts of job (or industry) segregation. Several studies have shown that jobs that are dominated by women are paid less than jobs that are dominated by men, even when differences in education and other skills are taken into account (Doeringer and Piore, 1971; Lloyd and Niemi, 1979). Similarly, Bergmann (1974) and Goldin (1990) found that wage disparities still existed even after controlling for occupation and other background variables. In a study by Horrace and Oaxaca (2001), using data from the 1998 Current Population Survey (CPS) and controlling for industry, significant differences were found in the earnings of women in every industry with the exception of the agriculture, forestry and fisheries industry. Included among those industries explicitly controlled for in the Horrace and Oaxaca study was the entertainment industry which includes many of the performing artists to be examined below. The present paper will further investigate the nature of job segregation within art occupations, as it is believed that discriminatory hiring practices contribute to the higher concentration of female artists into low-paying industries.

Sociologists and economists have often disagreed on the identification of the main causes of job segregation (England et al., 1988). On one side, the sociological factors can be summarized, following Reskin (1993), as: 1) discrimination; 2) streotypes and occupational sex labels; 3) government policies and their implementation; and 4) distribution of occupations and industries. Discrimination through job segregation is another form of discrimination, which may also lead to wage gaps, if the jobs to which women are segregated are lower-paying ones. Employers discriminate when they decide hires or promotions based on an aversion (or an affinity) toward one group of people that is unrelated to individual skills and performances. In the recent past, discriminatory practices have confined a large number of women to sex-typical jobs. Until the mid-1960s the majority of firms had jobs that were openly available to only one sex (Goldin, 1990). Studies suggest that the enforcement of anti-discrimination law has contributed to workplace integration (Leonard, 1989, Baron et al., 1991). However, discrimination can still play a significant role in perpetuating segregation when there is weak law enforcement, outdated workplace practices, and employers' opposition to job integration (Blau 1984, Rhode 1991). These shortfalls are severe in the art industry, where decisions can often be justified on the base of intangible assets such as personal taste and quality. For example, anti-discriminatory regulations

would be of difficult application in the case of a music venue's owner who offer gigs only to male bands. Employers may also assign men and women to different jobs because of beliefs they hold about the two sexes. As a consequence, occupational sex labels influence job assignments independent of workers' qualifications (Bielby and Baron, 1986). For example, female designers can be considered inadequate to work in a "rough" construction company, while they can be seen as a better fit for the "creative" advertising industry. On the other side, economists have contributed to the debate with three major models: the neoclassical model (Zellner, 1975), the implicit-contract theory (Rosen, 1985) and the dual market model (Lang and Dickens, 1988). In general, the allocating mechanism of these models depends on the market structure and on the assumptions regarding the differences in workers' tastes and preferences (England et al., 1988). On this regard, the present study will devote particular attention to the subset of never-married artists without children in the household. It is believed that these workers have similar preferences for the trade-off between leisure and work time and for the type of job. The analysis will use Fairlie's (2003) methodology to investigate the gender probability gap of working in a top-paying industry. Fairlie's decomposition technique has been widely used in recent studies (Bates and Robb, 2008; Fairlie and Robb, 2007; Mixon and Trevino, 2005) to decompose group differences in probability into an explained portion (due to differences in characteristics) and an unexplained one (due to differences in marginal effects).

The segregation literature has also investigated the effect of occupational integration, i.e. when the two sexes are equally represented across occupations, on gender earnings inequality. Tienda et al. (1987) analyze the effects of industrial shifts and intra-industry restructuring, and finds that men benefit more than women from the entry of the latter into male-dominated occupations. Cotter et al. (1997) find that the gender differential would disappear if occupational integration were complete. Gatta and Roos (2005) show that working in mixed occupations does not involve any significant advantage in earnings. Only few studies have investigated the issue of segregation in artist occupations. Allmendinger and Hackman (1995) examine the relationship between the gender composition of symphony orchestras and a number of subjective outcome measures in four different countries. Goldin and Rouse (2000) exploits the change in audition procedures in orchestras to estimate a fixed effects model of hiring and career promotions. They show that the adoption of blind auditions increases the proportion of women in orchestras.

The work is organized as follows: section two illustrates the decomposition strategy; section three describes the data in use; section four presents the empirical results; section five describes the model to investigate segregation and the related findings. Conclusions are presented in section six.

2 Data

The dataset in use is the 2000 Census PUMS 5-Percent. The analysis considers eleven artist occupations, identified by the Census: actor, announcer, architect, dancer, designer, fine artist, musician, photographer, producer, writer and NEC (Not Elsewhere Classified). The "class of worker" variable allows identifying the artist's *employment type*[31], which can be either organizational employment or self-employment. The former category includes wage or salary employees of either a for profit/not-for-profit company or of the local/state/federal government. The latter consists of owners of a business, either unincorporated or incorporated[32]. An artist is defined full-time (part-time) if she works an amount of hours greater than or equal to (less than) 35 hours per week. Estimated weekly hours of work are computed as total annual hours divided by the number of working weeks. The choice between full-time and part-time defines the *employment status*. Imputed hourly earnings (alternatively indicated in this study as "wage") are computed as total annual earnings[33] divided by total annual hours of work. The dataset also contains information on age, race, marital status, education, occupation, geographical location, citizenship and presence of one's own children in the household.

The following workers are excluded from the analysis. First, workers who did not claim to be self-employed, but reported self-employment income, are excluded. Second, workers who reported both salary

[31] The term "employment status choice" was defined by Katz (1992, p. 30) as "the vocational decision process in terms of the individual's decision to enter an occupation as a wage-or-salaried individual or a self-employed one."

[32] This study does not attempt to explain gender pay differences in the two types of self-employment. If incorporation systematically influences self-employment income, the return to incorporation may manifest itself as a return to personal characteristics that raise the likelihood of incorporation (e.g., education).

[33] Wage-and-salary income is defined as total money earnings received for work performed as an employee during the calendar year 1999. That is, it included wages, salary, commissions, tips, piece-rate payments, and cash bonuses earned before deductions were made for taxes, pensions, etc. Self-employment income was defined as net money income (gross receipts minus expenses) from one's own business, professional enterprise, or partnership.

income and self-employment income. These workers were either holding multiple jobs, or moving into or out one type of employment during the year. The reason for the exclusion is that reported hours and weeks are not separated by job.

The final sample consists of 96,059 observations, with equal representation of men and women, divided into organizational employment (61,238), self-employment (26,494) and unemployed/out of the labor force (8,327). The full sample of working artists is partitioned in four employment groups, identified by the possible combinations of worker's type and worker's status. In this way, four "markets" for artists are identified: 1) full-time in organizational employment (38,536 observations), 2) part-time in organizational employment (22,702), 3) full-time in self-employment (14,386), 4) part-time in self-employment (12,108). This approach is standard in labor economics and is further discussed in section three. Summary statistics are reported in Tables 1-6 for each employment group[34]. The differentials are computed with respect to the male group. The major findings are discussed below and can be summarized as follows. First, a substantial gender wage gap exists in most occupations and, on average, it is larger in self-employment. As far as annual earnings are concerned, the gap further increases due to large difference in worked hours by men and women. Second, it appears that wage mechanisms (i.e. returns to endowments) may be different across employment groups. In fact, despite a relatively homogeneous workforce, the gender gap within occupations varies accordingly to the combination of worker's type and status.

2.1 Descriptive Statistics for Organizational Employment

The sub-sample of full-time artists (Table 1) consists of about 60% of male artists, who are mostly employed in occupations such as architects, announcers and musicians. The average age is 39 years for men and 38 for women respectively. The potential years of experience[35] reflect a similar amount of educational attainment, which is about 14 years. The average hourly earnings for salaried full-time artists is $22 for men and $17.2 for women, ranging from a minimum of $12.2 for female NEC artists to a maximum of $26.1 for male architects and producers. The average gender wage gap is about 22%, reaching a maximum of 45% for NEC artists. Female actors are the top-earners and earn 17% more than male actors. The difference in annual earnings

[34] All the averages have been computed using sample weights.

[35] Years of potential experience are measured as: age - years of education -5.

is 26%, as male artists work about 89 hours more than women a year.

There are significant changes when the sub-sample of part-time artists is investigated (Table 2). The percentage of male artists decreases to 38% of the total. Some occupations, like designers and dancers, are very female-dominated. Female artists are about the same age as those in full-time employment, while men are three years younger. The level of educational attainment for both groups is on average lower than the one found for full-time workers. Part-time artists generally obtain lower hourly earnings ($21.5 for men and $16.1 for women). However, some occupations (dancers, NEC, musicians) now earn above average, while they earned below average in full-time. The average wage gap is slightly larger (25%), and reaches its peak for photographers. Female actors and dancers are generally paid as much as men when they are employed full-time, while there is a 22% pay gap when they work part-time. The wage differential for architects is reduced by more than half with respect to full-time. The difference in annual earnings is wider (30%), given that male artists work on average a greater number of hours.

Table 1: Summary Statistics - Organizational Employment FT

	Observations		Age (years)		Experience (years)		Hourly Earnings ($)			Annual Earnings	Hours Worked
	Female	Male	Female	Male	Female	Male	Female	Male	% Difference	%Difference	Difference
Actor	115	187	37.4	37.4	17.7	17.5	25.9	21.8	0.17	0.15	13.59
Announcer	256	896	34.9	37.4	15.7	18.2	15.6	17.8	-0.13	-0.17	-93.55
Architect	1061	4089	36.3	41.0	14.9	19.8	19.8	26.1	-0.28	-0.33	-120.6
Dancer	251	41	26.7	31.1	9.2	12.8	13.2	13.0	0.0088	-0.0076	-70.27
Designer	9001	9295	37.6	38.5	18.3	19.2	16.1	20.4	-0.24	-0.28	-90.78
Enternec	157	200	33.8	34.4	15.0	16.0	12.2	19.0	-0.45	-0.44	28.72
Fineart	1300	2096	37.8	37.5	18.2	18.0	17.4	21.0	-0.19	-0.22	-63.09
Musician	417	1040	44.1	39.3	23.9	19.6	17.3	18.8	-0.082	-0.13	-144.4
Photographer	652	1165	34.3	39.1	15.9	19.9	12.4	17.3	-0.33	-0.38	-104.5
Producer	1524	2398	35.9	38.3	15.2	18.0	21.6	26.1	-0.19	-0.21	-55.26
Writer	1201	1159	39.6	39.7	18.7	18.8	20.1	25.4	-0.23	-0.27	-83.46
Total	15,935	22,566	37.3	38.9	17.6	19.0	17.2	22.0	-0.22	-0.26	-88.93

Photographer and designer are the two occupations with the largest wage gap (respectively, 39% and 28%) in the full sample. The difference in hourly compensation is less than 10% only for musicians. On average, male artists work 313 hours a year more than female artists.

Table 2: Summary Statistics - Organizational Employment PT

	Observations		Age		Experience		Hourly Earnings			Annual Earnings	Hours Worked
	Female	Male	Female	Male	Female	Male	Female	Male	% Difference	%Difference	Difference
Actor	529	594	37.7	38.8	18.6	19.6	25.6	32.0	-0.22	-0.22	-82.19
Announcer	309	744	29.3	30.9	11.2	13.1	15.5	16.6	-0.068	-0.17	-148.9
Architect	355	526	34.3	36.5	13.4	15.9	20.5	23.1	-0.12	-0.064	5.636
Dancer	589	108	25.2	30.0	8.0	12.0	18.6	23.2	-0.22	-0.15	34.59
Designer	6350	2266	37.8	34.3	19.3	15.6	14.2	20.3	-0.36	-0.31	-0.472
Enternec	393	309	29.2	32.5	11.6	14.9	19.2	22.0	-0.13	-0.19	-49.89
Fineart	907	739	38.5	34.5	19.8	16.0	15.2	19.9	-0.27	-0.32	-77.44
Musician	1810	1498	49.0	41.1	29.4	22.2	19.8	22.1	-0.11	-0.51	-188.5
Photographer	1077	581	29.0	33.3	11.3	15.1	11.2	17.0	-0.42	-0.46	-65.59
Producer	533	509	33.4	34.2	13.3	14.6	20.5	23.0	-0.12	-0.14	-39.03
Writer	844	499	38.7	37.3	18.2	17.3	19.0	21.4	-0.12	-0.030	51.87
Total	13,696	8,373	37.3	35.7	18.6	16.8	16.3	21.4	-0.25	-0.30	-49.16

Table 3: Summary Statistics - Organizational Employment

	Observations		Age		Experience		Hourly Earnings			Annual Earnings	Hours Worked
	Female	Male	Female	Male	Female	Male	Female	Male	% Difference	%Difference	Difference
Actor	644	781	37.7	38.4	18.5	19.1	25.7	29.5	-0.14	-0.15	-159.2
Announcer	565	1640	32.0	34.4	13.3	15.9	15.5	17.2	-0.10	-0.24	-214.8
Architect	1416	4615	35.8	40.5	14.6	19.4	20.0	25.8	-0.25	-0.40	-277.1
Dancer	840	149	25.6	30.3	8.3	12.2	17.0	20.4	-0.18	-0.071	39.86
Designer	15351	11561	37.7	37.7	18.7	18.5	15.4	20.4	-0.28	-0.45	-342.5
Enternec	550	509	30.5	33.3	12.5	15.4	17.2	20.8	-0.19	-0.45	-217.4
Fineart	2207	2835	38.1	36.7	18.8	17.5	16.5	20.7	-0.23	-0.35	-265.1
Musician	2227	2538	48.1	40.3	28.3	21.1	19.3	20.7	-0.073	-0.60	-542.5
Photographer	1729	1746	31.0	37.2	13.0	18.3	11.6	17.2	-0.39	-0.71	-507.6
Producer	2057	2907	35.2	37.6	14.7	17.4	21.3	25.6	-0.18	-0.26	-166.6
Writer	2045	1658	39.2	39.0	18.5	18.3	19.7	24.2	-0.21	-0.32	-188.1
Total	29,631	30,939	37.3	38.0	18.0	18.4	16.8	21.9	-0.24	-0.42	-312.3

2.2 Descriptive Statistics for Self-Employment

The most evident change with respect to organizational employment is the increase in the workers' average age, both in full-time and part-time status. Self-employed artists are on average seven years older than salaried workers. It seems that artists with more potential experience prefer and manage to work as self-employed, as this choice probably guarantees more artistic freedom and satisfaction. The composition of the full-time and part-time is similar to the one found for organizational employment, with male artists representing respectively 60% and 40% of the observations.

In the full-time sample (Table 4), the average number of years of school is about 14, as in organizational employment. Full-time male artists earn on average $23.3 per hour, 5% more than salaried workers, while female artists earn about as much as in organizational employment. The highest-earning occupation is now

producer, closely followed by actor. Dancers are the artists wih the lowest earnings. The average wage gap is about 26%, which is 4% higher than the one found in organizational employment. On one side, there are dancers, producers and musicians with the lowest differentials. On the other side, architects, designers and announcers are characterized by the largest pay gaps. Female actors now earn 20% less than male actors. The average difference in annual earnings is 31%, due to a larger number of hours of work by male artists.

Table 4: Summary Statistics - Self-Employment FT

	Observations		Age		Experience		Hourly Earnings			Annual Earnings	Hours Worked
	Female	Male	Female	Male	Female	Male	Female	Male	% Difference	%Difference	Difference
Actor	45	63	42.1	42.9	22.3	23.6	23.6	28.9	-0.20	-0.29	-294.0
Announcer	12	109	40.5	39.2	21.4	20.8	13.6	18.2	-0.29	-0.31	-109.9
Architect	191	1732	43.4	47.9	21.9	26.8	20.3	29.5	-0.37	-0.45	-200.6
Dancer	46	13	29.1	43.1	11.4	23.1	14.6	14.2	0.026	-0.073	-257.1
Designer	2372	2051	44.9	44.8	25.4	25.2	16.5	22.1	-0.29	-0.34	-114.9
Enternec	89	148	40.2	42.0	22.0	23.0	15.5	19.1	-0.21	-0.21	38.86
Fineart	1020	1554	46.6	45.6	26.9	26.2	13.6	17.3	-0.24	-0.30	-132.5
Musician	138	783	39.7	40.8	19.8	21.9	17.2	19.0	-0.098	-0.13	-77.50
Photographer	299	988	42.9	46.0	23.3	26.3	16.3	20.8	-0.24	-0.26	-26.04
Producer	182	527	41.1	42.6	20.5	22.5	27.4	30.1	-0.093	-0.14	-74.92
Writer	616	835	46.6	48.9	25.6	27.9	21.2	27.7	-0.27	-0.32	-128.9
Total	5,010	8,803	44.7	45.4	24.9	25.5	17.1	23.3	-0.26	-0.31	-117.2

The average age further increases among part-time artists (Table 5), while the level of educational attainment slightly decreases. Self-employed part-time artists are the top earners among the four groups considered, with an average hourly earning of about $29 for men and $24 for women. Top-paid artists are actors and male producers, least paid are female fine artists and dancers. The average gender wage gap is about 14%, which is the minimum differential among the four employment groups. As previously found, male and female musicians approximately receive the same hourly earnings. The average differential in annual earnings is about 34%, as there is a large variation in hours of work.

The results slightly change when the full-sample is considered. The average differential in hourly earnings is stil 14%, while the gap in annual earnings reaches 50%, as there is a large difference in hours of work during a year (about 450 hours).

Table 5: Summary Statistics - Self-Employment PT

	Observations		Age		Experience		Hourly Earnings			Annual Earnings	Hours Worked
	Female	Male	Female	Male	Female	Male	Female	Male	% Difference	%Difference	Difference
Actor	140	155	38.8	41.9	19.1	22.6	41.0	46.4	-0.12	-0.12	-30.11
Announcer	33	142	38.3	36.8	19.9	18.6	34.4	30.2	0.13	0.0094	0.635
Architect	196	377	46.1	58.4	24.9	37.6	25.0	35.4	-0.35	-0.51	-89.95
Dancer	163	25	26.5	42.5	9.3	24.2	22.2	26.8	-0.19	-0.27	-19.83
Designer	2213	701	46.2	47.7	26.5	28.4	23.4	26.3	-0.12	-0.29	-129.1
Enternec	254	186	37.3	43.5	19.1	25.0	25.8	33.3	-0.26	-0.32	-6.343
Fineart	1618	852	49.5	50.4	29.8	31.1	18.8	23.5	-0.22	-0.50	-124.5
Musician	356	1084	43.7	43.9	24.2	25.6	29.9	30.2	-0.010	-0.26	-170.4
Photographer	336	456	41.9	48.2	22.4	28.8	24.7	27.3	-0.097	-0.34	-176.2
Producer	127	167	42.3	43.9	22.1	24.0	32.6	36.5	-0.11	-0.22	-91.28
Writer	1002	522	47.5	53.9	26.4	32.9	25.9	30.0	-0.15	-0.32	-88.40
Total	6,438	4,667	45.6	47.9	25.8	28.6	23.9	29.5	-0.14	-0.34	-116.1

Table 6: Summary Statistics - Self-Employment

	Observations		Age		Experience		Hourly Earnings			Annual Earnings	Hours Worked
	Female	Male	Female	Male	Female	Male	Female	Male	% Difference	%Difference	Difference
Actor	185	218	39.6	42.2	19.9	22.9	36.8	41.1	-0.11	-0.27	-210.6
Announcer	45	251	38.9	37.9	20.3	19.6	28.5	25.0	0.13	-0.26	-274.4
Architect	387	2109	44.8	49.7	23.5	28.7	22.7	30.5	-0.30	-0.74	-700.8
Dancer	209	38	27.1	42.7	9.8	23.8	20.6	22.8	-0.10	-0.26	-228.4
Designer	4585	2752	45.5	45.6	25.9	26.0	19.9	23.2	-0.15	-0.51	-498.0
Enternec	343	334	38.1	42.9	19.9	24.2	23.1	27.3	-0.17	-0.39	-257.0
Fineart	2638	2406	48.3	47.3	28.7	27.9	16.8	19.5	-0.15	-0.56	-529.2
Musician	494	1867	42.6	42.6	23.0	24.0	26.4	25.5	0.033	-0.32	-369.1
Photographer	635	1444	42.4	46.6	22.9	27.0	20.6	22.8	-0.098	-0.44	-428.9
Producer	309	694	41.6	42.9	21.2	22.8	29.5	31.7	-0.070	-0.27	-338.1
Writer	1618	1357	47.2	50.8	26.1	29.8	24.1	28.6	-0.17	-0.54	-468.1
Total	11,448	13,740	45.2	46.3	25.4	26.6	20.9	25.4	-0.14	-0.50	-477.7

3 Empirical Strategy

As a first step, Mincerian wage equations are estimated separately for men and women in each employment group. These four markets are analyzed individually, as it is believed that the equilibrium returns to the endowments are determined by different demand and supply mechanisms. While the distinction between paid-work and self-employment is standard in the labor economics literature, the analysis of part-time and full-time work has been conducted in two different ways. On the one hand, some authors (Kawaguchi, 1993) formulate a unique wage equation, looking for a wage premium associated with employment status. On the other hand, some studies (Ermisch and Wright, 1993; Simpson,1986) suggest the use of two separate wage equations in order to capture different wage setting mechanisms and other specific employment practices. The latter approach is particularly appropriate for the case of artists, as indicated by the summary statistics

previously discussed. However, as a term of comparison, the empirical model will also be estimated for the pooled observations in each employment type.

The general wage equation is specified as:

$$\ln W_i^s = X_i^s \beta_i^s + e_i^s \tag{8}$$

where $(i = p, f)$ indicates observations for part-time and full-time workers, while $(s = e, se)$ indicate whether the worker is in organizational employment or self-employment. X is a matrix of observations on measurable characteristics such as race, household composition, citizenship status, school attendance, educational attainment, potential experience and its square, industry of work and region of residence. The estimated coefficients from the wage regressions are presented in the Appendix (Tables 33-43).

The second step is to perform a Oaxaca decomposition. Decomposition analysis has been widely used to investigate gender and racial wage differentials since the papers of Blinder (1973) and Oaxaca (1973). The standard Oaxaca decomposition explains the mean outcome gap between groups in terms of differences in individual characteristics (explained portion) and differences in the returns to endowments (unexplained portion), as expressed by the OLS coefficients. The unexplained part has been often interpreted as an estimate of discrimination, rather than as an omitted variable problem due to unobserved or unmeasurable characteristics. However, the common interpretation may be inappropriate for some groups of the workers under analysis. The earnings of several self-employed artists (e.g. painters, novel writers, concert musicians) are primarily driven by their reputation, the quality of their work and how this is valued by the public. On the one hand, reputation is often affected by other types of discriminatory practices. For example, a gallery owner or a book reviewer may systematically discriminate against a specific gender. On the other hand, artists have now available new communication tools (e.g. websites, online selling, blogs, etc.) to promote themselves and be able to reach a larger public. As a consequence, unexplained earnings differentials should reflect differences in unobservable skills which contribute to determine the quality of the artists' production[36]. Even in the case of self-unemployed artists, however, earnings discrimination is possible. Consider, for example, free lance photographers and journalist or music players who perform in bars and local venues. These self-employed

[36] Footnote: It should be however remembered that the use of blogs and digital selling websites has blossomed in the last decade. In 1999, it is likely that only some of the youngest artists were taking advantage of the new communication tools.

artists are temporarily hired by an employer who could gender discriminate during the bargaining over the payment. Following Oaxaca and Ransom (1994), the general decomposition equation can be written as:

$$\overline{Y}_z - \overline{Y}_j = \left[(\overline{X_z} - \overline{X_j})'\widehat{\beta}^*\right] + \left[\overline{X}_z'\left(\widehat{\beta}_z - \widehat{\beta}^*\right) - \overline{X_j}'(\left(\widehat{\beta}_j - \widehat{\beta}^*\right)\right] \tag{9}$$

where z and j index the two different groups. $\overline{Y}$ is the mean outcome variable (e.g. hourly earnings), $\overline{X}$ is a vector of average values of the endowments, whose estimated returns are indicated with $\widehat{\beta}$. In this formulation, β^* represents the vector of coefficients associated with "absence-of-discrimination" and can be expressed as $\widehat{\beta}^* = W\widehat{\beta}_z + (I - W)\widehat{\beta}_j$, where I the identity matrix and W is matrix of weights given to group z relative to group j in determining the reference coefficients, depending on which group is assumed to receive non-discriminatory or "true" returns. In some studies (Neumark, 1988), the coefficients from a pooled model over both groups have been used as reference coefficients. The first term on the right-hand-side of equation (9) represents the characteristics effect, while the second one captures the coefficients effect.

The present study adopts the standard approach to consider the group with the highest hourly earnings, namely male artists, as the reference group, given that there is no reason to assume that their returns do not reflect the true marginal productivity of endowments. As a consequence, the Oaxaca decomposition for the gender wage gap analysis is rewritten as:

$$\overline{W}_m - \overline{W}_f = (\overline{X_m} - \overline{X_f})'\widehat{\beta}_m + \overline{X}_f\left(\widehat{\beta}_m - \widehat{\beta}_f\right) \tag{10}$$

where m and f index the male and female groups respectively.

It is a well known fact that when one or more categorical variables are used in the wage equation, a detailed decomposition of the coefficients effect is not invariant with respect to the choice of the reference groups[37]. Several studies have attempted to find a solution for this issue (Horrace and Oaxaca, 2001; Horrace, 2005). The methodology employed here is Yun's (2003) "averaging approach", which is based on the idea that the "true" contributions of the individual variables can be measured by taking an average of the estimates obtained with every possible choice of reference group. In practice, one set of regression estimates is enough

[37] However, Oaxaca and Ransom (1999) show that this identification problem is irrelevant for the results of the overall decomposition and for the estimate of the separate contributions to the explained portion.

to solve the identification problem once the following "normalized" regression equation is considered:

$$Y_i = \alpha + X_i'\beta + \sum_{m=1}^{M} \overline{\beta}_m + \sum_{m=1}^{M} \sum_{k_m=1}^{K_m} D_{mk_m}(\beta_{mk_m} - \overline{\beta}_m) + e$$

where M is the number of sets of dummy variables, $\overline{\beta}_m$ is the average of the coefficients of the k_m categories for set m (the coefficient of the base group is assigned a value of zero) and β_{mk_m} is the coefficient for each category. Given the mean characteristics for every variable, it is then possible to compute the contribution to the decomposition of each category, including the reference group.

3.1 Selection Issues

This framework ignores two potential source of selection bias. The first one is related to the choice between part-time and full-time employment (i.e. choice of employment *status or* on the intensive margin). It is reasonable to believe that individuals who choose to supply more hours may have some unobservable characteristics which are correlated with higher wages. For example, a gifted individual may find his work enjoyable and not tiring, and therefore will be keen to supply a large number of hours. The second source of selection bias is related to the class-of-worker type (or employment *type*), i.e. the choice among non participation, organizational employment and self-employment. The selection bias could be controlled by adjusting the wage equations with inverse Mill's ratios which are obtained by a first-stage model of choice of employment type and status. The analysis tried to implement this approach with the use of a Tobit model and a multinomial logit model. Unfortunately, the lack of good instruments in the dataset makes the estimates of the coefficients unreliable. Consequently, the findings discussed in the next section were those obtained with the unadjusted decomposition.

4 Empirical results

Tables 7-12 report the decomposition results for employment type and status. The top of the table reports predicted values (i.e. mean values) of log hourly earnings. Women are labelled as "group one", whereas men are "group two". A negative wage differential means that mean log hourly earnings are lower for females. The general importance of discrimination (or difference in unobserved skills) can be analyzed by considering

what percentage of the wage gap is unexplained (these percentages are available at the bottom of each table). A percentage greater than 100% means that the size of the unexplained portion is greater than the observed wage gap. In other words when women have better endowments then men. A negative percentage means that there is "discrimination" against male artists. The tables also present the detailed decomposition of the characteristics and coefficients effect into their sources, which are grouped in broad categories for the purpose of discussion. These groups are 1) household type, which includes marital status, number of children and presence of an elderly in the household; 2) education, which includes schooling level and current status in/out of school; 3) industry of work, 4) experience, which stands for potential experience and its square; and 5) region of residence.

4.1 Decomposition results for Organizational Employment

When observations are pooled, Table 9 shows that musicians and writers suffer the relatively largest unexplained gap. It is worthy to note that these are among the professions with the lowest wage differential. On the contrary, the wage gaps for designers and photographers – the profession with the largest differential – are more than half explained. There are some changes when full-time artists are investigated. There is a substantial increase in the relative importance of the unexplained part for fine artists and NEC artists. The significance of the coefficients effect further increases for nearly every occupation in part-time status, although the wage differential is statistically significant in only half of the occupations.

The main sources of the coefficient effects are different returns to experience (architects, designers and NEC), education (only in part-time) and citizenship (musicians). Only actresses are able to obtain significantly higher returns to experience.

The detailed decomposition of the characteristic effects presents some interesting findings. First, sex differences in educational investment depend on the art occupation. On one side, male musicians, photographers and (pooled) designers have higher schooling levels. On the other side, female producers and part-time writers are on average better educated. Second, women and men significantly differ for potential experience levels. The disparity is due to a combination of higher age and lower schooling level within gender group. As a consequence, men have usually more experience only in full-time jobs, while women are superior in

part-time ones. Female musicians always have a greater amount of potential experience, as men spend on average more years in school. Third, differences in household status are an important determinant of the gender pay gap for the large majority of full-time artists, while they are mostly irrelevant for part-time artists. Fourth, male designers, musicians, photographers and fine artists work on average in better paid industries. The negative effects of segregation are relatively small for musicians, photographers and fine artists, decreasing wages in the range of 2% to 5%, while they are extremely relevant for designers, with a peak of 14% for part-time workers.

Table 7: Oaxaca Decomposition - Employed-FT

	Actor"	Announcer	Architect	Dancer	Designer	Enternec	Fineart	Musician	Photographer	Producer	Writer
Differential											
Prediction 1	2.752***	2.477***	2.873***	2.358***	2.616***	2.336***	2.684***	2.588***	2.358***	2.853***	2.842***
Prediction 2	2.732***	2.605***	3.113***	2.377***	2.870***	2.708***	2.857***	2.659***	2.685***	2.999***	2.970***
Difference	0.020	-0.128*	-0.241***	-0.018	-0.254***	-0.372***	-0.174***	-0.070	-0.327***	-0.146***	-0.127***
Explained											
household	0.024	-0.044**	-0.047***	0.102	-0.049***	-0.014	-0.038***	-0.067**	-0.042**	-0.069***	-0.057***
region	0.021	-0.003	0.005*	-0.138	-0.007***	-0.015	-0.012*	0.001	0.002	0.016*	0.000
education	0.015	0.004	0.010*	-0.147	0.004	0.042	0.007	0.030*	-0.057***	0.029***	-0.001
citizen	-0.012	-0.000	-0.009**	0.023	0.000	0.014	0.000	0.010	0.000	-0.001	0.000
experience	-0.009	-0.034*	-0.102***	0.128	-0.013***	-0.074	0.001	0.040**	-0.093***	-0.072***	-0.000
industry	0.021	-0.005	-0.002	0.061	-0.084***	-0.008	-0.023**	-0.025*	-0.029**	-0.001	-0.007
Total	0.060	-0.081**	-0.145***	0.030	-0.150***	-0.055	-0.065***	-0.012	-0.218***	-0.098***	-0.065**
Unexplained											
household	0.467	0.094	0.030	0.198	0.025*	0.062	0.040	0.138	0.005	0.059	0.101*
region	0.087	0.020	0.005	-0.182	0.003	0.078	0.002	-0.002	-0.009	-0.004	-0.033*
education	0.308	0.082	-0.070	-0.035	-0.042	0.107	0.048	-0.011	0.030	0.007	-0.043
citizen	-0.121	-0.053	-0.027	-0.188	0.020	-0.151	-0.027	-0.403***	0.022	0.117*	0.099
experience	-0.229	0.199	-0.100*	0.447	-0.057*	-0.413*	-0.027	-0.195	-0.096	0.113	-0.078
industry	-0.083	0.049	0.022	-0.029	-0.015	-0.221**	0.044*	-0.048	0.015	0.028	-0.003
Constant	-0.469	-0.437*	0.045	-0.259	-0.039	0.221	-0.189	0.464*	-0.077	-0.367***	-0.105
Total	-0.040	-0.047	-0.096***	-0.048	-0.104***	-0.317***	-0.109***	-0.059	-0.110***	-0.048*	-0.062*
% of the gap	-2.058	0.366	0.398	2.602	0.411	0.852	0.628	0.834	0.335	0.327	0.487
Observations	302	1151	5150	292	18290	357	3395	1456	1816	3922	2360

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 8: Oaxaca Decomposition - Employed-PT

6	Actor"	Announcer	Architect	Dancer	Designer	Enternec	Fineart	Musician	Photographer	Producer	Writer
Differential											
Prediction 1	2.666***	2.277***	2.796***	2.546***	2.343***	2.461***	2.354***	2.626***	2.130***	2.576***	2.591***
Prediction 2	2.850***	2.360***	2.797***	2.753***	2.605***	2.583***	2.583***	2.702***	2.422***	2.667***	2.601***
Difference	-0.184**	-0.084	-0.002	-0.207	-0.262***	-0.122	-0.229***	-0.075*	-0.292***	-0.090	-0.010
Explained											
household	-0.021	-0.049	-0.065	0.044	-0.013	0.007	-0.021	0.004	-0.094*	-0.019	0.001
region	-0.017	-0.013	0.015	-0.003	-0.008	-0.011	-0.008	-0.011	-0.013	-0.014	-0.003
education	-0.031	-0.005	0.043*	-0.024	0.001	0.001	0.019	0.048***	-0.018	0.054**	0.063**
citizen	-0.001	-0.000	0.001	0.003	0.003	0.008	0.000	0.000	0.001	-0.001	0.000
experience	-0.015	-0.022	0.004	-0.156*	0.069***	-0.023	0.055**	0.059**	-0.004	0.004	0.062*
industry	-0.021	-0.001	0.000	-0.004	-0.139***	-0.071	-0.102***	-0.049**	-0.004	-0.009	0.034
Total	-0.107*	-0.090	-0.001	-0.140	-0.086**	-0.088	-0.057	0.051	-0.134**	0.016	0.157**
Unexplained											
household	0.195	-0.149	-0.051	0.010	-0.033	0.001	-0.023	-0.021	0.125	-0.075	-0.057
region	-0.173*	-0.052	-0.060	0.036	-0.005	-0.020	-0.018	-0.033*	-0.025	-0.027	-0.046
education	-0.223*	0.020	-0.121	0.042	0.048	0.342**	0.056	-0.029	-0.312**	-0.001	-0.017
citizen	0.034	-0.079	-0.042	-0.039	-0.047	-0.092	-0.002	-0.058	0.026	0.036	-0.027
experience	0.318*	-0.096	-0.058	-0.270	-0.115*	-0.126	0.045	-0.013	-0.165*	0.137	-0.029
industry	-0.093	0.100	0.132	-0.031	-0.010	-0.315***	-0.023	-0.140	-0.085	-0.072	-0.046
Constant	-0.136	0.263	0.199	0.185	-0.013	0.176	-0.207	0.168	0.277	-0.104	0.056
Total	-0.077	0.007	-0.001	-0.067	-0.176***	-0.034	-0.173**	-0.126**	-0.159**	-0.106	-0.167*
% of the gap	0.421	-0.078	0.615	0.323	0.672	0.279	0.752	1.672	0.543	1.177	16.989
Observations	1123	1053	881	697	8614	702	1646	3308	1657	1042	1343

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 9: Oaxaca Decomposition - Employed

	Actor"	Announcer	Architect	Dancer	Designer	Enternec	Fineart	Musician	Photographer	Producer	Writer
Differential											
Prediction 1	2.681***	2.372***	2.853***	2.490***	2.506***	2.425***	2.552***	2.619***	2.215***	2.782***	2.740***
Prediction 2	2.821***	2.493***	3.078***	2.650***	2.819***	2.634***	2.788***	2.684***	2.598***	2.940***	2.859***
Difference	-0.140*	-0.121**	-0.224***	-0.160	-0.313***	-0.209***	-0.235***	-0.065*	-0.382***	-0.158***	-0.119***
Explained											
household	-0.018	-0.032*	-0.050***	0.027	-0.048***	0.003	-0.035***	-0.022	-0.046**	-0.063***	-0.035*
region	0.001	0.001	0.007***	0.007	-0.006***	-0.010	-0.011**	-0.003	-0.006	0.010	-0.002
education	-0.025*	-0.002	0.004	-0.065	-0.011***	-0.010	-0.000	0.026***	-0.057***	0.026***	0.009
citizen	-0.003	-0.000	-0.006**	-0.006	0.001	0.014	0.000	0.004	-0.000	-0.001	0.000
experience	-0.017	-0.038*	-0.098***	-0.125**	-0.001	-0.059*	0.017**	0.059***	-0.104***	-0.061***	0.019*
industry	-0.010	-0.004	-0.002	-0.017	-0.112***	-0.029	-0.050***	-0.044***	-0.024**	-0.003	0.007
Total	-0.071*	-0.076**	-0.145***	-0.179	-0.177***	-0.091*	-0.080***	0.019	-0.237***	-0.092***	-0.002
Unexplained											
household	0.199	0.032	-0.006	0.014	0.011	0.052	0.041	0.015	0.026	0.040	0.057
region	-0.111	-0.026	-0.006	-0.007	-0.001	-0.018	-0.008	-0.022	-0.007	-0.012	-0.036*
education	-0.163*	-0.019	-0.111*	0.087	-0.009	0.261**	0.039	0.010	-0.088	0.004	-0.008
citizen	0.033	-0.040	-0.034	-0.021	-0.003	-0.145	-0.014	-0.128*	0.036	0.094	0.036
experience	0.188	-0.018	-0.105*	-0.150	-0.115***	-0.259*	-0.047	-0.147	-0.164***	0.110*	-0.051
industry	-0.084	0.058	0.024	0.017	-0.019	-0.233***	0.005	-0.111*	-0.050	0.013	-0.022
Constant	-0.131	-0.034	0.158	0.078	0.001	0.224	-0.171*	0.300**	0.100	-0.316***	-0.094
Total	-0.069	-0.045	-0.079***	0.019	-0.136***	-0.118*	-0.155***	-0.084*	-0.146***	-0.066**	-0.117***
% of the gap	0.492	0.376	0.353	-0.118	0.434	0.564	0.659	1.288	0.381	0.417	0.985
Observations	1425	2204	6031	989	26904	1059	5041	4764	3473	4964	3703

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

4.2 Decomposition results for Self-Employment

When observations are pooled (Table 12), the unexplained portion accounts for more than 50% of the total gap in most cases. The unexpained gap is significant for architects, designers, photographers and writers. Female actors and writers receive lower retuns than men who work in the same industry. Additionally, female fine artists and producers receive lower returns to education. When observations are grouped by employment status, the wage differentials are again mostly unexplained, with the exception of part-time photographers (20% of the total gap). However, the coefficients effect are statistically significant in half of the full-time occupations and in only one of the part-time ones (designers). The detailed decomposition shows that there is not a principal source of the coefficients effect. Differences in returns to education, experience, region and citizenship are rarely significant and there is no clear pattern across occupations. There is a significant negative coefficient effects for full-time fine artists (returns to US citizenship status) and producers (returns to the industry of work). In part-time, female writers obtain lower returns to experience, while NEC female artists obtain higher ones. Part-time female fine artists now obtain higher returns to the citizenship status.

Differences in experience levels are never significant, while unequal schooling levels are marginally significant only in three cases (full-time NEC, part-time designers and fine artists) and always in favour of female artists. As in the case of organizational employment, there is some degree of segregation for designers and fine artists. Again, differences in household status are more significant for full-time artists than for part-time ones.

Table 10: Oaxaca Decomposition - Self-Employed FT

	Actor"	Announcer	Architect	Dancer	Designer	Enternec	Fineart	Musician	Photographer	Producer	Writer
Differential											
Prediction 1	2.507***	2.318***	2.702***	2.355***	2.423***	2.262***	2.155***	2.356***	2.349***	2.879***	2.608***
Prediction 2	2.875***	2.462***	3.058***	2.391***	2.715***	2.513***	2.369***	2.448***	2.623***	2.956***	2.832***
Difference	-0.368	-0.144	-0.356***	-0.036	-0.292***	-0.251	-0.213***	-0.092	-0.275***	-0.077	-0.224***
Explained											
household	0.019	-0.032	-0.075**	-0.183	-0.060*	-0.080	-0.118***	-0.017	-0.035	-0.135**	-0.004
region	0.036	0.115	-0.007	0.243	-0.012*	-0.083	-0.007	0.008	0.004	0.018	-0.011
education	0.081	0.083	0.016	0.902	-0.004	0.118*	0.012	0.035	-0.004	0.003	0.019
citizen	-0.002	0.003	-0.001	0.000	0.000	-0.031	0.009*	0.004	-0.002	0.003	-0.002
experience	-0.048	0.032	-0.000	0.525	0.006	-0.068	0.001	-0.002	0.012	-0.034	0.000
industry	-0.252	0.054	0.001	0.105	-0.040***	-0.026	-0.031*	-0.006	-0.006	0.005	-0.019
Total	-0.165	0.255	-0.067*	1.592**	-0.109***	-0.169	-0.135***	0.022	-0.031	-0.140*	-0.017
Unexplained											
household	-0.122	0.185	0.149	0.039	0.006	-0.066	0.107	-0.097	0.110	0.083	0.094
region	-0.293	-0.059	0.035	0.377	0.009	0.402**	-0.017	-0.055	0.026	0.363**	0.029
education	0.175	-0.294	0.243	0.508	0.023	0.380	-0.198	-0.083	0.179	0.409	0.144
citizen	-0.293	-0.173	0.326	-0.070	-0.008	0.232	-0.171*	-0.170	-0.060	0.532	-0.102
experience	-0.536	2.357***	-0.022	4.844***	-0.136	-0.763	-0.302	0.292	0.052	-0.449	0.146
industry	-0.137	-0.008	0.807**	0.218	-0.042	-0.035	0.054	0.241	0.130	-0.255*	-0.153
Constant	1.004	-2.406***	-1.826**	-7.544***	-0.035	-0.233	0.449	-0.242	-0.682	-0.621	-0.365
Total	-0.202	-0.399	-0.289***	-1.628**	-0.183***	-0.082	-0.079	-0.114	-0.244**	0.063	-0.207***
% of the gap	0.550	2.769	0.811	45.123	0.625	0.325	0.368	1.238	0.889	-0.810	0.926
Observations	108	121	1923	59	4422	237	2574	921	1287	709	1450

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 11: Oaxaca Decomposition -Self-Employed PT

	Actor"	Announcer	Architect	Dancer	Designer	Enternec	Fineart	Musician	Photographer	Producer	Writer
Differential											
Prediction_1	3.094***	2.995***	2.766***	2.605***	2.647***	2.771***	2.331***	2.848***	2.699***	3.030***	2.732***
Prediction_2	3.283***	2.951***	3.060***	2.961***	2.806***	2.996***	2.569***	2.855***	2.806***	3.165***	2.808***
Difference	-0.189	0.043	-0.295**	-0.356	-0.159***	-0.225*	-0.238***	-0.007	-0.107	-0.135	-0.076
Explained											
household	-0.050	0.031	0.048	0.634	0.048	-0.112	-0.068	-0.093**	-0.116	-0.117	-0.086
region	-0.026	0.033	-0.021	0.355	-0.011	-0.007	-0.005	0.014	0.010	-0.103*	-0.005
education	0.054	-0.008	0.044	-0.238	0.034*	-0.033	0.022*	0.031	-0.010	-0.008	0.004
citizen	0.018	-0.002	0.000	0.000	0.001	0.003	-0.011*	-0.001	-0.005	-0.016	-0.002
experience	0.017	0.007	-0.135	0.032	0.012	0.094	-0.009	-0.006	0.031	0.035	0.017
industry	-0.002	-0.059	-0.035	0.142	-0.035	-0.023	-0.043*	0.004	0.003	-0.018	-0.002
Total	0.010	0.002	-0.099	0.924	0.049	-0.079	-0.114	-0.051	-0.088	-0.227	-0.074
Unexplained											
household	0.646*	-0.488	-0.141	-0.287	-0.043	0.082	0.079	-0.036	-0.126	-0.235	0.045
region	-0.382	0.346	0.115	-0.171	-0.006	-0.020	0.043	0.062	0.073	0.176	-0.003
education	-0.157	0.139	-0.185	-0.223	0.032	0.156	-0.200	0.139	-0.145	0.501	-0.153
citizen	-0.229	-0.695	0.015	-0.146	-0.046	-0.056	0.209*	-0.015	0.143	0.642**	0.129
experience	0.469	0.141	0.684	0.797	0.111	0.870*	-0.058	-0.252	-0.464	0.225	-0.649*
industry	-0.194	-0.428*	-0.041	0.376	-0.025	0.179	-0.098	-0.125	0.029	-0.324	-0.123
Constant	-0.352	1.027	-0.643	-1.627	-0.231	-1.356**	-0.098	0.272	0.469	-0.892	0.752*
Total	-0.198	0.041	-0.195	-1.280	-0.208*	-0.146	-0.124	0.044	-0.020	0.092	-0.002
% of the gap	1.052	0.956	0.663	3.594	1.309	0.649	0.521	-6.547	0.182	-0.677	0.031
Observations	295	175	573	188	2914	440	2470	1440	792	294	1524

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 12: Oaxaca Decomposition - Self-Employed

	Actor"	Announcer	Architect	Dancer	Designer	Enternec	Fineart	Musician	Photographer	Producer	Writer
Differential											
Prediction_1	2.951***	2.802***	2.735***	2.552***	2.533***	2.638***	2.262***	2.710***	2.527***	2.941***	2.684***
Prediction_2	3.158***	2.740***	3.059***	2.782***	2.738***	2.793***	2.440***	2.684***	2.679***	3.008***	2.822***
Difference	-0.207	0.062	-0.324***	-0.231	-0.205***	-0.155	-0.178***	0.026	-0.152**	-0.067	-0.138***
Explained											
household	-0.055	0.020	-0.061*	-0.479	-0.034	-0.061	-0.104***	-0.052**	-0.029	-0.112**	0.002
region	0.005	0.040	-0.005	-0.089	-0.010*	0.006	-0.006	0.001	0.004	-0.002	-0.009
education	0.046	0.021	0.016*	0.003	0.006	0.005	0.013**	0.033	-0.012	-0.007	0.013
citizen	0.005	-0.000	-0.001	-0.058	0.001	0.004	0.002	0.001	0.000	-0.003	-0.000
experience	0.006	0.001	-0.011	-0.066	0.007	0.039	-0.002	-0.008	0.005	-0.007	-0.000
industry	-0.021	-0.010	-0.004	0.025	-0.034***	-0.027	-0.038***	-0.002	-0.001	0.004	-0.019*
Total	-0.014	0.072	-0.066*	-0.664	-0.064*	-0.034	-0.134***	-0.028	-0.033	-0.127**	-0.013
Unexplained											
household	0.277	0.338	0.008	-0.699	-0.019	0.030	0.049	-0.116	-0.075	-0.024	-0.025
region	-0.277	0.356	0.062	-0.015	0.006	-0.030	0.007	0.031	0.026	0.172	0.012
education	-0.191	0.648	-0.051	0.037	0.044	-0.056	-0.199*	0.121	-0.022	0.485*	-0.023
citizen	-0.019	-0.642*	0.039	-0.845	-0.034	0.012	-0.041	-0.145	0.053	0.446*	0.005
experience	0.274	-0.734	0.092	0.463	-0.028	0.371	-0.110	-0.060	-0.251	-0.235	-0.346
industry	-0.657**	-0.189	0.485	0.063	-0.018	0.100	-0.015	-0.126	0.094	-0.192	-0.261**
Constant	0.398	0.214	-0.892	1.431	-0.091	-0.549	0.265	0.348	0.056	-0.592	0.515*
Total	-0.193	-0.010	-0.257***	0.433	-0.141***	-0.122	-0.044	0.054	-0.118*	0.060	-0.125*
% of the gap	0.932	-0.160	0.795	-1.880	0.688	0.783	0.246	2.069	0.781	-0.898	0.902
Observations	403	296	2496	247	7336	677	5044	2361	2079	1003	2974

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

5 Discussion

The findings of this section indicate that an unexplained pay gap in favor of men exists in several art occupations and varies across employment type and status. In particular, this differential is frequent in part-time organization employment and full-time self-employment. The results for organizational employment indicate that unexplained differences are somewhat "fixed" or systematic; therefore suggesting a reconsideration of the possible role of skill inequality. It is certainly hard to accept the idea that women and men differ by some constant skill factor across occupations, whereas it seems more reasonable to believe that employed male artists receive a fixed "gender" premium. A notable exception is represented by female actresses, who obtain higher returns to level of potential experience. A possible explanation for this finding is that some industries (e.g. Film and TV) reward unobservable traits such as physical aspect. The relative size of the unexplained portion further increases in self-employment. A possible reason is that there is more room for wage bargaining and male artists may be better negotiators than women. Another plausible cause is that high-skill male artists select themselves into self-employment, while high-skill women do not. In this case, the unexplained portion would be attributable to gender differences in skills. Consider, for example, an independent painter or instrumental musician who work under a pseudonym and sell their production online. Any unexplained earnings gap is likely to be due to the quality of the work (which reflects the skills of the artist) and its interaction with the tastes of the potential buyers. Furthermore, there could be substantial gender differences in actual work experience which are not captured by the variable which measures potential work experience. Women with children are more likely to spend time out of the labor force, with negative effects on their productivity and the returns to human capital. In this setting, however, these consequences should be minimal for self-employed women in certain art occupations (e.g. designers and writers) who should be able to practice their art even with the presence of children in the household. Finally, it could also be the case that that women are more discriminated against in a job environment where hiring decisions for temporary or freelance jobs are often made through an informal process and the compliance with anti-discriminatory laws is more difficult to be verified than in structured organizations.

The summary statistics presented in section two and the detailed decomposition of the characteristics effect suggest that the hypothesis of gender segregation, i.e. an uneven gender distribution across industries,

may hold for several art occupations. This issue will be better investigated in the next section.

6 Gender Segregation

The findings of the previous section have shown that the presence of gender-dominated industries is one of the determinants of the gender pay gap in some art occupations. Low-paying industries are therefore likely to be female-dominated, while the opposite is true for high-paying industries. Gender segregation "per se" does not imply any form of discrimination, as long as the distribution of jobs between sexes is the result of an optimal market mechanisms which takes into account workers' preferences and productivity. However, it is legitimate to suspect the existence of market imperfections (e.g. discriminatory hiring practices) when similar artists, who can be assumed to have similar preferences, are systematically found to work in different industries. On the one hand, it is unrealistic to assume that married women with children trade off leisure and work as men with the same household characteristics. On the other hand, it is plausible to assume that young never-married artists without children may have the same work and career aspirations. The same occupation is likely to be characterized by different degrees of industry segregation depending on whether the artist is self-employed or not. Segregation in organizational employment may arise because some industries require a work schedule which is not feasible for women with a family. For example, recording studios usually require work at night and on weekends in order to maximize the revenue from the renting of the equipment. Segregation due to discriminatory hiring practices should be minimized in settings like symphony orchestras or television and film production companies, given the introduction of blind auditions and other regulations on hiring. Self-employment jobs are usually characterized by a temporary and one-to-one relationship with the buyer of the product or service. On the one hand, the schedule flexibility may allow women to work in industries which would not be otherwise accessible in organizational employment. For example, self-employed musicians can choose to work on a freelance basis (e.g. support musician) for a recording studio. On the other hand, the same features may increase the risk of gender segregation and discrimination. For example, self-employed musicians generally perform in nightclubs, weddings and concert tours. In some cases, the chance of obtaining these jobs may be influenced by other considerations than the artist's success, reputation and ability. Assume that the owner of a nightclub has sexist preferences, all other things equal.

As a consequence, freelance players or DJ's may find difficult to be offered a gig. In particular, the owner's taste becomes increasingly important when the music show is not the driving force of the business activity – this is the case of bars with occasional night performances. Similar examples can be done for freelance writers, photographers and other artists. An additional problem is that the professional reputation in local settings usually reflects the number of jobs obtained in the past and, therefore, past segregation. However, in recent times, the Internet and other new forms of media (digital distribution, social networking websites, blogs, etc.) have provided independent artists with alternative methods for distributing their work and building their reputation.

The goal of this section is to understand if the different distribution of female and male artists across industries[38] is uniquely explained by the worker's preferences and characteristics. To this purpose, the analysis is organized as follows. First, two segregation indexes are used to identify which occupations shows the highest level of gender segregation. Second, a decomposition methodology proposed by Fairlie (2003) is applied to investigate the gender gap in the probability of working in top-paying industries. Similarly to Oaxaca's, the decomposition identifies the portion of the probability gap which is explained by differences in characteristics. In the case of single artists without children, the unexplained (residual) portion could be interpreted as discrimination.

6.1 Segregation indexes

There is a vast literature (Corcoran and Duncan, 1979) on the impact of family structures on the career advancement of women. Married women with and without children spend more time out of the labor force than never-married women without children. Consequently, according to the predictions of human capital theory, labor force intermittence should be penalized by jobs with lower earnings. Others authors (England

[38] The artists in the sample are distributed across the following industries: Acting agents; Amusement/Gambling and Drinking places; Arts and Entertainment (independent artists); Teachers (college and university); Construction; Education, Health, and Social Services; Information (film, television, and radio information); Manufacturing (durable, toys and amusement, printing); Other (personal services); Professional (architects, landscape architects, advertising, design and related services); Publishing (including newspapers); Retail Trade (wholesale, furniture retail, florists, hobby and miscellaneous retail stores); Real Estate, Finance, and Insurance; Religious organizations; and Sound Recording.

1992) suggest that mothers may be less productive on the job because they are tired because of housework, or because they are saving energy for the work they will have to do at home. Furthermore, mothers may choose jobs with parent-friendly characteristics, such as flexible schedules, few demands for evening work, weekends or travel, and on-site day care. According to the theory of compensating differential, these non-pecuniary benefits can be traded off against wages. However, the empirical evidence is mixed and some authors (Duncan et al., 2002) find that family structure explains a woman's decision to work, but does not explain her occupational choice.

For these reasons, the present analysis categorizes different samples of artists according to marital status and presence of children in the household. In this way, it is possible to make meaningful comparisons between the full sample of artists and the sub-samples of married artists (with and without children) and never married artists without children. In particular, the latter group is believed to be able to provide some insights into the existence of discriminatory hiring practices. While the decision of a woman with children to work in a low-paying industry may be explained, ceteris paribus, by the existence of non-pecuniary benefits, it is harder to believe that those benefits will affect the choice of a never-married female artist without children. If there was any gender segregation for unmarried artists without children with similar characteristics, that could be attributed to discrimination. The analysis is performed for each class-of-worker (organizational employment and self-employment), but ignores worker's status in order to increase the sample size[38]. Tables 41-48 in Appendix report summary statistics for each group and the gender distribution across industries.

Never married artists are on average the youngest group, followed by married artists with children in the household. In self-employment, the age profile of these two groups is relatively similar and the average wage gap is almost nil. Married artists without children are the oldest group and the one with the highest average wage differential. The gender distribution across industries indicates that male artists are relatively more present in top-paying industries, especially in organizational employment.

As a preliminary step, two different segregation indexes are calculated. The Duncan and Duncan (1955) dissimilarity index, or also called the 'displacement index', measures the fraction of female artists that would

[38] In particular, the analysis of the two subgroups of married artists would not be possible for many art occupations. However, the worker's status could be taken into account for the analysis of unmarried artists. The findings are not significantly different from those presented in the study and are available upon request.

need to be displaced to other industries, without replacing them, in order that every industry has the same shares of male and female artists as in the whole sample.

$$D = \frac{1}{2} \sum_{i=1}^{I} \left| \frac{f_i}{F} - \frac{m_i}{M} \right|$$

where f_i is the number of females in industry i $(i = 1, ..., I)$, m_i is the number of males in in industry i, F and M are respectively the total number of females and males over all industries . If there is no segregation, $\frac{f_i}{F} = \frac{m_i}{M}$ in every industry. A value equal to zero implies that there is no segregation in any industry category, while a value equal to one indicates complete segregation.

Table 13 reports the values of the Duncan Index for every occupation in each employment group. On average, 22 percent of employed females need to be displaced from their current industry in order to have distributional evenness. In particular, there is evidence of segregation for dancers, designers, NEC artists, musicians, photographers and writers. The findings are similar for full-time and part-time employment. The index is on average lower in self-employment. Specifically, the index is is close to or greater than 20%. only for dancers, designers, NEC artists and part-time producers. There is no degree of segregation for musicians, photographers and writers. There is evidence of segregation also in the case of unmarried artists without children (Table 14). The Duncan index is always greater than 20% for dancers and self-employed announcers. In organizational employment, the proportion of women to be relocated is particularly significant for designers, photographers and part-time musicians. The value of the index drastically increases for self-employed photographers and it remains high for self-employed NEC artists.

Table 13: Duncan Index - All

	ORG FT	ORG PT	SELF FT	SELF PT	ORG	SELF
Actor	0.094	0.025	0.22	0.036	0.025	0.075
Announcer	0.066	0.13	0.19	0.10	0.079	0.11
Architect	0.019	0.10	0.063	0.044	0.028	0.050
Dancer	0.27	0.26	0.28	0.28	0.26	0.26
Designer	0.29	0.37	0.19	0.20	0.32	0.19
Enternec	0.13	0.21	0.17	0.23	0.19	0.21
Fineart	0.14	0.16	0.12	0.13	0.15	0.13
Musician	0.18	0.36	0.027	0.046	0.33	0.032
Photographer	0.20	0.20	0.038	0.033	0.23	0.011
Producer	0.069	0.094	0.086	0.22	0.066	0.13
Writer	0.21	0.19	0.077	0.037	0.19	0.060
Total	0.19	0.27	0.12	0.12	0.22	0.12

It is shown in Hutchens (2004) that a square root index is the only measure of segregation that satisfies

Table 14: Duncan Index - Not Married

	ORG FT	ORG PT	SELF FT	SELF PT	ORG	SELF
Actor	0.083	0.063	0.050	0.057	0.050	0.051
Announcer	0.16	0.18	0.53	0.37	0.17	0.36
Architect	0.035	0.13	0.042	0.086	0.032	0.040
Dancer	0.27	0.23	0.38	0.34	0.24	0.34
Designer	0.16	0.25	0.096	0.15	0.19	0.078
Enternec	0.25	0.10	0.28	0.22	0.15	0.23
Fineart	0.14	0.18	0.096	0.089	0.13	0.074
Musician	0.039	0.12	0.034	0.039	0.11	0.025
Photographer	0.20	0.21	0.12	0.14	0.21	0.025
Producer	0.045	0.037	0.15	0.20	0.033	0.11
Writer	0.22	0.19	0.044	0.10	0.20	0.066
Total	0.13	0.18	0.096	0.12	0.15	0.081

seven properties needed for a complete measure of segregation[40]. The Hutchens square root index is define as the sum, over all industries, of each industry's shortfall from distributional evenness. This shortfall is expressed as the difference between the geometric mean of the shares of males and females needed to have no segregation and the geometric mean of the actual shares:

$$H = \sum_{j=1}^{T} \left[\frac{f_i}{F} - \sqrt{\frac{f_i}{F} * \frac{m_i}{M}} \right]$$

Also in this case, a value equal to zero implies no segregation, while a value equal to one indicates complete segregation. The values of the Hutchens index cannot be interpreted as "replacement percentages" as in the case of the Duncan Index. The Hutchens index, presented in Table 15, confirms the previous findings for the full sample and the one of unmarried artists. The degree of industry segregation is clearly not the same across employment type and marital status, although certain occupations are consistently characterized by a more uneven distribution.

[40] These seven properties are: (1) Scale invariance: if N1 and/or N2 are multiplied by a positive scalar and the share of both types in the T industries remains the same then segregation does not change, with N1 (N2) the number of observations of type 1 (type 2) in the sample. (2) Symmetry in industries: measure is unaffected if all the people in industry i trade places with those in industry j. (3) Movement between industries: for example, if a female in a top-paying industry moves to a 'low-paying' industry, segregation increases. (4) Insensitivity to proportional divisions. (5) Additive decomposability: the segregation measure can be decomposed in as sum of between-group (e.g. top-paying and low-paying) segregation and within-group segregation.(6) Symmetry in types: the segregation measure is unaffected if females are named group 1 or group 2. (7) Index in interval [0; 1], with 0 no segregation and 1 full segregation.(Hutchens, 2004)

Table 15: Hutchens Index - All

	ORG FT	ORG PT	SELF FT	SELF PT	ORG	SELF
Actor	0.0091	0.0017	0.063	0.00091	0.0012	0.0058
Announcer	0.011	0.012	0.022	0.012	0.0066	0.0098
Architect	0.00097	0.014	0.014	0.013	0.0013	0.0094
Dancer	0.038	0.043	0.083	0.089	0.040	0.045
Designer	0.070	0.11	0.039	0.038	0.093	0.036
Enternec	0.014	0.043	0.042	0.033	0.031	0.030
Fineart	0.018	0.023	0.018	0.020	0.020	0.020
Musician	0.017	0.069	0.0056	0.0050	0.058	0.0032
Photographer	0.027	0.032	0.0013	0.0079	0.038	0.0022
Producer	0.0056	0.0062	0.026	0.038	0.0047	0.021
Writer	0.032	0.023	0.0082	0.0036	0.023	0.0048
Total	0.040	0.062	0.022	0.021	0.053	0.019

Table 16: Hutchens Index - Not Married

	ORG FT	ORG PT	SELF FT	SELF PT	ORG	SELF
Actor	0.021	0.0060	0.025	0.0024	0.0024	0.0031
Announcer	0.028	0.023	0.27	0.11	0.021	0.12
Architect	0.0027	0.030	0.012	0.045	0.0042	0.0092
Dancer	0.041	0.034	0.21	0.11	0.033	0.10
Designer	0.022	0.061	0.028	0.038	0.034	0.014
Enternec	0.039	0.0091	0.066	0.037	0.013	0.033
Fineart	0.018	0.023	0.015	0.022	0.016	0.0077
Musician	0.0035	0.0093	0.011	0.0060	0.0091	0.0022
Photographer	0.034	0.036	0.0100	0.011	0.033	0.0017
Producer	0.0022	0.0030	0.071	0.13	0.0013	0.063
Writer	0.034	0.029	0.0079	0.030	0.024	0.0093
Total	0.018	0.033	0.027	0.033	0.022	0.016

6.2 The Empirical Model

Given the findings discussed above, the second step is to investigate the determinants of this segregation and to understand the possible role of discriminatory hiring practices. To do so, the following strategy is implemented. First, industries in each occupation are divided in two groups: high-paying and low-paying, where the cutoff is the average wage in the occupation, Second, a model for the probability of working in the top-paying group is estimated separately for men and women. The gender gap is measured as the average difference between the predicted probabilities for each gender. Third, Fairlie's technique (2003) is used to decompose the gap in an explained portion, due to different endowments of characteristics, and in an unexplained one, due to different marginal effects.

A probit model for working in a high-paying industry is estimated for employed and self-employed artists:

$$HP^* = X\beta + \nu_1$$

$$P(HP = 1|X) = P(HP^* > 0|X) = F(X\beta)$$

where HP^* is a latent variable which reflect the worker's preferences and the employer's hiring decision. X contains worker's characteristics, such as race, citizenship, potential experience, education, working status of the spouse, presence of children in the household, other family income and region of residence. Given X and the estimated $\widehat{\beta}$, predicted probabilities $\widehat{P}$ can be calculated for men and women. Following Fairlie (2003), the average predicted probability differential can be decomposed as follows:

$$\overline{P}^M - \overline{P}^W = \left[\sum_{i=1}^{N^M} \frac{F(X_i^M \widehat{\beta}^M)}{N^M} - \sum_{i=1}^{N^M} \frac{F(X_i^W \widehat{\beta}^M)}{N^M}\right] + \left[\sum_{i=1}^{N^W} \frac{F(X_i^W \widehat{\beta}^M)}{N^W} - \sum_{i=1}^{N^W} \frac{F(X_i^W \widehat{\beta}^W)}{N^W}\right]$$

where N^J is the sample size for gender j. The decomposition differs from the standard Oaxaca decomposition because $\overline{P}$ does not necessarily equal $F(\overline{X}\widehat{\beta})$, as the equation is nonlinear. The first term in brackets is the explained portion and represents the part of the gender gap due to group differences in characteristics, while the second term is the unexplained portion and represents the part due to gender differences in marginal effects. As usual, the second term also captures the portion of the gender gap determined by unobserved or unmeasurable endowments.

The unexplained part is meant to capture the effect of discriminatory hiring practices, although other factors may concur to determine the size of it. As discussed earlier, the presence of children is likely to affect in a dissimilar way the probability of men and women of accessing specific jobs. For instance, female musicians with children may be more likely to choose a low-paying teaching profession, rather than a career in the high-paying entertainment industry, which often demands a nonstandard work schedule with evening and weekend shifts. Still, as it shall be seen, there are many high-paying industries which are male-dominated even though they should be "family friendly". For example, the public administration is the top-paying industry for photographers and is largely male-dominated.

6.3 Empirical Results

The results of the Fairlie decomposition are show in Tables 17-23 and are to be interpreted in the following way. The upper part of the table reports the contribution of each covariate or groups of covariates (household, region, race, education, etc.) to the explained portion. The lower part of the table reports the predicted probability to work in a high-paying industry (group 1: female, group 2: male), their difference and the proportion of the gap which is explained. A negative difference indicates that men have a higher probability than women to work in a high-paying industry. Vice-versa for a positive difference. Given a negative difference, a percentage greater than equal to one means that the gap is fully explained[41], while a percentage less than zero indicates that the gap is fully unexplained. The reasoning is reverse in case of a positive difference.

6.3.1 All artists

Table 17 reports the results of the Fairlie decomposition for the full sample in organizational employment. The probability gap in favor of men ranges from 4.6% (producers) to 31.5% (designers). The explained portion never represents more than 50% and in some cases the difference is almost fully unexplained (designers).

Women have more chances of working in a top-paying industry only when they are announcers and this gap is fully unexplained. In some cases (architects and NEC artists) the explained portion suggests that

[41] When the percentage is greater than one, it means that the potential gap (caused by differences in characteristics) would be bigger than the observed gap.

men should have a higher probability of access but the overall gap is smaller than the characteristics effect.

In the case of self-employment (Table 18), the probability gap drastically decreases, reaching a maximum of 16% for NEC artists, largely unexplained. The explained portion is on average higher. Self-employment is likely to facilitate the access of women to top-paying industries, as it offers flexible work schedules which can accommodate for family duties.

Table 17: Fairlie Decomposition - All artists (Organizational Employment)

	Actor	Announcer	Architect	Designer	Enternec	Fineart	Musician	Photographer	Producer	Writer
Income	0.008	-0.002	0.001	0.000	-0.008	-0.005	-0.002	-0.009*	0.001	-0.011**
Household	-0.012	-0.013	-0.007	-0.009**	-0.008	-0.021***	0.009	-0.026*	-0.012*	-0.011
Region	0.000	-0.002	0.000	-0.001	-0.028***	-0.004*	-0.012***	0.001	0.003*	-0.001
rRce	0.003	-0.001	0.002	-0.000	-0.012*	0.004***	0.001	0.003	-0.000	0.001
Childu under 6	0.000	-0.001	0.000	0.000	-0.001	-0.000	0.000	0.004	0.001	0.000
US citizen	0.001	-0.000	-0.001	0.000	0.000	-0.000	-0.005**	0.001	-0.000	-0.000
Experience	-0.000	-0.015***	-0.025***	-0.001	-0.004	-0.007***	-0.011	0.002	0.004*	-0.000
Education	-0.006	-0.001	-0.001	-0.008***	-0.001	-0.002*	0.003	-0.041***	-0.006**	0.002
Marital	0.000	0.009**	-0.008**	0.004*	-0.012	0.006	0.003	0.005*	-0.006**	-0.003
Prediction_1	0.315	0.743	0.232	0.493	0.725	0.447	0.188	0.124	0.793	0.320
Prediction_2	0.311	0.670	0.227	0.807	0.774	0.549	0.429	0.351	0.839	0.371
Difference	0.004	0.073	0.006	-0.314	-0.049	-0.102	-0.241	-0.227	-0.046	-0.051
Explained	-0.006	-0.025	-0.039	-0.015	-0.074	-0.030	-0.015	-0.059	-0.015	-0.022
% of the gap	-1.378	-0.347	-6.880	0.049	1.521	0.294	0.063	0.262	0.332	0.431

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 18: Fairlie Decomposition - All artists (Self-Employment)

	Actor	Announcer	Architect	Designer	Enternec	Fineart	Musician	Photographer	Producer	Writer
Income	-0.018	-0.002	0.006	-0.001	-0.009**	-0.003	0.001	0.007	-0.001	0.005
Household	-0.005	-0.007	-0.003	-0.007	0.002	-0.023**	-0.012*	0.018	-0.024	-0.004
Region	0.001	0.008	-0.002	0.003	-0.009	-0.002	-0.001	0.005*	-0.006	0.002
Race	-0.009	-0.005	-0.001	0.002	-0.001	0.000	-0.002	-0.001	0.001	0.000
Child under 6	-0.000	0.001	-0.000	0.000	0.001	0.000	0.000	-0.001	0.000	0.007*
US citizen	0.001	0.003	-0.001	-0.000	0.000	0.000	0.000	-0.000	-0.000	0.000
Experience	-0.018	-0.017	-0.006	0.000	0.008	-0.004*	0.001	-0.001	-0.001	0.006
Education	0.001	0.021	0.003	-0.002	-0.011	0.004*	-0.001	0.002	0.004	0.005
Marital	-0.011	0.014	-0.004	0.009*	-0.006	0.006	0.001	0.002	-0.002	-0.004
Prediction_1	0.205	0.222	0.935	0.737	0.499	0.170	0.059	0.272	0.699	0.190
Prediction_2	0.275	0.167	0.951	0.826	0.656	0.235	0.071	0.273	0.768	0.242
Difference	-0.070	0.055	-0.016	-0.089	-0.157	-0.065	-0.012	-0.000	-0.069	-0.051
Explained	-0.058	0.018	-0.008	0.003	-0.025	-0.021	-0.014	0.031	-0.029	0.018
% of the gap	0.825	0.320	0.530	-0.039	0.161	0.326	1.135	-75.298	0.427	-0.352

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

6.3.2 Married artists

The sample of married artists is divided in those with own children (less than six years old) in the household and those without them. It should be noted that the latter group may include female artists who have spent time out of the labor force when they had children. The occupations of actors and announcers are dropped from the analysis because of lack of observations.

In the case of married artists with children, the results are contrasting and depend on the type of employment. In the case of organizational employment, the probability gap is always negative and on average high, ranging from 1% to 35%. In most cases, it is poorly explained by differences in characteristics. In self-employment, women have a higher probability of working when they are photographers (10%) or producers (8%). The gap is largely explained and actually should be even higher for photographers. When women are segregated, the difference is largely unexplained in the cases of designers and musicians.

Table 19: Fairlie Decomposition - Married artists with children (Organizational Employment)

	Architect	Designer	Fineart	Musician	Photographer	Producer	Writer
Income	0.023*	-0.000	0.011	0.039	0.009	0.037*	0.021
Household	-0.029	-0.023	-0.065	0.106	-0.007	-0.014	0.102
Region	0.004	-0.003	0.003	-0.014	-0.008	0.005	-0.011
Race	0.002	0.000	0.009	0.005	0.017*	-0.004	-0.002
US citizen	0.002	0.001	0.000	0.000	-0.001	0.000	-0.002
Experience	-0.002	-0.001	0.004	-0.007	0.002	0.006	-0.015
Education	0.003	-0.003	-0.013	-0.013	-0.094***	0.000	-0.033**
Spouse works	-0.028***	-0.008	0.000	0.016	0.031*	-0.013	-0.026
Prediction_1	0.206	0.547	0.481	0.202	0.085	0.773	0.349
Prediction_2	0.219	0.861	0.605	0.454	0.429	0.850	0.413
Difference	-0.013	-0.313	-0.123	-0.252	-0.344	-0.077	-0.063
Explained	-0.028	-0.038	-0.050	0.132	-0.053	0.017	0.036
% of the gap	2.170	0.121	0.404	-0.526	0.154	-0.228	-0.564

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Quite surprisingly, female segregation is higher in the case of married artists without children. The average probability gap increases both in organizational and self-employment. In the first case, highly segregated occupations are designer (40% gap and largely unexplained) and musician (28% difference and fully unexplained). In the second case, the gap is above 10% for producers and designers and it is still largely unexplained.

A naïve interpretation of these findings should suggest that the presence of children at home at the time of the interview does not impair the ability of women to work in top-paying industries. More likely, the results

Table 20: Fairlie Decomposition - Married artists with children (Self-Employment)

	Architect	Designer	Fineart	Musician	Photographer	Producer	Writer
Income	-0.002	0.020	0.004	-0.008	0.078**	-0.028	0.035
Household	-0.009	0.050	-0.091	0.019	0.096	0.036	-0.056
Region	-0.006	0.004	-0.010	0.006	0.002	-0.006	0.003
Race	-0.002	0.001	0.001	-0.016	0.004	0.021	0.003
US citizen	-0.001	-0.001	-0.011*	0.005	0.012	0.000	-0.002
Experience	-0.003	0.017*	0.024*	0.026	0.004	-0.005	-0.002
Education	0.031*	0.007	0.020	0.004	-0.007	0.015	-0.011
Spouse works	-0.008	0.002	0.036**	-0.008	-0.032	0.011	-0.034
Prediction_1	0.923	0.799	0.276	0.000	0.326	0.837	0.216
Prediction_2	0.913	0.866	0.298	0.070	0.234	0.759	0.366
Difference	0.010	-0.066	-0.022	-0.070	0.092	0.079	-0.151
Explained	-0.001	0.100	-0.028	0.027	0.157	0.050	-0.062
% of the gap	-0.072	-1.512	1.239	-0.387	1.707	0.640	0.413

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 21: Fairlie Decomposition - Married artists without children (Organizational Employment)

	Architect	Designer	Fineart	Musician	Photographer	Producer	Writer
Income	-0.003	0.007	0.018	0.033**	-0.008	-0.000	0.005
Household	-0.009	-0.012	-0.064**	0.045	-0.087**	-0.029	-0.045
Region	0.000	0.001	-0.002	-0.004	0.000	0.000	0.002
Race	0.005*	0.001	0.004*	0.002	0.003	-0.002	-0.000
US citizen	-0.005*	0.000	0.000	-0.007*	-0.000	0.000	-0.000
Experience	-0.037***	-0.000	0.002	-0.006	0.005	0.004	0.009
Education	-0.001	-0.011***	-0.002	-0.001	-0.018*	-0.002	0.002
Spouse works	-0.000	-0.005**	0.009*	-0.002	0.006	-0.004	0.001
Prediction_1	0.267	0.442	0.428	0.140	0.130	0.766	0.302
Prediction_2	0.268	0.842	0.526	0.417	0.340	0.856	0.338
Difference	-0.001	-0.401	-0.098	-0.277	-0.210	-0.090	-0.036
Explained	-0.051	-0.019	-0.035	0.060	-0.099	-0.033	-0.028
% of the gap	65.441	0.048	0.354	-0.217	0.473	0.370	0.785

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 22: Fairlie Decomposition - Married artists without children (Self-Employment)

	Architect	Designer	Fineart	Musician	Photographer	Producer	Writer
Income	0.009	0.007	0.011	0.014	0.017	0.027	0.006
Household	-0.012	-0.011	-0.052*	-0.026	0.036	-0.134**	0.031
Region	-0.002	0.004	0.001	0.005	-0.004	-0.003	0.005
Race	-0.002	0.001	0.001	-0.009	-0.000	-0.001	-0.000
US citizen	-0.000	0.000	0.001	-0.000	-0.001	-0.002	0.000
Experience	-0.011	0.001	0.004	0.002	0.002	0.006	-0.003
Education	-0.003	-0.005**	0.004	-0.002	0.003	0.007	0.010*
Spouse works	-0.002	-0.004	0.002	0.002	0.002	0.006	-0.004
Prediction_1	0.938	0.716	0.137	0.056	0.252	0.626	0.175
Prediction_2	0.963	0.831	0.224	0.088	0.243	0.813	0.226
Difference	-0.025	-0.114	-0.088	-0.032	0.009	-0.186	-0.051
Explained	-0.023	-0.007	-0.027	-0.015	0.054	-0.096	0.045
% of the gap	0.935	0.060	0.304	0.474	5.805	0.514	-0.879

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

found for the second group are due to the presence of children in the past, which may have forced women to stay out of the labor force for some periods of time. Furthermore, this group of women is on average the oldest. Discriminatory working practices were more frequent in the past and may have compromised the career path of these women.

6.3.3 Unmarried artists without children

The strength of the previous conclusions is tested by considering the subset of artists who have never been married and do not have children under the age of six in the household. The number of observations in this sub-sample is 27,291, divided in 15,714 men and 11,577 women. The analysis for the occupation of dancers is not carried out because of data limitations.

The Fairlie decomposition confirms that a certain degree of segregation is also present for unmarried artists. Consider the case of organizational employment (Table 23). When women are segregated, the average probability gap is 8.5%. Female photographers are 20% less likely of working in top-paying industries and this difference is unexplained for about 80%. Other probability gaps range from 17% (fully unexplained) for designers to 2% (explained for more than two thirds) for writers. Women are more likely to gain access to a top-paying industry when they work as announcers (16%) or architects (1.2%).

It is worth noting that women have often "better" endowments than men, meaning that the explained portion alone would imply a higher probability of female employment in high-paying industries. Nevertheless, this positive contribution is largely offset by an unexplained difference in marginal effects.

On the one hand, the worker's choice is still the best key to understanding this difference in some specific cases. Female designers, for example, may prefer to be employed in industries other than construction, which is often characterized by sexual harassment. It should be noted that this particular choice is all the same due to discrimination, rather than to a concern about physical strength or ability. On the other hand, it is reasonable to believe that discriminatory hiring practices are in action in most cases. Male designers dominate the high-paying "film-TV-radio" industry, while the low-paying "furniture retail" industry is largely female dominated. It is hard to justify this distribution with an explanation based uniquely on gender difference in taste and preferences. In the same way, there is an overrepresentation of male fine artist in the high-paying

"Film-TV-Radio" , "Information" and "Toys" industries, while there is a large underrepresentation in the low-paying "Hobbies and Miscellaneous" stores. Once again, it is likely that the partition is caused by discrimination in hiring, rather than a significant difference in preferences.

Female segregation significantly decreases in the case of self-employment (Table 24). The probability gap ranges from 17% (10% of which is explained) for NEC artists to 2% (fully unexplained) for photographers. The average value is 5.3%. There are now five occupations (actors, announcers, architects, musicians and writers) where women have a higher probability of working in top-paying industries. In this case, the average probability gap is 7.5% and is mostly due to the 28% gap for announcers.

Table 23: Fairlie Decomposition - Never married artists (Organizational Employment)

	Actor	Announcer	Architect	Designer	Enternec	Fineart	Musician	Photographer	Producer	Writer
Income	0.001	-0.001	0.004	-0.001	0.000	-0.002	-0.003	-0.017*	-0.000	-0.007**
Household	0.001	-0.001	-0.002	-0.001	0.001	0.000	-0.003	0.003	0.002	-0.000
Region	0.003	0.004	0.003	-0.000	-0.034*	0.002	-0.007*	0.005	0.002	0.006
Race	-0.002	-0.004	-0.001	-0.000	-0.009	0.002	-0.002	-0.001	-0.000	0.005
US citizen	0.001	-0.003	-0.001	-0.000	-0.003	-0.000	0.000	0.001	-0.000	0.000
Experience	-0.007	-0.001	-0.018***	0.011***	-0.002	0.004**	0.006	0.002	0.002	0.000
Education	-0.010	-0.004	-0.003	-0.007***	0.003	0.013**	-0.033***	-0.035***	-0.002	0.012*
Prediction_1	0.266	0.747	0.162	0.579	0.654	0.489	0.344	0.146	0.824	0.352
Prediction_2	0.286	0.584	0.150	0.748	0.731	0.570	0.417	0.358	0.827	0.398
Difference	-0.020	0.163	0.012	-0.169	-0.077	-0.081	-0.073	-0.212	-0.002	-0.046
Explained	-0.014	-0.011	-0.019	0.002	-0.044	0.021	-0.041	-0.042	0.005	0.016
% of the gap	0.711	-0.065	-1.608	-0.011	0.569	-0.254	0.565	0.199	-1.979	-0.357

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 24: Fairlie Decomposition - Never married artists (Self-Employment)

	Actor	Announcer	Architect	Designer	Enternec	Fineart	Musician	Photographer	Producer	Writer
Income	0.014	-0.005	0.003	-0.003	0.015	-0.002	0.000	0.000	0.012	-0.003
Household	0.006	0.025	0.001	0.003	-0.009	-0.001	-0.003	-0.004	0.004	0.001
Region	-0.011	-0.017	0.000	-0.004	0.001	-0.005	-0.006	0.016	0.009	-0.013
Race	0.020	0.003	0.000	-0.004	-0.007	-0.001	0.001	0.010	0.002	-0.001
US citizen	-0.001	0.000	0.000	-0.000	0.004	0.000	0.001	-0.000	0.003	0.000
Experience	-0.006	0.081	0.006	0.003	0.009	0.002	0.001	-0.003	0.006	-0.003
Education	0.058*	0.077	0.030	0.013**	-0.029	0.008	-0.002	0.004	0.010	0.001
Prediction_1	0.271	0.333	0.957	0.775	0.510	0.234	0.063	0.346	0.686	0.236
Prediction_2	0.214	0.054	0.945	0.798	0.689	0.259	0.052	0.363	0.710	0.220
Difference	0.057	0.279	0.012	-0.023	-0.179	-0.025	0.011	-0.017	-0.023	0.016
Explained	0.080	0.154	0.040	0.008	-0.018	0.000	-0.008	0.022	0.048	-0.017
% of the gap	1.406	0.551	3.334	-0.363	0.101	-0.017	-0.746	-1.298	-2.068	-1.027

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

7 Conclusion

This study has shown that a significant unexplained gender wage gap exists in the art occupations. In particular, women employed in full-time jobs in organizational employment are those who suffer the largest degree of wage discrimination. Female artists are found to receive lower returns to education, citizenship status, region of residence and industry of work. However, for some occupations in self-employment, these unequal returns are probably caused by gender differences in unobserved skills. The quality of a work of art and its success are not measurable only in terms of the artist's educational level and other observable characteristics. Moreover, there could be substantial gender differences in actual work experience which are not captured by the available data. However, the decomposition of the characteristics effect indicate that a potential cause of the wage differential is the overrepresentation of women in low paying industries. The degree of segregation is indeed considerably higher in organizational employment than in self-employment. A possible explanation for this finding is that top-paying jobs in organizations do not offer flexible work schedules to women with children. However, the analysis of a more homogenous group - unmarried artists without children - suggests that for some occupations the gender distribution across industries may also be determined by discriminatory hiring practices, and not only by individual preferences.

References

[1] Aigner, G.J., and G.G. Cain. "Statistical theories of discrimination in labor markets." *Industrial and Labor Relations Review*, 30(2), 1977, pp. 175-187.

[2] Allmendinger, J., and J. R. Hackman. "The More, the Better? A Four-Nation Study of the Inclusion of Women in Symphony Orchestras." *Social Forces*, 74(2), 1995, pp. 423-460

[3] Alper, N., and G. Wassall. "More Than Once in a Blue Moon: Multiple Jobholdings by American Artists." Santa Ana, CA: Seven Locks Press, 2000.

[4] Bates, T., and A. Robb. "Analysis of young neighborhood firms serving urban minority clients." *Journal of Economics and Business*, 60(1-2), 2008, pp. 139-148.

[5] Becker, Gary. "Human capital, effort and the sexual division of labor." *Journal of Labor Economics*, 3(1), 1985, pp. 33-58.

[6] Beller, Andrea. "The impact of equal opportunity policy on sex differentials in earnings and occupations." *American Economic Review*, 72(2), 1982, pp. 171-5.

[7] Bergmann, Barbara R. "Occupational Segregation, Wages and Profit When Employers Discriminate by Race or Sex." *Eastern Economic Journal*, 1(2), 1974, pp. 103-110.

[8] Bielby, D., and W. Bielby. "Women and Men in Film: Gender Inequality among Writers in a Culture Industry." *Gender & Society*, 10(3), 1996, pp. 248-270.

[9] Blau F.D., and L. M. Kahn. "Gender Differences in Pay." *The Journal of Economic Perspectives*, 14(4), 2000, pp. 75-99.

[10] Brown, C., and M. Corcoran. "Sex-Based Differences in School Content and the Male-Female Wage Gap." *Journal of Labor Economics*, 15(3), 1997, pp. 431-465.

[11] Brown, Gary. "How type of employment affects earnings difference by sex." *Monthly Labor Review*, 1976, 99(7), pp. 25-30.

[12] Cameron, Sam. “The Political Economy of Gender Disparity in Musical Markets.” *Cambridge Journal of Economics*, 27(6), 2003, pp. 905-917.

[13] Census 2000, Public Use Microdata Sample, (PUMS), United States, Technical Documentation, Prepared by the U.S. Census Bureau, 2003.

[14] Clawson, Mary Ann. “When Women Play the Bass.” *Gender & Society*, 13(2), 1999, pp. 193-210.

[15] Corcoran, M., and G. J. Duncan. “Work History, Labor Force Attachment, and Earnings Differences Between the Races and the Sexes.” *Journal of Human Resources,* 14(1), 1979, pp. 3-20.

[16] Cowen, Tyler. “Why Women Succeed, and Fail, in the Arts.” *Journal of Cultural Economics*, 20(2), 1996, pp. 93-113.

[17] Cotter, D. A., J. DeFiore, J. M. Hermsen, B. M. Kowalewski, and R. Vanneman. “All Women Benefit: The Macro-Level Effect of Occupational Integration on Gender Earnings Inequality.” *American Sociological Review*, 62(5), 1997, pp. 714-734.

[18] Doeringer, P., and M. Piore. "Internal Labour Markets and Manpower Analysis." Lexington, MA: *Heath Lexington Books*, 1971.

[19] Duncan, O. D., and B. Duncan. "A Methodological Analysis of Segregation Indexes." *American Sociological Review,* 20(2), 1955, pp. 210-217.

[20] England, P., G. Farkas, B. S. Kilbourne, and T. Dou. "Explaining Occupational Sex Segregation and Wages: Findings from a Model with Fixed Effects." *American Sociological Review*, 53(4), 1988, pp. 544-558

[21] England, Paula. "From Status Attainment to Segregation and Devaluation." *Contemporary Sociology*, 21(5), 1992, pp. 643-646.

[22] Fairlie, Robert W. "An extension of the Blinder-Oaxaca decomposition technique to logit and probit models." Yale University, Economic Growth Center, Discussion paper 873, 2003.

[23] Fairlie, R.W., and A.M. Robb. "Why Are Black-Owned Businesses Less Successful than White-Owned Businesses? The Role of Families, Inheritances, and Business Human Capital." *Journal of Labor Economics*, 25(7), 2007, pp. 289-323.

[24] Filer, Randall K. "The 'starving artist' – myth or reality? Earnings of artists in the United States." *Journal of Political Economy*, 94(1), 1986, pp. 56-75.

[25] Fuchs, Victor R. "Differences in Hourly Earnings between Men and Women." *Monthly Labor Review*, 94(9), 1971, pp. 9-15.

[26] Gatta, M. L., and P. A. Roos. "Rethinking Occupational Integration." Sociological Forum, 20(3), 2005, pp. 369-402.

[27] Goldin, Claudia. "Understanding the gender gap: An economic history of American women." Oxford: Oxford University Press, 1990.

[28] Goldin, C., and C. Rouse. "Orchestrating Impartiality: The Impact of 'Blind' Auditions on Female Musicians." *American Economic Review*, 90(4), 2000, pp. 715-741.

[29] Gunderson, Morley. "The influence of the status and sex composition of occupations on the male-female earnings gap." *Industrial and Labor Relations Review*, 31(2), 1978, pp. 217-226

[30] Gupta, N., R. Oaxaca, and N. Smith. "Swimming Upstream, Floating Downstream: Comparing Women's Relative Wage Progress in the United States and Denmark." *Industrial and Labor Relations Review*, 59(2), 2006, pp. 243-266.

[31] Horrace, W., and R. Oaxaca. "Inter-Industry Wage Differentials and the Gender Wage Gap: An Identification Problem." *Industrial and Labor Relations Review*, 54(3), 2001, pp. 611- 618.

[32] Kulis, Stephen. "Gender Segregation among College and University Employees" *Sociology of Education*, 70(2), 1997, pp. 151-173.

[33] Lang, K., and W. T. Dickens. "Sociological and Neoclassical Views of Segmented Labor Markets." In Industries, Firms, and Jobs: Sociological and Economic Approaches, edited by George Farkas and Paula England, New York: Plenum, 1988.

[34] Lloyd, C., and B. Niemi. "The economics of sex differentials." New York: Columbia University Press, 1979.

[35] Macpherson, D., and B. Hirsch. "Wages and Gender composition: Why Do Women's Jobs Pay Less?." *Journal of Labor Economics*, 13(3), 1995, pp. 426-71.

[36] Madden, David. "Towards a broader explanation of male – female wage differentials." *Applied Economics Letters*, 7(12), 2000, pp. 765-770.

[37] Mincer, J., and S. Polachek. "Family investments in human capital: earnings of women." *Journal of Political Economy*, 82(2), 1974, pp. 76-108.

[38] Mixon, F.G., and L. J. Trevino, "Is There Gender Discrimination in Named Professorships? An Econometric Analysis of Economics Departments in the U.S. South." *Applied Economics,* 37(8), 2005, pp. 849-854.

[39] Neumark, David, "Employers' Discriminatory Behavior and the Estimation of Wage Discrimination." *The Journal of Human Resources*, 23(3), 1988, pp. 279-295.

[40] Oaxaca, Ronald. "Male-Female wage differentials in urban labor markets." *International Economics Review*, 14(3), 1973, pp. 693-709.

[41] _____, and R. Michael. "On Discrimination and the Decomposition of Wage Differentials." *Journal of Econometrics*, 61(1), 1994, pp. 5-21.

[42] _____. "Identification in Detailed Wage Decompositions." *The Review of Economics and Statistics*, 81(1), 1999, pp. 154-157.

[43] _____. "Calculation of Approximate Variances for Wage Decomposition Differentials." *Journal of Economic and Social Measurement*, 24(1), 1998, pp. 55-61.

[44] Pinkston, Joshua C. "A Test of Screening Discrimination with Employer Learning." *Industrial & Labor Relations Review*, 59(2), 2006, pp. 267-284

[45] Rengers, M., and E. Plug. “Private or public? How Dutch visual artists choose between working for the market and the government.” *Journal of Cultural Economics*, 25, 2001, pp. 1-20.

[46] Reskin, Barbara. “Sex Segregation in the Workplace.” Annual Review of Sociology 19, 1993, pp. 241-70.

[47] Rytina, Mary. "Occupational segregation and earnings differential by sex." *Monthly Labor Review*, 1981, pp. 49-60

[48] Rosen, Sherwin. "Implicit Contracts: A Survey." *Journal of Economic Literature,* 23(3), 1985, pp. 1144-1175.

[49] Sattinger, Michael. "Statistical discrimination with employment criteria." *International Economic Review*, 39(1), 1998, pp. 205-237.

[50] Sanborn, Henry. "Pay Différences Between Men and Women." *Industrial and Labor Relations Review*, 17(4), 1964, pp. 534-550.

[51] Simpson, Wayne. "Analysis of part-time pay in Canada." *Canadian Journal of Economics*, 19(4), 1986, pp. 798-807.

[52] Smith, Thomas. “Longitudinal analysis of the earnings of artists.” 11th International Conference of Cultural Economics, 2000.

[53] Snooks, G.D. “Determinants of earnings inequality amongst Australian artists.” *Australian Economic Papers*, 22(4), 1983, pp. 322-32.

[54] Throsby, David. “A work-preference model of artists behavior.” In: Alan Peacock and Idle Rizzo (eds.), *Cultural Economics and Cultural Policies*, Boston, MA: Kluwer Academic Publishers, 1994, pp. 69-80.

[55] Tienda M., S. A. Smith, and V. Ortiz. "Industrial Restructuring, Gender Segregation, and Sex Differences in Earnings." *American Sociological Review*, 52(2), 1987, pp. 195-210.

[56] Wassall, G., and A. Neil. “Toward a unified theory of the determinants of the earnings of artists." In Ruth Towse and Abdul Kakhee (eds.), *Cultural Economics*, Berlin/Heidelberg: Springer Verlag, 1992, pp. 187-200.

[57] _____. “Determinants of artists’ earnings.” In Hendon et al. (eds.), *The Economics of Cultural Industries*, Akron, Ohio: Association for Cultural. Economics 1994.

[58] Withers, Glen. “Artists’ subsidy of the arts.” *Australian Economic Papers*, 24(45), 1985, pp. 290-95.

[59] Wolf, Edward. "Occupational Earnings Behavior and the Inequality of Earnings by Sex and Race in the United States." *The Review of Income and Wealth*, 22, 1976, pp. 151-66.

[60] Yun, Myeong-Su. “A Simple Solution to the Identification Problem in Detailed Wage Decompositions.” *Economic Inquiry*, 43(4), 2005, pp. 766-772.

[61] Zellner, Harriet. "The Determinants of Occupational Segregation." In Women in the Labor Market, edited by Cynthia Lloyd. New York: Columbia University Press, 1975.

Appendix

Table 25: Summary Statistics: Married artists (Organizational Employment)

	Observations		Age		Experience		Hourly Earnings			Annual Earnings	Annual Hours
	Female	Male	Female	Male	Female	Male	Female	Male	% Diff	% Difference	Difference
Actor	644	781	45.4	48.6	25.7	28.9	26.0	35.1	-0.35	-0.49	-313.8
Announcer	565	1640	36.8	41.5	17.7	22.4	18.1	21.1	-0.16	-0.47	-351.9
Architect	1416	4615	37.6	42.9	16.3	21.7	21.3	28.0	-0.31	-0.58	-356.2
Dancer	840	149	29.5	39.1	11.7	20.4	16.9	20.4	-0.21	-0.18	1.225
Designer	15351	11561	40.5	41.8	21.6	22.6	15.7	23.1	-0.47	-0.87	-504.9
Enternec	550	509	36.6	40.3	18.3	21.9	20.2	20.5	-0.016	-0.96	-449.6
Fineart	2207	2835	41.3	41.0	22.1	21.8	17.6	23.7	-0.35	-0.68	-415.0
Musician	2227	2538	50.5	46.8	30.4	27.2	19.9	23.7	-0.19	-1.20	-668.6
Photographer	1729	1746	35.7	43.0	17.6	23.9	12.0	19.6	-0.64	-1.36	-679.1
Producer	2057	2907	38.4	41.9	17.9	21.6	23.4	29.8	-0.27	-0.53	-351.0
Writer	2045	1658	41.6	44.5	20.8	23.6	20.8	27.6	-0.33	-0.61	-382.2
Total	9303.8	6320.2	40.9	42.6	21.6	22.8	17.4	24.9	-0.39	-0.81	-471.2
N	31263										

Table 26: Summary Statistics: Married artists (Self-Employment)

	Observations		Age		Experience		Hourly Earnings			Annual Earnings	Annual Hours
	Female	Male	Female	Male	Female	Male	Female	Male	% Diff	% Difference	Difference
Actor	185	218	42.2	47.6	22.0	28.1	33.2	42.5	-0.28	-0.97	-546.0
Announcer	45	251	40.1	41.8	21.7	23.1	40.6	26.7	0.34	-0.65	-548.1
Architect	387	2109	44.1	50.3	22.9	29.3	24.3	31.8	-0.31	-1.26	-911.4
Dancer	209	38	29.4	54.2	12.2	35.8	18.0	20.1	-0.11	-0.44	-259.7
Designer	4585	2752	45.6	47.3	26.0	27.8	19.6	24.6	-0.26	-0.97	-665.1
Enternec	343	334	43.1	46.3	24.4	27.5	24.1	31.2	-0.30	-0.97	-364.7
Fineart	2638	2406	48.8	50.3	29.2	30.9	16.4	20.4	-0.24	-1.00	-655.5
Musician	494	1867	44.0	47.0	24.2	28.5	23.8	26.9	-0.13	-1.03	-540.1
Photographer	635	1444	43.3	48.7	23.8	29.1	21.1	24.1	-0.14	-0.76	-606.7
Producer	309	694	42.9	44.9	22.6	24.8	30.0	33.0	-0.10	-0.65	-665.1
Writer	1618	1357	47.0	53.3	25.8	32.2	23.3	29.3	-0.25	-1.12	-607.0
Total	2933.2	1933.0	46.1	48.9	26.2	29.0	20.3	26.8	-0.23	-0.99	-659.2
N	16104										

Table 27: Summary Statistics: Married artist with children (Organizational Employment)

	Observations		Age		Experience		Hourly Earnings			Annual Earnings	Annual Hours
	Female	Male	Female	Male	Female	Male	Female	Male	% Diff	% Difference	Difference
Actor	644	781	35.3	39.4	15.4	19.8	25.0	46.2	-0.85	-2.42	-627.3
Announcer	565	1640	32.3	36.2	13.4	16.9	22.4	19.7	0.12	-0.66	-631.3
Architect	1416	4615	35.1	37.0	13.8	15.7	22.7	26.1	-0.15	-0.55	-598.4
Dancer	840	149	27.0	30.1	9.2	12.2	19.7	18.9	0.039	0.026	82.56
Designer	15351	11561	33.9	35.1	14.6	15.8	17.2	21.8	-0.27	-0.83	-680.1
Enternec	550	509	28.6	35.5	10.9	17.6	14.9	21.0	-0.41	-2.87	-1037.9
Fineart	2207	2835	34.5	35.1	15.4	15.6	18.3	24.8	-0.35	-1.00	-661.8
Musician	2227	2538	36.1	36.8	15.7	17.7	20.4	21.3	-0.045	-1.51	-970.8
Photographer	1729	1746	28.7	36.1	10.8	16.8	11.1	19.0	-0.71	-2.51	-1044.6
Producer	2057	2907	35.1	36.9	14.5	16.5	28.0	29.4	-0.051	-0.47	-511.0
Writer	2045	1658	35.1	37.0	14.1	15.8	20.7	29.6	-0.43	-1.03	-733.5
Total	8981.4	6362.1	33.7	36.0	14.2	16.1	18.4	24.1	-0.26	-0.96	-693.9
N	7998										

Table 28: Summary Statistics: Married artist with children (Self-Employment)

	Observations		Age		Experience		Hourly Earnings			Annual Earnings	Annual Hours
	Female	Male	Female	Male	Female	Male	Female	Male	% Diff	% Difference	Difference
Actor	185	218	37.5	40.2	17.1	20.7	31.6	62.0	-0.96	-1.46	-637.9
Announcer	45	251	35.3	35.8	17.0	17.2	29.2	30.6	-0.047	-3.49	-864.3
Architect	387	2109	38.2	40.1	16.9	19.2	27.8	28.7	-0.033	-1.59	-1283.1
Dancer	209	38	29.7	45.6	12.7	24.9	19.5	9.61	0.51	-0.91	-1676.2
Designer	4585	2752	36.2	38.1	16.0	18.4	23.3	25.4	-0.090	-1.37	-1029.8
Enternec	343	334	32.8	38.0	14.6	19.3	22.9	28.7	-0.26	-0.73	-772.8
Fineart	2638	2406	36.8	39.0	16.7	19.6	21.7	18.9	0.13	-0.99	-1137.8
Musician	494	1867	36.7	39.6	16.5	21.1	30.9	26.5	0.14	-1.84	-1061.8
Photographer	635	1444	34.6	40.2	14.9	20.5	30.7	24.5	0.20	-1.15	-1154.5
Producer	309	694	38.1	37.7	17.3	17.5	42.6	33.2	0.22	-0.24	-905.2
Writer	1618	1357	37.2	41.5	15.9	20.2	25.6	28.9	-0.13	-1.84	-1108.9
Total	2797.6	1913.3	36.4	39.3	16.1	19.4	25.0	26.7	-0.0012	-1.37	-1087.6
N	3247										

Table 29: Summary Statistics: Married artist without children (Organizational Employment)

	Observations		Age		Experience		Hourly Earnings			Annual Earnings	Annual Hours
	Female	Male	Female	Male	Female	Male	Female	Male	% Diff	% Difference	Difference
Actor	644	781	48.1	50.6	28.4	30.8	26.3	32.7	-0.24	-0.23	-237.6
Announcer	565	1640	38.2	43.4	19.0	24.4	16.8	21.6	-0.28	-0.41	-257.4
Architect	1416	4615	38.6	45.4	17.2	24.2	20.7	28.7	-0.39	-0.60	-262.8
Dancer	840	149	30.9	41.1	13.1	22.2	15.3	20.7	-0.35	-0.17	41.77
Designer	15351	11561	42.5	44.4	23.7	25.2	15.2	23.6	-0.55	-0.89	-447.2
Enternec	550	509	40.7	41.4	22.2	22.9	22.9	20.4	0.11	-0.54	-270.2
Fineart	2207	2835	43.3	43.5	24.0	24.3	17.3	23.3	-0.34	-0.56	-328.5
Musician	2227	2538	53.8	50.2	33.8	30.5	19.8	24.6	-0.24	-1.10	-570.6
Photographer	1729	1746	39.9	45.3	21.7	26.3	12.5	19.8	-0.58	-0.97	-496.2
Producer	2057	2907	39.4	44.1	18.9	23.9	22.0	29.9	-0.36	-0.54	-290.4
Writer	2045	1658	43.9	47.1	23.2	26.3	20.9	26.9	-0.29	-0.47	-256.2
Total	9406.2	6304.1	43.2	45.1	23.9	25.4	17.0	25.2	-0.44	-0.77	-392.0
N	23265										

Table 30: Summary Statistics: Married artist without children (Self-Employment)

	Observations		Age		Experience		Hourly Earnings			Annual Earnings	Annual Hours
	Female	Male	Female	Male	Female	Male	Female	Male	% Diff	% Difference	Difference
Actor	185	218	43.7	49.4	23.6	29.9	33.7	37.6	-0.12	-0.85	-507.0
Announcer	45	251	42.8	44.0	24.2	25.4	46.8	25.2	0.46	-0.13	-375.1
Architect	387	2109	46.5	53.2	25.3	32.1	22.9	32.6	-0.43	-1.15	-779.7
Dancer	209	38	29.0	55.6	11.6	37.5	16.6	21.7	-0.31	-0.41	38.68
Designer	4585	2752	48.2	49.7	28.7	30.2	18.6	24.4	-0.31	-0.87	-567.3
Enternec	343	334	46.4	48.3	27.6	29.5	24.5	31.8	-0.30	-1.11	-250.1
Fineart	2638	2406	51.1	52.7	31.5	33.2	15.5	20.7	-0.34	-1.00	-559.7
Musician	494	1867	46.1	49.2	26.3	30.7	21.8	27.0	-0.24	-0.84	-387.7
Photographer	635	1444	46.1	50.5	26.6	30.9	18.1	24.0	-0.33	-0.67	-447.6
Producer	309	694	45.1	47.9	25.0	27.9	24.2	33.0	-0.36	-0.94	-552.4
Writer	1618	1357	50.3	55.7	29.2	34.6	22.5	29.3	-0.30	-0.95	-460.5
Total	2970.4	1938.0	48.7	51.4	29.0	31.5	19.0	26.8	-0.32	-0.92	-540.7
N	12857										

Table 31: Summary Statistics: Never married artist (Organizational Employment)

	Observations		Age		Experience		Hourly Earnings			Annual Earnings	Annual Hours
	Female	Male	Female	Male	Female	Male	Female	Male	% Diff	% Difference	Difference
Actor	644	781	27.1	31.0	8.1	11.9	25.4	25.9	-0.018	0.056	-85.20
Announcer	565	1640	24.8	27.0	6.6	8.8	11.6	14.0	-0.21	-0.29	-174.8
Architect	1416	4615	30.5	32.6	9.3	11.6	17.4	20.4	-0.17	-0.24	-98.28
Dancer	840	149	23.5	28.1	6.2	10.0	17.0	20.5	-0.20	-0.13	-72.82
Designer	15351	11561	28.6	30.2	9.1	10.9	14.5	16.5	-0.14	-0.18	-141.4
Enternec	550	509	24.5	26.6	6.5	8.9	14.5	18.4	-0.27	-0.32	-106.4
Fineart	2207	2835	29.9	30.6	10.3	11.4	15.2	18.0	-0.18	-0.17	-107.1
Musician	2227	2538	29.4	30.7	10.5	11.8	16.2	16.9	-0.040	-0.39	-381.8
Photographer	1729	1746	24.0	28.7	6.0	9.9	10.9	14.3	-0.30	-0.63	-361.4
Producer	2057	2907	30.4	30.8	9.7	10.8	18.5	19.6	-0.061	-0.016	20.91
Writer	2045	1658	31.2	30.6	10.5	10.2	17.8	20.2	-0.14	-0.16	-8.616
Total	7836.2	5757.7	28.4	30.3	8.9	10.8	15.6	17.8	-0.15	-0.21	-137.2
N	20109										

Table 32: Summary Statistics: Never married artist (Self-Employment)

	Observations		Age		Experience		Hourly Earnings			Annual Earnings	Annual Hours
	Female	Male	Female	Male	Female	Male	Female	Male	% Diff	% Difference	Difference
Actor	185	218	32.0	33.1	12.7	13.8	41.0	38.2	0.067	0.28	120.7
Announcer	45	251	32.0	30.5	13.0	12.4	17.1	22.1	-0.30	0.042	-55.02
Architect	387	2109	44.0	43.5	22.3	22.5	17.3	25.1	-0.45	-0.63	-3.922
Dancer	209	38	24.9	34.4	7.2	15.2	24.1	30.2	-0.25	-0.48	-201.2
Designer	4585	2752	37.8	39.2	17.6	19.3	19.6	20.7	-0.059	-0.14	-14.07
Enternec	343	334	30.4	33.2	12.5	14.8	22.9	19.8	0.14	-0.035	-194.2
Fineart	2638	2406	38.4	37.8	18.2	18.2	18.7	18.3	0.022	-0.23	-225.0
Musician	494	1867	34.3	33.8	14.7	15.1	27.4	24.1	0.12	0.14	-82.29
Photographer	635	1444	33.9	38.1	14.1	18.3	17.5	19.4	-0.10	-0.15	6.014
Producer	309	694	37.6	35.2	16.9	14.9	29.2	26.9	0.079	0.073	66.59
Writer	1618	1357	41.5	40.1	20.2	19.2	25.2	23.9	0.052	-0.057	-208.6
Total	2155.6	1881.9	36.6	37.4	16.6	17.7	22.6	22.4	-0.024	-0.10	-80.53
N	4585										

Table 33: Regression Results - Males- Employed FT

	Actor	Announcer	Architect	Dancer	Designer	Enternec	Fineart	Musician	Photographer	Producer	Writer
Elderly in Household	-0.194	-0.064	-0.005	1.101	-0.042*	-0.280	-0.103*	-0.044	0.015	-0.078	-0.116
Middle Atlantic	-1.155**	0.245	-0.018	0.836	0.035	-0.041	0.135*	-0.184	0.147	0.099	0.047
Midwest-East	-1.110**	0.007	-0.047	0.724	-0.009	-0.115	-0.001	-0.181	-0.035	-0.202***	-0.120
Midwest-North	-1.812***	0.012	-0.101*	0.683	-0.141***	-0.283	-0.073	-0.331**	0.041	-0.303***	-0.418***
South-Atlantic	-0.984*	0.002	-0.084*	1.235	-0.135***	-0.230	-0.070	-0.250*	-0.042	-0.113*	-0.025
South-East	-1.410***	-0.071	-0.196***	0.000	-0.192***	-0.082	-0.080	-0.508***	-0.087	-0.304***	-0.255*
South-West	-1.128**	-0.010	-0.088*	1.199	-0.060*	-0.213	-0.131	-0.341**	-0.072	-0.263***	-0.215*
West-Mountain	-0.791	-0.025	-0.147***	-0.200	-0.053	0.015	-0.132	-0.298	-0.041	-0.139*	-0.342**
West-Pacific	-1.021*	0.094	-0.021	1.280	0.046	0.000	0.220***	-0.181	0.019	0.206***	0.036
Head of Household	0.250*	0.101	0.061**	-0.156	0.104***	-0.072	0.082**	0.197***	0.088*	0.141***	0.144**
Children in Household	0.417	0.004	0.007	0.009	0.033*	-0.033	0.041	0.057	-0.012	0.085*	0.068
In School	0.418	-0.210*	-0.026	-0.108	-0.052**	-0.041	0.023	-0.146	-0.125	-0.095*	-0.092
US citizen	-0.275	-0.056	0.159***	0.195	0.040	0.128	0.038	0.226	-0.043	-0.147*	0.075
Experience	0.028	0.039***	0.045***	-0.022	0.032***	0.055***	0.031***	0.038***	0.039***	0.044***	0.045***
Experience Squared	-0.000	-0.001**	-0.001***	-0.000	-0.000***	-0.001**	-0.000**	-0.001***	-0.000***	-0.001***	-0.001***
No HS diploma	0.027	-0.050	0.220	-0.443	-0.184***	0.026	-0.208**	-0.150	-0.167*	0.029	-0.765*
Some college	0.015	0.162**	0.219***	0.095	0.113***	0.184	0.148***	0.001	0.067	0.071	-0.109
Associate Degree	-0.052	0.224**	0.237***	0.203	0.143***	0.100	0.206***	0.035	0.110	0.029	-0.094
Bachelor Degree	0.215	0.313***	0.442***	1.177*	0.308***	0.590***	0.350***	0.237**	0.279***	0.307***	0.070
Master Degree	0.265	0.661***	0.492***	0.000	0.376***	0.513*	0.281***	0.307***	0.392***	0.379***	0.118
Ph.D. Degree	0.047	0.592**	0.497***	0.000	0.299***	0.377*	0.186	0.238*	0.099	0.302***	0.114
Married, spouse works	-0.123	0.093	0.065**	-0.071	0.079***	-0.013	0.115***	0.081	0.108*	0.048	0.079
Married, spouse does not work	0.105	0.420***	0.143***	0.679	0.166***	0.170	0.220***	0.088	0.044	0.241***	0.189*
Divorced or Widowed	0.165	0.032	-0.066*	1.379	0.019	0.067	-0.018	0.084	-0.040	0.031	-0.009
Observations	187	895	4089	41	9292	200	2096	1039	1165	2398	1159

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 34: Regression Results - Females- Employed FT

	Actor	Announcer	Architect	Dancer	Designer	Enternec	Fineart	Musician	Photographer	Producer	Writer
Elderly in Household	-0.083	-0.029	0.017	-0.264	-0.045*	0.012	0.080	0.102	0.116	-0.043	0.015
Middle Atlantic	0.212	0.080	0.034	0.282	-0.001	0.627	0.132	-0.017	-0.239*	0.173*	-0.021
Midwest-East	0.135	0.148	-0.009	-0.178	-0.159***	0.101	0.027	-0.205	-0.305**	-0.103	-0.283***
Midwest-North	0.000	0.005	-0.137	0.286	-0.241***	0.160	-0.136	-0.303	-0.438***	-0.129	-0.340***
South-Atlantic	0.392	-0.077	-0.047	-0.008	-0.195***	0.300	-0.024	-0.178	-0.354***	0.026	-0.162**
South-East	0.139	-0.290	-0.139	0.061	-0.252***	0.509	-0.088	-0.064	-0.491***	-0.289**	-0.361***
South-West	0.811	-0.066	0.047	0.043	-0.182***	0.267	-0.021	-0.187	-0.437***	-0.114	-0.191**
West-Mountain	-0.495	-0.264	0.004	0.226	-0.211***	0.203	-0.096	-0.237	-0.391***	-0.096	-0.257**
West-Pacific	0.207	0.182	0.063	0.183	-0.013	0.588	0.223**	-0.180	-0.170	0.228**	-0.048
Head of Household	0.021	0.079	0.052	-0.051	0.067***	0.133	0.124**	0.193*	0.060	0.089**	0.072*
Children in Household	-0.779	0.121	0.095*	-0.075	0.050**	0.095	0.070	-0.166	0.006	0.090	0.062
In School	-0.436	-0.373**	0.007	0.105	-0.026	-0.034	0.012	-0.158	0.054	-0.070	-0.091
US citizen	-0.527	-0.173	0.089	-0.239	0.086**	-0.188	-0.023	-0.631**	0.006	0.106	0.288***
Experience	0.004	0.067***	0.035***	0.025	0.031***	0.011	0.033***	0.028*	0.035***	0.060***	0.040***
Experience Squared	-0.000	-0.001***	-0.000***	-0.000	-0.001***	-0.000	-0.001***	-0.001*	-0.001***	-0.001***	-0.001***
No HS diploma	1.445	-0.075	0.387**	-0.071	-0.164***	-0.132	-0.164	-0.212	-0.014	0.318	0.150
Some college	0.769	0.081	-0.016	-0.135	0.136***	-0.054	0.143**	0.185	0.060	0.174	0.281**
Associate Degree	0.837	-0.092	0.263**	-0.011	0.214***	-0.242	0.257***	0.431	0.086	0.143	0.059
Bachelor Degree	0.711	0.402**	0.316***	0.145	0.371***	0.131	0.421***	0.319*	0.385***	0.525***	0.393***
Master Degree	0.784	0.517**	0.385***	0.103	0.428***	0.092	0.291**	0.317	0.452**	0.426***	0.464***
Ph.D. Degree	0.000	0.656***	0.336***	0.000	0.594***	-0.647	-0.016	0.406*	-0.688	0.559***	0.575***
Married, spouse works	0.014	-0.001	0.051	0.116	0.025	-0.022	0.129**	0.228*	0.040	0.059	0.082
Married, spouse does not work	0.340	-0.281	-0.153	-0.272	-0.002	-0.214	0.039	0.123	0.004	-0.019	-0.177
Divorced or Widowed	-0.216	-0.151	-0.041	-0.074	-0.035	0.051	0.009	0.207	-0.076	0.015	-0.053
Observations	115	256	1061	251	8998	157	1299	417	651	1524	1201

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 35: Regression Results - Males- Employed PT

	Actor	Announcer	Architect	Dancer	Designer	Enternec	Fineart	Musician	Photographer	Producer	Writer
Elderly in Household	-0.022	-0.103	-0.169	-0.060	0.052	-0.220	0.083	-0.134*	0.057	-0.083	-0.119
Middle Atlantic	0.303	0.174	0.054	-0.027	-0.029	0.074	0.149	0.309**	0.054	0.172	0.277
Midwest-East	-0.362	0.222	-0.308*	-0.353	-0.158	0.074	0.206	0.141	-0.048	0.143	0.109
Midwest-North	-0.337	-0.033	-0.376*	-0.072	-0.198	-0.221	0.206	-0.133	-0.256	-0.219	-0.106
South-Atlantic	-0.262	0.191	-0.014	0.114	-0.157	0.095	0.073	0.185	0.145	0.250	0.166
South-East	-1.015***	-0.176	-0.196	0.000	-0.338**	0.522	-0.079	-0.034	-0.281	-0.154	-0.009
South-West	-0.648	0.430	-0.120	-0.496	-0.132	0.077	-0.003	0.065	0.037	0.358	-0.155
West-Mountain	-0.095	0.099	-0.344*	-0.182	-0.174	-0.058	0.003	0.080	0.167	0.480	0.058
West-Pacific	0.369*	0.324	-0.200	-0.239	-0.058	0.244	0.246	0.214	0.034	0.461*	0.412**
Head of Household	0.170	0.129	0.261**	-0.015	0.186***	0.349*	0.261**	0.065	0.248**	0.185*	0.039
Children in Household	0.219	-0.094	-0.042	-0.076	-0.059	0.009	-0.056	-0.045	-0.039	-0.107	-0.058
In School	-0.404**	-0.145	-0.244**	0.159	-0.099	-0.229	-0.100	-0.093	-0.241**	-0.327**	-0.285*
US citizen	-0.253	0.063	-0.080	0.038	0.077	0.157	0.021	0.006	0.030	-0.255	0.048
Experience	0.018	0.056***	0.037***	0.078***	0.032***	0.044***	0.024**	0.020***	0.043***	0.030*	0.032**
Experience Squared	-0.000	-0.001***	-0.001*	-0.001**	-0.000***	-0.001**	-0.000	-0.000*	-0.001***	-0.000	-0.000*
No HS diploma	0.258	-0.175	-0.180	-0.215	-0.050	-0.274	-0.204	-0.119	0.002	-0.094	0.225
Some college	0.256	-0.065	0.131	0.030	0.047	0.012	0.104	0.114	0.109	0.066	0.159
Associate Degree	0.078	0.219	0.139	-0.453	0.217**	0.027	0.086	0.162	-0.040	0.104	0.058
Bachelor Degree	0.189	0.081	0.325**	-0.016	0.243***	-0.230	0.298**	0.247**	0.189	0.293*	0.300
Master Degree	0.428*	0.267	0.362*	-0.063	0.466***	0.263	0.413*	0.247**	-0.078	0.445*	0.371
Ph.D. Degree	-0.054	0.365	0.502**	0.000	0.410*	0.588	0.589	0.209	-0.730	0.541	0.170
Married, spouse works	-0.034	-0.091	0.006	-0.213	0.146*	-0.363	0.098	0.170*	-0.103	0.184	0.044
Married, spouse does not work	0.100	0.046	0.028	-0.059	0.148*	-0.350*	-0.208	0.165	0.086	0.105	0.087
Divorced or Widowed	0.161	-0.186	0.019	0.396	0.059	0.187	0.003	0.052	0.136	-0.276	-0.078
Observations	594	744	526	108	2264	309	739	1498	581	509	499

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 36: Regression Results - Females- Employed PT

	Actor	Announcer	Architect	Dancer	Designer	Enternec	Fineart	Musician	Photographer	Producer	Writer
Elderly in Household	-0.253*	0.219	0.086	-0.104	0.075**	0.056	0.086	-0.025	0.044	-0.072	-0.134
Middle Atlantic	0.268	0.074	0.010	0.302	-0.035	-0.386	0.060	-0.050	0.050	0.188	0.238
Midwest-East	-0.352	-0.160	-0.113	-0.073	-0.162***	-0.356	-0.305*	-0.169	-0.047	-0.022	-0.116
Midwest-North	0.348	-0.293	-0.042	0.204	-0.134**	-0.235	-0.352*	-0.196	-0.030	-0.027	-0.054
South-Atlantic	-0.416	-0.340	-0.162	0.146	-0.103*	-0.239	-0.087	-0.148	-0.033	0.071	-0.145
South-East	-0.301	-0.285	-0.040	0.197	-0.173**	-0.550	-0.217	-0.083	-0.114	-0.045	-0.019
South-West	-0.536*	-0.309	0.070	0.305	-0.200***	-0.242	-0.220	-0.143	0.034	0.045	0.031
West-Mountain	-0.336	-0.184	0.012	0.190	-0.219***	-0.145	-0.061	-0.359**	0.064	0.107	-0.093
West-Pacific	0.236	-0.046	0.010	0.377	-0.036	-0.142	-0.024	-0.053	0.062	0.176	0.187
Head of Household	0.017	0.339	0.128	0.012	0.079**	0.205	0.026	0.001	0.062	0.085	0.059
Children in Household	0.039	0.211	0.186*	0.104	0.136***	-0.445**	0.063	0.149*	-0.001	0.148	0.146
In School	-0.034	0.114	-0.139	-0.030	-0.050	-0.392**	-0.102	-0.226**	-0.168**	-0.153	-0.151
US citizen	-0.177	-0.108	-0.187	-0.055	-0.034	-0.043	0.018	-0.118	0.086	-0.176	-0.011
Experience	0.045***	0.045*	0.038**	0.043**	0.019***	0.038**	0.029**	0.018**	0.012	0.047***	0.032***
Experience Squared	-0.001**	-0.001	-0.001*	-0.001*	-0.000***	-0.001***	-0.000*	-0.000*	-0.000	-0.001*	-0.000**
No HS diploma	-0.044	0.025	0.726**	-0.034	-0.018	-0.003	0.078	0.084	-0.009	0.024	0.038
Some college	-0.083	0.127	0.168	0.032	0.089**	0.146	0.194*	0.025	0.052	0.355*	0.139
Associate Degree	0.075	-0.094	0.130	-0.174	0.190***	-0.266	0.366***	0.101	0.192	0.334	0.139
Bachelor Degree	0.136	0.284	0.426*	0.153	0.402***	0.419*	0.402***	0.052	0.352***	0.647***	0.386*
Master Degree	0.190	0.318	0.440*	0.406	0.395***	0.492*	0.404**	0.172*	0.612***	0.792***	0.410*
Ph.D. Degree	0.685*	0.743	0.558*	-0.508	0.179	-1.525**	0.220	0.331	0.564	1.053**	0.390
Married, spouse works	-0.204	0.202	0.019	-0.071	0.006	-0.052	0.018	-0.026	-0.067	0.080	0.023
Married, spouse does not work	-0.551*	-0.135	0.151	-0.204	0.003	0.524*	-0.079	-0.018	-0.122	-0.171	0.004
Divorced or Widowed	-0.279	0.197	0.111	-0.174	0.016	0.232	-0.038	-0.085	-0.077	-0.011	-0.052
Observations	529	309	355	589	6350	393	907	1810	1076	533	844

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 37: Regression Results - Males- Self-Employed FT

	Actor	Announcer	Architect	Dancer	Designer	Enternec	Fineart	Musician	Photographer	Producer	Writer
Elderly in Household	-0.117	-0.311	-0.025	0.000	-0.092	-0.028	-0.071	-0.097	-0.177	0.042	-0.198*
Middle Atlantic	0.048	0.571	0.024	-1.710	0.117	0.591	0.030	-0.021	0.148	-0.090	0.099
Midwest-East	0.982	0.400	0.176	0.000	-0.039	0.284	-0.121	-0.044	-0.007	-0.469*	-0.004
Midwest-North	-1.171	0.776*	0.061	-2.076	-0.204	0.209	-0.267	-0.022	-0.200	-0.211	0.095
South-Atlantic	-0.275	0.397	0.011	0.000	-0.109	0.615	-0.084	-0.167	0.081	-0.324	0.000
South-East	0.000	0.547	0.128	0.000	0.057	1.704***	-0.297*	0.231	0.028	-0.437	-0.172
South-West	0.519	0.902*	0.022	0.000	0.027	0.087	-0.173	-0.059	-0.046	-0.355	0.081
West-Mountain	1.501	0.504	-0.071	0.000	-0.128	0.076	-0.266*	-0.076	-0.149	-0.265	-0.031
West-Pacific	0.639	0.686	0.030	-2.706	0.032	1.058**	-0.055	0.292	0.207	-0.115	0.169
Head of Household	0.275	-0.072	0.082	1.918	0.097	0.448*	0.256***	-0.037	-0.017	0.186	-0.072
Children in Household	0.989*	0.359	-0.036	0.000	0.075	0.143	0.081	-0.026	0.005	0.151	-0.067
In School	0.663	-0.895*	-0.096	0.000	-0.082	0.248	-0.056	-0.300	-0.217	-0.196	-0.058
US citizen	0.203	-0.075	0.172	0.000	0.009	-0.831**	0.324***	0.328*	0.112	-0.333	0.352
Experience	0.029	0.033	0.040***	-0.662	0.025***	0.046	0.003	0.012	-0.002	0.055*	0.001
Experience Squared	-0.000	-0.000	-0.001***	0.016	-0.000**	-0.001*	-0.000	-0.000	-0.000	-0.001	-0.000
No HS diploma	-0.224	-1.041***	0.017	0.000	-0.134	0.718*	-0.144	-0.198	0.455	0.825*	-0.013
Some college	-0.197	-0.110	0.068	-3.510	0.070	0.211	0.007	0.131	-0.028	0.036	-0.009
Associate Degree	0.427	-0.110	0.070	0.000	0.160	1.131***	0.028	0.051	0.142	0.131	0.617*
Bachelor Degree	0.446	-0.142	0.280**	-1.687	0.316***	0.149	0.182*	0.243*	0.227*	0.230	0.316
Master Degree	0.598	0.934*	0.316***	0.000	0.171	0.280	0.133	0.274	0.025	0.200	0.462*
Ph.D. Degree	0.184	0.000	0.346**	0.000	0.329*	-0.321	-0.005	0.436	0.687**	0.793**	0.378
Married, spouse works	0.309	0.010	0.196*	-2.229	0.058	-0.110	0.088	0.194	0.241*	0.112	0.294**
Married, spouse does not work	-0.383	0.086	0.366***	0.000	0.227**	-0.069	0.304**	0.257*	0.519***	0.451**	0.467***
Divorced or Widowed	-0.124	-0.223	0.153	-3.571	-0.066	-0.137	-0.025	0.012	0.010	0.104	0.053
Observations	63	109	1732	13	2051	148	1554	783	988	527	835

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 38: Regression Results - Females- Self-Employed FT

	Actor	Announcer	Architect	Dancer	Designer	Enternec	Fineart	Musician	Photographer	Producer	Writer
Elderly in Household	-1.469*	0.000	-0.068	0.711	-0.071	0.149	0.089	-0.154	0.302	-0.173	0.037
Middle Atlantic	-0.036	-0.300	-0.028	1.109	0.036	0.834	-0.081	0.078	0.037	0.097	0.015
Midwest-East	0.057	0.000	-0.039	0.186	-0.140	0.391	-0.219	0.258	0.033	-0.368	-0.306
Midwest-North	0.000	-0.254	-0.431	0.511	-0.297**	-0.590	-0.147	0.484	0.034	-0.453	-0.352
South-Atlantic	-1.231	0.000	-0.100	1.102	-0.074	0.747	-0.159	0.189	0.082	0.013	-0.190
South-East	-1.006	-3.122	-0.194	1.190	-0.066	-1.654	-0.077	0.749	-0.287	-1.604*	-0.120
South-West	-0.911	0.000	-0.004	0.944	-0.182	0.894	-0.170	-0.113	0.073	-0.805	-0.333
West-Mountain	0.000	0.000	-0.345	2.167*	-0.038	0.452	-0.029	-0.226	-0.276	-1.144	-0.251
West-Pacific	-0.791	0.000	-0.151	1.280	0.008	0.380	0.077	-0.208	0.465	0.142	0.031
Head of Household	0.398	0.000	0.018	0.275	0.118*	-0.235	0.105	0.082	0.049	0.206	0.347**
Children in Household	0.545	0.000	-0.297	-0.399	0.056	0.389	0.032	0.020	-0.181	0.662*	0.026
In School	0.565	0.000	-0.843**	0.247	-0.152	0.140	0.198	-0.726**	-0.403	-0.019	-0.331*
US citizen	-0.471	-0.519	0.876	-0.164	-0.008	-0.324	-0.047	-0.071	-0.027	0.846	0.134
Experience	-0.044	0.403	0.056	0.082	0.016*	-0.026	-0.019	0.035	0.008	0.006	0.025
Experience Squared	0.001	-0.011	-0.001	-0.002	-0.000*	0.000	0.000	-0.001	-0.000	0.000	-0.001*
No HS diploma	0.000	0.000	0.000	0.588	-0.165	-0.488	0.305	0.674	-0.929**	-0.329	0.407
Some college	-0.194	-0.123	-0.648*	-0.194	0.130*	-0.323	-0.024	0.349	-0.361	0.534	-0.002
Associate Degree	-0.199	0.000	-1.057*	0.395	0.169*	-0.224	-0.065	0.942*	0.193	0.303	-0.337
Bachelor Degree	0.164	1.033	-0.335	-0.820	0.300***	0.011	0.140	0.785*	0.053	0.695*	0.233
Master Degree	0.851	0.000	-0.258	-2.055	0.370***	0.139	0.236	0.360	0.012	0.621	0.404
Ph.D. Degree	-1.595	0.000	-0.149	0.000	0.323	-3.107***	0.206	2.000***	0.682*	-0.276	0.263
Married, spouse works	0.104	0.000	0.447**	-0.495	-0.101	0.229	0.031	-0.697**	0.068	0.054	0.137
Married, spouse does not work	0.000	0.000	0.416	-1.740	-0.051	-0.137	-0.050	0.090	0.241	-0.938***	-0.203
Divorced or Widowed	-0.768	1.154	0.338	-0.417	-0.048	0.257	-0.107	-0.523*	0.139	0.172	-0.006
Observations	45	12	191	46	2371	89	1020	138	299	182	615

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 39: Regression Results - Males- Self-Employedt PT

	Actor	Announcer	Architect	Dancer	Designer	Enternec	Fineart	Musician	Photographer	Producer	Writer
Elderly in Household	-0.217	-0.037	-0.275*	-1.757	-0.025	0.253	-0.164	-0.011	0.034	0.364	-0.132
Middle Atlantic	0.387	0.755	0.310	1.929	-0.279	-0.015	-0.235	0.173	0.151	-0.291	0.193
Midwest-East	-0.388	0.507	0.212	3.530	-0.418*	-0.415	-0.240	-0.272	-0.031	0.091	0.126
Midwest-North	-1.123	0.011	0.359	0.000	-0.408	0.583	-0.106	-0.178	0.126	0.986	0.379
South-Atlantic	0.389	0.442	0.179	1.531	-0.434*	0.073	-0.203	-0.082	0.201	0.267	0.147
South-East	0.000	0.655	0.340	1.455	-0.851**	-0.538	-0.482	-0.039	0.210	-0.718	0.045
South-West	0.860	1.163*	0.197	2.512	-0.150	0.311	-0.142	-0.149	0.179	0.374	-0.123
West-Mountain	-0.059	0.552	0.266	1.470	-0.516*	-0.187	-0.143	-0.110	0.269	0.040	0.181
West-Pacific	0.456	0.799	0.486**	0.523	-0.420**	0.008	-0.146	0.037	0.061	0.380	0.390*
Head of Household	0.308	0.200	0.063	1.477	-0.058	0.222	0.192	0.251***	0.188	0.433*	0.130
Children in Household	0.367	0.030	-0.078	0.000	0.145	0.101	0.173	0.212	-0.055	0.261	-0.031
In School	0.522	-0.127	0.013	0.000	-0.255	-0.929**	-0.206	-0.156	-0.357	0.009	-0.427*
US citizen	0.436	-0.179	-0.025	0.000	0.041	0.538	-0.426**	-0.096	-0.212	-0.227	-0.273
Experience	0.009	0.004	-0.003	-0.098	0.008	-0.029	-0.005	0.015	0.027	0.031	0.028
Experience Squared	-0.000	-0.000	0.000	0.002	-0.000	0.000	0.000	-0.000	-0.001*	-0.001	-0.000
No HS diploma	-0.599	-0.303	0.000	0.409	0.387	0.594	-0.319	0.042	-0.132	1.370	-0.224
Some college	0.489	-0.013	0.277	0.641	0.355**	0.171	-0.119	0.251**	-0.031	-0.242	0.138
Associate Degree	0.083	0.122	-0.387	2.059	0.534***	0.379	0.134	0.474***	-0.027	-0.071	-0.007
Bachelor Degree	0.047	0.545	0.316	-0.175	0.471***	0.271	0.100	0.309**	0.073	0.156	0.148
Master Degree	0.422	2.509***	0.495*	0.210	0.555**	0.230	-0.029	0.212	0.219	0.281	-0.049
Ph.D. Degree	-0.441	1.091**	0.366	0.000	0.477	2.572***	0.150	0.712**	-0.654	-0.194	0.120
Married, spouse works	-0.073	0.218	0.078	0.000	0.019	0.371	-0.052	-0.142	0.069	0.050	-0.117
Married, spouse does not work	0.346	-0.207	0.408	-0.987	0.125	0.569	0.138	0.014	0.322	-0.260	0.185
Divorced or Widowed	0.439*	0.292	-0.187	-0.385	0.038	0.445	0.098	-0.126	0.208	-0.092	0.147
Observations	155	142	377	25	701	186	852	1084	456	167	522

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 40: Regression Results - Females- Self-Employed PT

	Actor	Announcer	Architect	Dancer	Designer	Enternec	Fineart	Musician	Photographer	Producer	Writer
Elderly in Household	0.082	2.245*	-0.023	0.000	0.102	0.068	0.040	0.157	-0.353*	-0.347	0.025
Middle Atlantic	-0.051	-0.868	-0.072	-0.686	0.111	0.027	0.078	0.370	-0.290	0.314	0.122
Midwest-East	0.338	-2.452*	-0.550	0.051	-0.067	-0.481	0.036	0.237	-0.425	-0.427	0.061
Midwest-North	0.000	1.280	-0.430	0.521	-0.036	-0.344	-0.279	-0.550	-0.397	-0.299	-0.039
South-Atlantic	0.323	-0.021	0.068	-0.194	-0.059	-0.394	0.148	0.094	-0.463	0.164	0.036
South-East	-0.296	-0.031	-0.175	-0.199	-0.038	-0.233	-0.202	-0.067	-0.660*	-0.217	-0.314
South-West	2.560***	-1.760*	-0.408	-0.350	-0.078	-0.560	-0.011	0.624*	-0.537	-1.016*	-0.093
West-Mountain	-0.091	-0.572	0.004	-0.263	-0.113	-0.389	-0.108	0.118	-0.401	-0.151	-0.315
West-Pacific	0.364	0.790	0.216	0.059	0.027	-0.152	0.071	0.416	-0.084	-0.202	-0.063
Head of Household	0.292	0.624	0.118	-0.044	0.106	0.069	0.070	0.043	-0.144	-0.324	-0.002
Children in Household	-0.139	1.743*	0.678***	0.228	0.240***	-0.085	0.183	0.472**	0.240	0.440	0.186*
In School	0.550	-0.044	-0.228	-0.122	-0.252*	-0.185	0.025	-0.187	0.034	-0.111	0.022
US citizen	-0.064	-1.681	0.009	-0.332	-0.060	0.417	0.021	-0.133	0.110	1.143**	0.003
Experience	0.061*	-0.174	0.047	0.025	0.019*	0.047*	0.004	0.008	-0.012	0.032	-0.019
Experience Squared	-0.001*	0.007	-0.001	-0.000	-0.000*	-0.001	-0.000	-0.000	0.000	-0.000	0.000
No HS diploma	-0.466	2.274	0.000	-0.532	-0.108	-0.194	0.095	-0.231	0.074	-0.132	-0.301
Some college	-0.137	-0.473	-1.653***	0.086	0.017	-0.026	0.062	-0.293	-0.017	0.833*	0.043
Associate Degree	0.292	-0.926	-1.123*	1.473***	0.022	-0.021	0.057	-0.132	0.123	0.628	0.107
Bachelor Degree	-0.062	1.426*	-0.797**	1.331***	0.151	0.110	-0.010	-0.081	0.292	0.766**	0.231
Master Degree	-0.489	0.000	-0.849**	0.000	0.106	-0.416	0.148	-0.233	-0.061	0.232	0.200
Ph.D. Degree	0.184	0.000	-0.645	0.775	0.111	-0.213	0.486*	-0.782	-0.388	0.000	0.326
Married, spouse works	-0.008	0.053	-0.042	0.036	-0.159	-0.203	-0.230	-0.202	0.133	-0.811*	-0.105
Married, spouse does not work	-1.390	0.000	0.060	-0.200	-0.213	0.111	-0.240	-0.078	0.576	-0.224	-0.038
Divorced or Widowed	0.072	-1.192*	-0.192	0.198	-0.109	-0.114	-0.042	0.163	0.643*	-0.643	0.204
Observations	140	33	196	163	2213	254	1618	356	336	127	1002

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 41: Regression Results - Males- Employed

	Actor	Announcer	Architect	Dancer	Designer	Enternec	Fineart	Musician	Photographer	Producer	Writer
Elderly in Household	-0.089	-0.097*	-0.047	-0.001	-0.018	-0.281*	-0.037	-0.108**	0.005	-0.094	-0.120
Middle Atlantic	0.143	0.184	-0.014	-0.003	0.022	0.047	0.143*	0.114	0.120	0.094	0.109
Midwest-East	-0.375	0.077	-0.078*	-0.313	-0.038	0.008	0.051	0.011	-0.042	-0.159**	-0.062
Midwest-North	-0.493	-0.019	-0.132**	-0.140	-0.151***	-0.266	-0.024	-0.206*	-0.058	-0.308***	-0.323**
South-Atlantic	-0.230	0.051	-0.081*	0.220	-0.141***	-0.013	-0.026	-0.001	0.013	-0.064	0.026
South-East	-0.772***	-0.141	-0.204***	0.000	-0.221***	0.153	-0.070	-0.232*	-0.133	-0.320***	-0.185
South-West	-0.510*	0.168	-0.096*	-0.306	-0.073**	0.028	-0.114	-0.097	-0.033	-0.178**	-0.212*
West-Mountain	-0.095	-0.000	-0.178***	-0.113	-0.072*	0.051	-0.097	-0.073	0.041	-0.044	-0.210*
West-Pacific	0.221	0.180	-0.039	-0.046	0.025	0.185	0.215**	0.057	0.042	0.230***	0.137
Head of Household	0.172*	0.085	0.088***	-0.022	0.123***	0.065	0.136***	0.088*	0.115**	0.152***	0.112*
Children in Household	0.246	-0.025	0.007	0.066	0.023	0.014	0.039	-0.013	-0.027	0.067	0.050
In School	-0.281*	-0.146*	-0.096**	0.142	-0.073***	-0.148	-0.054	-0.021	-0.142**	-0.167***	-0.178**
US citizen	-0.226	-0.003	0.109**	-0.065	0.046	0.186	0.023	0.072	-0.023	-0.166*	0.063
Experience	0.021*	0.045***	0.045***	0.055**	0.033***	0.050***	0.031***	0.025***	0.042***	0.044***	0.040***
Experience Squared	-0.000	-0.001***	-0.001***	-0.001*	-0.000***	-0.001***	-0.000***	-0.000***	-0.001***	-0.001***	-0.001***
No HS diploma	0.164	-0.114	0.047	-0.452	-0.137***	-0.191	-0.239***	-0.119	-0.032	-0.095	-0.209
Some college	0.198	0.041	0.175**	0.108	0.098***	0.059	0.131**	0.049	0.072	0.075	0.013
Associate Degree	0.104	0.202**	0.207***	-0.512	0.154***	0.033	0.177***	0.103	0.066	0.046	-0.024
Bachelor Degree	0.205	0.197***	0.418***	0.130	0.299***	0.182	0.348***	0.215***	0.254***	0.311***	0.182
Master Degree	0.383*	0.531***	0.466***	0.170	0.390***	0.429*	0.321***	0.260***	0.243	0.412***	0.235*
Ph.D. Degree	0.118	0.485**	0.485***	0.000	0.324***	0.441	0.222	0.208*	-0.054	0.344***	0.170
Married, spouse works	-0.071	-0.003	0.058**	-0.196	0.084***	-0.170	0.104**	0.123*	0.051	0.055	0.067
Married, spouse does not work	0.065	0.258**	0.123***	-0.125	0.157***	-0.103	0.111*	0.131*	0.035	0.214***	0.184*
Divorced or Widowed	0.140	-0.060	-0.059	0.152	0.022	0.171	-0.007	0.060	-0.003	-0.024	-0.034
Observations	781	1639	4615	149	11556	509	2835	2537	1746	2907	1658

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 42: Regression Results - Females- Employed

	Actor	Announcer	Architect	Dancer	Designer	Enternec	Fineart	Musician	Photographer	Producer	Writer
Elderly in Household	-0.209*	0.164	0.009	-0.126	0.021	0.035	0.091	-0.005	0.065	-0.060	-0.049
Middle Atlantic	0.213	0.064	0.034	0.261	-0.015	-0.106	0.100	-0.042	-0.016	0.187**	0.098
Midwest-East	-0.279	-0.026	-0.040	-0.126	-0.162***	-0.209	-0.117	-0.162	-0.116	-0.079	-0.194**
Midwest-North	0.273	-0.144	-0.120	0.210	-0.193***	-0.050	-0.216*	-0.225*	-0.155	-0.093	-0.196*
South-Atlantic	-0.268	-0.253	-0.077	0.061	-0.157***	-0.126	-0.039	-0.156	-0.116	0.054	-0.143
South-East	-0.148	-0.266	-0.113	0.149	-0.218***	-0.308	-0.118	-0.079	-0.214*	-0.227*	-0.210*
South-West	-0.426	-0.245	0.038	0.215	-0.182***	-0.098	-0.091	-0.171	-0.101	-0.056	-0.093
West-Mountain	-0.319	-0.199	-0.008	0.171	-0.218***	-0.092	-0.066	-0.330**	-0.059	-0.017	-0.166
West-Pacific	0.234	0.037	0.055	0.298	-0.026	0.013	0.124	-0.079	0.006	0.229***	0.065
Head of Household	0.025	0.167*	0.056	-0.030	0.087***	0.181*	0.108**	0.045	0.074	0.098**	0.086*
Children in Household	-0.020	0.124	0.126**	0.053	0.078***	-0.321**	0.046	0.075	-0.005	0.114*	0.073
In School	-0.116	-0.032	-0.044	0.000	-0.057**	-0.271**	-0.101	-0.229***	-0.109*	-0.101*	-0.143**
US citizen	-0.153	-0.090	0.023	-0.115	0.040	-0.124	-0.009	-0.203*	0.056	0.039	0.142
Experience	0.039***	0.048***	0.036***	0.039***	0.025***	0.030**	0.030***	0.014**	0.021***	0.058***	0.039***
Experience Squared	-0.001**	-0.001**	-0.001***	-0.001**	-0.000***	-0.001***	-0.000***	-0.000*	-0.000**	-0.001***	-0.001***
No HS diploma	0.076	0.021	0.537**	-0.031	-0.072**	-0.029	-0.027	0.102	-0.003	0.135	0.107
Some college	-0.010	0.101	0.065	0.001	0.117***	0.086	0.160**	0.054	0.062	0.222**	0.200*
Associate Degree	0.183	-0.096	0.239*	-0.081	0.221***	-0.311*	0.304***	0.179	0.148*	0.207*	0.102
Bachelor Degree	0.164	0.322**	0.347***	0.135	0.394***	0.211	0.439***	0.110	0.375***	0.574***	0.392***
Master Degree	0.260	0.500***	0.403***	0.244	0.429***	0.365	0.339***	0.192**	0.559***	0.518***	0.442***
Ph.D. Degree	0.752*	0.739***	0.388***	-0.415	0.424***	-0.955*	0.088	0.320*	0.191	0.677***	0.489***
Married, spouse works	-0.154	0.107	0.046	-0.008	0.014	0.036	0.087*	0.047	-0.035	0.056	0.059
Married, spouse does not work	-0.322	-0.138	-0.040	-0.197	-0.007	0.198	-0.031	0.058	-0.066	-0.063	-0.072
Divorced or Widowed	-0.236	-0.014	-0.007	-0.157	-0.013	0.217	-0.006	0.000	-0.072	0.008	-0.053
Observations	644	565	1416	840	15348	550	2206	2227	1727	2057	2045

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 43: Regression Results - Males- Self-Employed

	Actor	Announcer	Architect	Dancer	Designer	Enternec	Fineart	Musician	Photographer	Producer	Writer
Elderly in Household	0.048	-0.083	-0.100	-0.700	-0.051	0.093	-0.082	-0.029	-0.099	0.172	-0.153
Middle Atlantic	0.282	0.931**	0.067	0.768	0.027	0.034	-0.054	0.012	0.144	-0.088	0.162
Midwest-East	0.214	0.674*	0.173*	1.204	-0.127	-0.373	-0.160	-0.207	-0.018	-0.329	0.094
Midwest-North	-0.710	0.564	0.132	-1.431	-0.249*	0.222	-0.236	-0.162	-0.055	0.038	0.304
South-Atlantic	0.019	0.664*	0.023	0.478	-0.186*	0.049	-0.113	-0.164	0.112	-0.142	0.097
South-East	0.000	0.881*	0.154	1.019	-0.122	0.114	-0.347*	0.026	0.064	-0.458	-0.055
South-West	0.899	0.964**	0.067	-0.057	-0.014	0.064	-0.170	-0.113	-0.016	-0.148	0.020
West-Mountain	0.296	0.679	-0.015	-0.384	-0.238*	-0.219	-0.181	-0.111	-0.053	-0.125	0.079
West-Pacific	0.624	0.909**	0.111	0.164	-0.070	0.229	-0.049	0.111	0.160	0.040	0.302**
Head of Household	0.251	0.018	0.081	0.854	0.064	0.110	0.223***	0.118*	0.017	0.242*	-0.011
Children in Household	0.358	0.245	-0.040	-2.777	0.093	-0.019	0.083	0.034	-0.023	0.162	-0.040
In School	0.220	-0.251	-0.070	0.000	-0.088	-0.609*	-0.103	-0.098	-0.250	-0.072	-0.226*
US citizen	0.182	-0.051	0.109	1.773	0.036	0.233	0.074	0.053	-0.023	-0.244	0.027
Experience	0.021	0.006	0.022*	-0.042	0.016**	-0.021	-0.003	0.010	0.008	0.041**	0.012
Experience Squared	-0.001	0.000	-0.000*	0.001	-0.000*	0.000	0.000	-0.000	-0.000	-0.001*	-0.000
No HS diploma	-0.429	-0.524*	-0.115	-0.022	-0.006	0.696**	-0.195	-0.020	0.201	0.853*	-0.041
Some college	0.317	-0.021	0.143	-0.059	0.135*	0.174	-0.015	0.215**	-0.035	-0.116	0.063
Associate Degree	0.252	0.197	0.013	0.863	0.241**	0.644**	0.070	0.293*	0.102	-0.074	0.382
Bachelor Degree	0.232	0.181	0.310***	-0.707	0.347***	0.167	0.164*	0.268***	0.180*	0.133	0.269
Master Degree	0.075	1.373***	0.366***	0.107	0.237**	0.232	0.090	0.263*	0.101	0.165	0.284
Ph.D. Degree	-0.056	1.149***	0.367***	0.000	0.342*	-0.362	0.069	0.554**	0.292	0.505*	0.287
Married, spouse works	0.065	-0.021	0.177*	1.122	0.033	0.359*	0.041	-0.053	0.159	0.072	0.137
Married, spouse does not work	0.319	-0.185	0.369***	-0.815	0.180**	0.368	0.249**	0.089	0.440***	0.273	0.330**
Divorced or Widowed	0.426	-0.052	0.097	-1.086	-0.034	0.349	0.010	-0.109	0.042	0.099	0.122
Observations	218	251	2109	38	2752	334	2406	1867	1444	694	1357

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 44: Regression Results - Females- Self-Employed

	Actor	Announcer	Architect	Dancer	Designer	Enternec	Fineart	Musician	Photographer	Producer	Writer
Elderly in Household	-0.418	1.222	0.070	-0.065	0.057	0.156	0.071	0.132	-0.096	-0.331	0.020
Middle Atlantic	-0.165	-0.984	-0.057	-0.140	0.074	-0.196	0.026	0.240	-0.176	0.206	0.060
Midwest-East	0.193	-1.802*	-0.352	0.337	-0.109	-0.546	-0.043	0.233	-0.268	-0.330	-0.080
Midwest-North	0.000	0.182	-0.444	0.656	-0.189*	-0.670	-0.208	-0.523*	-0.320	-0.435	-0.114
South-Atlantic	0.105	-0.209	-0.024	0.015	-0.071	-0.427	0.037	0.041	-0.246	0.063	-0.051
South-East	-0.532	-3.015	-0.107	0.046	-0.053	-0.331	-0.143	0.176	-0.481*	-0.492	-0.277
South-West	0.956	-1.190*	-0.073	-0.048	-0.136	-0.424	-0.100	0.370	-0.347	-0.755	-0.175
West-Mountain	-0.238	-0.954	-0.131	0.162	-0.076	-0.408	-0.068	0.039	-0.315	-0.454	-0.308*
West-Pacific	0.128	0.415	0.001	0.396	0.011	-0.287	0.084	0.147	0.128	0.016	-0.028
Head of Household	0.205	0.200	0.142	0.066	0.104*	-0.004	0.079	0.013	-0.075	0.074	0.118
Children in Household	0.056	0.666	0.212	0.144	0.195***	-0.065	0.180*	0.391**	0.192	0.511**	0.175*
In School	0.434	-1.031	-0.431*	-0.058	-0.187**	-0.204	0.129	-0.308	-0.093	-0.015	-0.066
US citizen	0.141	-1.503*	0.195	-0.165	-0.039	0.260	-0.013	-0.297	0.098	0.729	0.037
Experience	0.035	-0.152	0.035	0.032	0.016**	0.019	-0.003	0.014	-0.009	0.005	-0.011
Experience Squared	-0.001	0.005	-0.001	-0.001*	-0.000**	-0.000	-0.000	-0.000	0.000	0.000	0.000
No HS diploma	-0.357	1.577*	0.000	-0.384	-0.140	-0.295	0.165	-0.042	-0.119	-0.490	-0.121
Some college	-0.147	0.266	-1.116***	0.069	0.077	-0.161	0.026	-0.128	-0.140	0.540*	-0.004
Associate Degree	0.087	-0.133	-1.146***	1.351***	0.105	-0.185	0.000	0.030	0.097	0.401	-0.067
Bachelor Degree	-0.079	1.196*	-0.593*	0.665	0.237***	0.021	0.048	0.073	0.174	0.629**	0.238
Master Degree	-0.088	-0.092	-0.584*	-1.626***	0.256***	-0.230	0.188*	-0.198	-0.072	0.214	0.290
Ph.D. Degree	-0.300	0.000	-0.380	0.598	0.226	-0.934	0.349*	-0.279	0.224	-0.418	0.333
Married, spouse works	-0.073	0.478	0.345*	-0.152	-0.092	-0.074	-0.061	-0.289*	0.098	-0.180	-0.027
Married, spouse does not work	-0.690	-1.912	0.306	-0.268	-0.101	0.120	-0.106	-0.017	0.285	-0.404	-0.055
Divorced or Widowed	0.042	-0.673	0.209	0.038	-0.049	-0.031	-0.048	-0.079	0.367*	-0.127	0.077
Observations	185	45	387	209	4584	343	2638	494	635	309	1617

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$