Low-Wage Women:

The Demographic Determinants of their Wages

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Acknowledgments

Abstract

Of the prime-age, low wage women I examined, the largest groups were white, married, full-time working women performing clerical work in the metropolitan South. To determine demographic variability among low wage women and the relative impact of the minimum wage between these different demographic groups, I regressed real wages on different demographic categories. My regression analysis showed little pay differential among racial categories; however, different ethnic groups did show significantly different wages. Minimum wage impacts varied the most among employment sector and geographical region, having the largest effect on workers at the bottom of the wage distribution.

1. Introduction

Fifty-nine percent of the female labor force is low wage earning (Department of Labor, www.dol.gov)[1]. While the majority of female workers earn low wages, they are clustered into relatively few employment sectors. Nearly 70 percent of all low wage women work in traditional "female job"—clerical, sales or service related fields. These conventional female jobs—teacher, secretary or shopkeeper—tend to pay lower wages than predominately male jobs (Blau, Ferber and Winkler 210-2111).

But how do wages vary between these employment sectors? Is there demographic variability among low wage women? What is the relative impact of the minimum wage on these workers? Through regression analysis, I determine the wages of various demographic groups and how they are affected by the minimum wage. I examine the age, race, number of children, educational level, work time variability, marital status, region and occupation of the low wage female workforce.

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[1] In this study, I define low wage women as those with hourly earnings in the bottom two-thirds of the wage distribution.

The rest of the article consists of four more sections. The first section, *Background*, characterizes the low wage female work force. *Theoretical Framework* discusses the regression model and data set. *Empirical Findings and Analysis* summarizes the findings and analyzes the results. The last section, *Conclusion*, summarizes and restates the most important findings.

2. Background

Previous studies examined the low wage subset of the female workforce. Many researchers profiled low wage working women based on their race, educational level, marital status and age. Their studies show that the typical low wage worker is a young, black, single, uneducated woman (Carrington and Fallick 18). In these studies, married women are underrepresented in the population of low wage working women, while single women are overrepresented. Part time workers were several times more likely than full time workers to hold low wage employment (Kim 27). Many studies also found that black and Hispanic women are more likely to be low wage workers than white women (Haugen and Mellor 71).

However, due to the specific parameters I used to define my sample group, my results are not congruent. As seen in Table 3, I found married to be the more prevalent marital status, whites to be the most common racial group, clerical to be the largest occupational group, non-Hispanic to be the largest ethnic group, metropolitan South to be the largest residential group and full time/full year workers to be the largest work time group. Each respondent has an average of one child under the age of 18, an average educational level of 11^2 and roughly a quarter of all respondents were in each of the four regions of residence[3]. Values are listed in Table 2.

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[2] Education is the number of years of education completed, with a range from zero to 18, 12 representing completion of high school..

[3] The Current Population survey divided the United States into four regions: Northeast, North central/Midwest, South and west. Each respondent fell into one of the four regions.

These discrepancies relate to differences between my data set and the data used by other researchers. The primary difference is the restriction I placed on age. I limited my sample to include only "prime age" women: those between the ages 25 and 65[4]. Since low wage work is also common among "prime age" women, who comprise 45 percent of low wage working females and assume nearly 30 percent of all low paying jobs, these boundaries allow me to look at a substantial subset of low wage women (Kim 26).The age restrictions excluded all retired and teenaged employees from the sample. By excluding young and old respondents, I removed those below marrying age and most of those old enough to have lost a spouse to death. This accounts for the difference seen in the marital status groups.

Teenagers tend to work part time after school and on weekends or part year during the summer months. Those between the ages of 25 and 65 tend to be individuals who are completing or have finished their educational investments and require full time/full year employment to support their lives and families. Since teenagers were not a part of the sample data, the number of respondents included in the sample who worked part time and part year decreased significantly.

One factor forcing a prime age woman to remain in a low wage position was her educational level (Kim 26). As educational levels rise, women are less likely to work for low wages. Seventy-four percent of low wage jobs are held by women without a high school education and those women with educational backgrounds including a high school degree or less constitute 21 percent of low wage female workers and 11 percent of the total female labor force. In addition, those women with college courses or a college degree comprise half of the female workforce, but only 30 percent of the low wage portion of the female labor force. Only 14

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[4] When I sorted each year and removed those outside the 25-65 age range, each year contained roughly 2,100 respondents. The pooled model containing data from all 20 years contained 45,151 respondents.

percent of those women with a college degree work at low wage jobs (Kim 27). This is evident in my data since the average educational level, on a scale from one to eighteen, is approximately eleven, one year short of high school graduation.

Transition is another frequently cited reason women hold low wage jobs. Women hold low wage jobs during a time of transition before they begin educational investments in human capital (Carrington and Fallick 17). Carrington and Fallick's data showed that many women left low wage jobs within five years of completing their educational investment. However, their data included women as young as age 16. These women would likely hold these jobs before beginning training, apprenticeship or college. As stated earlier, women between the ages of 25 to 65 have normally completed their job training and are not in transitional stages. This indicates that not all women use low wage jobs as temporary employments and it is clear that almost ten percent of the female labor force remains in low wage jobs nearly ten years into their working careers (Carrington and Fallick 24).

The sample group showed a mean and median age of 40. This signifies that the majority of women in the sample are prime-age workers who hold low wage careers or who retain low wage employments for many years. These women do not only have low wage jobs, but most likely have low wage careers. Another reason causing the respondent women to remain in low wage jobs could be employment segregation. Recall that women tend to be concentrated in female jobs performing sales, service or clerical work (Blau, Ferber and Winkler 209).

3. Theoretical Framework

All wages given by the Current Population Survey are hourly wage values from the Bureau of Labor Statistics[5]. They are found in nominal terms and I adjusted them for inflation by

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[5] All data come from the Current Population Survey (CPS) March Survey.

dividing by the Consumer Price Index[6]. I normalized these CPI values by dividing them by the 1981 value giving a CPI of one for first year of observation so that in this year, the nominal and real wage values are the same making the nominal and real wage variations over the 20 year period easier to discern. I also converted yearly minimum wage values by the same normalized CPI to obtain their real equivalents. A graph of minimum wage values is given in Figure 1.

Once I deflated the wage values, I took their natural log. Using log values as the dependent variable in the regression model results in beta coefficients for each demographic independent variable that represent proportional changes in wage with respect to the variable. The set of dummy variables that do not appear explicitly in the regression because they are subsumed in the reference group are: married, white, clerical, full time/full year and South[7]. The coefficient for each demographic characteristic shows the extent to which this characteristic commands a higher wage than the corresponding characteristic in the reference group.

I use the following demographic characteristics in my regression model: marital status, race, age, ethnicity, occupation, region and metropolitan status of residence, education, children, and full-time, part-time employment. Dummy variables are coded one if the respondent had the particular characteristic and zero if she did not. I put marital status into a series of three dummy variables: married, single and separated/divorced; race into a series of two dummy variables: white and black[8]; region into four dummy variables Northeast, North Central/Midwest, South and West; occupation into five dummy variables: service, sales, administrative, clerical and labor

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[6] The CPI I used to make the adjustment was the December Consumer Price Index for urban consumers. These values had a 1967 base year, but I normalized all the CPI values by dividing each by the 1981 values. Therefore, all the real wage values are in 1981 dollars (www.economagic.com).

[7] These groups represent the largest group in each category of demographic dummy variables.

[8] During the early 1980s, Affirmative Action, Title VII and several Supreme Court cases attempted to further diminish racial inequality in the workplace. I tested to see if regulations passed during the time period changed blacks' wages. I interacted time dummy variables for small periods of time with racial dummies. These terms were not significant meaning wages did not substantially change for different racial groups in different portions of the 20 year span I examine.

intensive; and work time variables into four dummy variables full time/full year, part time/full year, full time/part year and part time/part year. Ethnicity is coded one if the respondent is Hispanic[9]; rural is coded one if the respondent was from non-metropolitan area; and recession is coded one if the year in which the respondent reported was in an economic recession[10]. I used ordinary least squares regressions to estimate the effect of these variables on the natural log of each respondent's real wage[11]. Additional independent variables are time ranging from one to 20 years for each year in the series, the natural log of the real minimum wage and a series of interaction terms to estimate the relationship between the natural log of the real minimum wage and the demographic characteristics[12]. The interaction terms show how much more of an impact the minimum wage has on those certain demographic characteristics compared to the reference group. Thus it shows the differential impact of the minimum wage on certain demographic characteristics compared to the reference group[13]. Before I ran the regression, I expected that Hispanics, blacks, single, southern and labor intensive workers would have the lowest wages and feel the greatest impact from minimum wage changes.

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[9] I decided to use Hispanic as the only ethnic group since it is the largest, non-white ethnic category. Other ethnicities only included a nominal number of respondents. Also, in other data surveys Hispanics sometimes report their race as white creating overlap between the racial and ethnic categories. However, in this data survey none of the respondents in the sample who reported Hispanic as their ethnicity were are classified under the white or black racial categories.

[10] The information on recession came from the National Bureau of Economic Research. It defines a recession as, "A significant decline in activity spread across the economy, lasting more than a few months, visible in industrial production, employment, real income, and wholesale-retail trade. A recession begins just after the economy reaches a peak of activity and ends as the economy reaches its trough." Those marked as recession were those the NBER indicated as such and occurred in 1981, 1982, 1991 and 1992.

[11] In order to examine only low wage women, I deleted those women with earnings in the top one-third of the wage distribution in each year. I was left with a truncated data set of women in the bottom two-thirds. The regression describes the relationship for the women in the truncated population.

[12] Throughout all 20 years of the sample, female labor force participation rates remained relatively constant. Rates only increased about 0.7 percent annually during each year of the sample (www.bls.gov). Therefore, I there are approximately the same numbers of women in each year of the sample and I did not include any participation rate controls.

[13] The interaction terms represented by "*", indicated multiplying the natural log of the real minimum wage by the demographic characteristic.

Letting "*" denote interaction between terms and "RMW" denote LN Real Minimum Wage, I

estimate equation (1):

$$Ln \operatorname{Re}alWage = \beta_0 + \beta_1 Time + \beta_2 Age + \beta_3 Age^2$$
$$+ \beta_4 Children + \beta_5 Education + \beta_6 RMW + \beta_7 \operatorname{Re}cession + \beta_8 Hispanic + \beta_9 Black + \beta_{10} Rural$$
$$+ \beta_{11} Separated / Divorced + \beta_{12} Single$$
$$+ \beta_{13} Northeast + \beta_{14} NorthCentral / Midwest + \beta_{15} West$$
$$+ \beta_{16} FullTime / PartYear + \beta_{17} PartTime / FullYear + \beta_{18} PartTime / PartYear + \beta_{19} Sales$$
$$+ \beta_{20} Service + \beta_{21} Administrative + \beta_{22} LaborIntensive$$
$$+ \beta_{23} RMW * Black + \beta_{24} RMW * Hispanic + \beta_{25} RMW * Rural$$
$$+ \beta_{26} RMW * Separated / Divorced + \beta_{27} RMW * Single$$
$$+ \beta_{28} RMW * Northeast + \beta_{29} RMW * NorthCentral / Midwest + \beta_{30} RMW * West$$
$$+ \beta_{31} RMW * FullTime / PartYear + \beta_{32} RMW * PartTime / FullYear + \beta_{33} RMW * PartTime / PartYear$$
$$+ \beta_{34} RMW * Sales + \beta_{35} RMW * Service + \beta_{36} RMW * Administrative + \beta_{37} RMW * LaborIntensive$$

This model includes many important demographic characteristics. Factors including job

experience, educational level of parents and language proficiency could affect the female labor

force working at or below minimum wage. Factors that affect only a small few women, union

membership for example, are not included[14].

4. Empirical Findings and Analysis

Table 1 shows the estimation of equation (1): relationships between the variables and real

wages. Each of the coefficients estimates the proportion by which the wage of a respondent with

the given demographic characteristic exceeds that of the reference population.

The time coefficient, 0.0008, is insignificant. This indicates that the respondent's sample

year did not affect their wage. It is not surprising that time insignificant since all wage values are

in real terms which controls for time and business cycle changes. The coefficient for Real

Minimum Wage was 0.18 and significant indicating that a one percent increase in the real

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[14] In 2000, only 11 percent of working women were union members (www.bls.gov). This is most likely due to the industries in which women work. Sales and clerical positions, the largest occupational groups for women, are not normally unionized.

minimum wage increases real wages by 0.18 percent. Changes in the real minimum wage lead to proportional changes in the respondent's real wage.

Age has a positive, significant coefficient of 0.0074 percent, while Age Squared has a negative, significant coefficient of -0.000074, indicating that wage increases up to a certain point, then decreases. By differentiating the natural log of the real wage with respect to Age and Age Squared, I determined that the wage maximizing age is 50 years.

Number of children has a significant coefficient of -0.005. Each additional child a woman has decreases her wage by 0.5 percent. Children act as interruptions to a woman's labor force participation and often cause women to temporarily or permanently leave the work force. Women with children under the age of three are 10 to 20 percent less likely to work outside the home[15] (Blau, Ferber, and Winkler 95). The number of children a woman has can also be used as a proxy for her job tenure. Each child a woman has forces her to leave the work force an additional time, which lowers her wage and affects her jobs status. However, each additional year of education increases a woman's wage by roughly 1.09 percent, a statistically significant value. The dummy variable for Recessions is significant and shows an average of 2.56 percent lower wages in years of recession. This result indicates that wages are procyclical. In years when the economy performs well, wages tend to be higher than in years when it performs poorly.

Blacks showed only a small, insignificant coefficient compared to the white reference group. This indicates that there is no economic or statistical difference in the average pay of blacks and whites holding other characteristics constant. This dispels the notion of a racial wage gap. The pay differentials that existed decades ago, have receded most likely due to policy changes, political action programs and perhaps a better educated and equipped black work force

in ways in the educational variable does not capture[16]. However, Hispanics show a significant wage difference. They earn approximately 1.34 percent lower wages than non-Hispanics. There has been less policy and governmental action working to ensure equal pay and treatment of Hispanic workers in the labor force than black workers. Thus, ethnic pay differentials persist while the wage gap between whites and blacks diminished. All work time dummies were significant and indicate that the full time/ full year base group is the highest earning. Full time/part year workers were 7.12 percent lower, part time/full year workers were 9.59 percent lower and part time/part year workers were 13.3 percent lower. These short-time or short-term workers are less valuable to companies due to the transient or temporary nature of their employment. Thus, they receive lower pay.

Compared to married women, single women showed a significant 4.03 percent lower wage, while women who were separated or divorced showed wages 2.32 percent below married women. Since they have homes, families and husbands, married women tend to be more stable, committed workers. These women have been employed for longer amounts of time and likely have a greater job tenure status than non-married women. Married women also have a greater stake in their jobs since their wages likely affect a husband, child or some one other than themselves. They are less likely to leave a job and more likely to desire sustained employment. All regional dummy variables were significant and showed comparatively higher wage values than the Southern base group: Northeast was 6.95 percent above, west was 6.65 percent above and North central/Midwest was 3.41 percent above. A workers' metropolitan status was a significant wage determinant. Rural workers had 4.51 percent lower wages than workers in

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[15] The variation in percent is related to the spouse. Never married women are 20 percent less likely to work outside the home and women with a spouse present are only ten percent less likely to participate in the labor force. These statistics compare rates to women with no children (Blau, Ferber and Winkler 95).

metropolitan areas. These regional and metropolitan differences are not surprising and are related to the different industries and jobs availability in these areas. Regions are often dominated by particular industries which might be low paying, labor intensive[17] for or factory work. Higher paying jobs are likely clustered in urban areas and located in the Northeast or West where more office or administrative work is available.

The occupational dummy variables were all significant and showed occupational wage differentials. Compared to the clerical base group, administrative was 1.67 percent higher, sales was 13.6 percent lower, service was 16.7 percent lower and labor intensive was 7.88 percent lower. This indicates that workers in higher status employments receive higher wages. The low estimate for service and sales is attributable to food service workers who are tipped, but reported their wages without adding in their average hourly tip wage.

Interaction terms between the real minimum wage and these demographic characteristics show how much more impact the minimum wage has on the wage of the type of woman in question than it does on the reference group. Thus, it shows the varying impact of the minimum wage in different demographic groups compared to the reference group. I would expect the minimum wage to have the largest impact on the lowest wage demographic categories. I interacted all demographic dummy variables with the natural log of the real minimum wage, but I will only discuss those interaction estimates which were statistically significant. An insignificant interaction estimate indicates little impact from minimum wage on that particular group. Marital status, ethnicity, some regional and some work time dummies were statistically insignificant, therefore, unaffected by minimum wage changes. The magnitude of the minimum

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[16] The wage gap is far less than it was a generation ago and the gap continues to diminish. At higher educational levels, there is less wage disparity between races (Johnson and Neal).

[17] Labor intensive jobs include those that require intense physical exertion such as moving, building or packing work.

wage's impact on the different groups is best illustrated by relating the interaction coefficient and the coefficient of the real minimum wage term. By placing these terms in a ratio, the impact and full effects are apparent[18].

The coefficient for the blacks' interaction term was 0.169, indicating that minimum wages effect a greater change in wages of blacks than of whites. Blacks' minimum wage impact is nearly double that of whites. As I mentioned earlier, the average wages of blacks and whites are nearly equal; however their impact from the minimum wage is not. This is due to the unequal distribution of blacks and whites on the earning spectrum. Black workers are clustered at the top and bottom of the wage distribution, while whites are distributed evenly throughout. While this gives similar average estimates, the large cluster of black workers at the bottom of the distribution leads them to be more affected by minimum wage changes than whites.

By determining the ratio between the part time/part year interaction term and the reference group, I determined that the minimum wage has double the impact on part time/part year workers that it does on the reference group. Recall that full time/full year was the highest earning and part time/part year was the lowest. Since part time/ part year showed the lowest earnings, it is not surprising that they would be impacted more than the highest earning group. More part time/part year workers are earning at or near the minimum wage so their wages would be greatly affected.

The Northeast interaction term is -0.273. When I summed the coefficients and determined the ratio between Northeastern workers and the southern reference group, the resulting sum is negative despite the positive sign of the minimum wage coefficient. The negative sum could be

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[18] The magnitude of these interaction coefficients can be seen by the following using the part time/part year group as an example: $\left(\dfrac{(PartTime/PartYear * RMW) + RMW)}{RMW} \right)$. This indicates the ratio of the effect on the Part Time/Part Year group to the effect on the reference group.

interpreted as showing that the minimum wage lowers the wages of northeastern workers while increasing the wages of southern workers. However, this is not the case. When I reran the regression with Northeast as the reference group, the coefficient of the natural log of the minimum wage was insignificant. Therefore, it is unlikely that increases in the minimum wage actually reduce the wages of Northeastern workers. It is more likely that it benefits low wage southern workers and has little effect on higher wage Northeastern workers.

When I determined the effect ratio, those workers in rural areas showed double the impact from minimum wage increases as the metropolitan reference group. This was not surprising since, ceteris paribus, rural workers earned lower wages than metropolitan workers. Those lower wage workers consistently proved to see greater effects from minimum wage increases than workers earning higher wages. This could be related to the lack of high paying jobs in rural areas or a lower educational level for individuals outside of metropolitan regions in ways that my educational variable does not pick up.

The labor intensive, sales and service groups showed three times as much impact from minimum wage changes than the clerical base group. Administrative showed twice the impact of the base group. These values reflect the relative number of low wage workers in these particular industries. For example, labor intensive industries show the greatest impact from real minimum wage changes; therefore, they have the largest number of low wage workers among the five occupation groups.

5. Conclusion

The race dummy variables indicate that blacks and white earn similar wages; correcting for other demographic characteristics. Married women receive higher wages than non-married women, and wage rates increase with age and years of education. Full time/full year workers are

paid more than any other work time group and workers from northeast, metropolitan regions show higher wages than any other geographical category, indicating that higher paying jobs are normally located in northeastern cities. Hispanics have lower wages than non-Hispanics, denoting the existence of an ethnic wage gap. Those demographic groups with the lowest wages also saw the greatest affects from minimum wage increases. These low wages, highly impacted workers include part time/part year, rural, labor intensive, Hispanic demographic groups.

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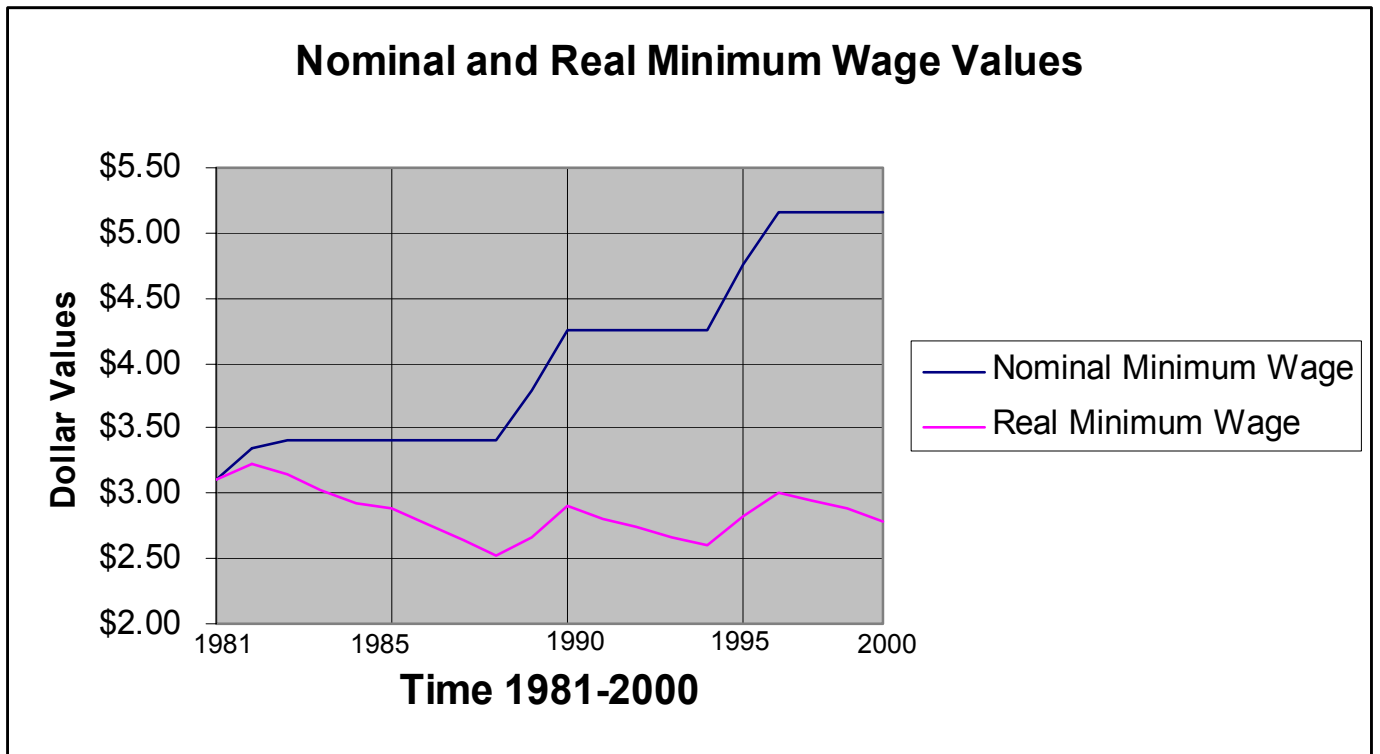
Figure 1

Nominal and Real Minimum Wage Values

(Dollar Values vs. Time 1981-2000)

- Nominal Minimum Wage
- Real Minimum Wage

Table 1- Estimates and Significance

Term	Estimate	T Ratio
Intercept (δ)	4.81	20.0
Children (δ)	-0.00521	-3.14
Age (δ)	0.00739	5.89
Age Squared (δ)	-0.0000740	-5.10
Education (δ)	0.0109	13.8
Time	0.000817	0.880
LN Real Minimum Wage (δ)	0.178	4.28
Recession (δ)	-0.0256	-6.69
Black	0.00139	0.260
Hispanic (δ)	-0.0134	-2.20
Separated/Divorced (δ)	-0.0232	-5.29
Single (δ)	-0.0403	-6.85
Part Time/Full Year (δ)	-0.0959	-20.2
Full Time/Part Year (δ)	-0.0712	-15.5
Part Time/Part Year (δ)	-0.133	-27.5
Northeast (δ)	0.0695	14.8
North Central/Midwest (δ)	0.0341	7.74
West (δ)	0.0665	13.6
Rural (δ)	-0.0451	-12.4
Sales (δ)	-0.136	-24.6
Administrative (δ)	0.0167	2.9
Labor Intensive (δ)	-0.0788	-16.6
Service (δ)	-0.166	-39.1
Black* RMW (δ)	0.169	2.31
Hispanic* RMW	0.124	1.48
Separated/Divorced* RMW	-0.0478	-0.790

Term	Estimate	T Ratio
Single* RMW	-0.00809	-0.110
Part Time/Full Year* RMW	0.00203	0.0300
Full Time/Part Year* RMW	0.0137	0.220
Part Time/Part Year* RMW (δ)	0.1682	2.57
Northeast* RMW (δ)	-0.237	-3.66
North Central/Midwest* RMW	0.0539	0.900
West* RMW	0.00173	0.0300
Rural* RMW (δ)	0.216	4.37
Sales* RMW (δ)	0.272	3.50
Administrative* RMW (δ)	0.166	2.09
Labor Intensive* RMW (δ)	0.336	5.40
Service* RMW (δ)	0.326	5.79

(δ) = Denotes Significance at the Five Percent Level
(RMW)=LN Real Minimum Wage

Table 2- Mean and Median Values

Term	Range	Mean	Median	Standard Deviation
Number of Children	0–7	0.957	1.00	1.15
Years of Education	0-18	11.9	12.0	2.29
Earnings per Hour	$0.50-$12.00	$6.05	$5.92	1.98
Age	25-65	40.5	39.0	10.7
Natural Log Real Min. Wage	5.54-5.78	5.65	5.64	0.062
Natural Log Real Earnings	3.30-6.49	6.01	6.04	0.283

Table 3- Demographic Percentiles

Characteristic	Share of Sample in Percent
Race	100
White	82.9
Black	13.1
Other	4.0
Spanish Ethnicity	100
Hispanic	9.7
Non-Hispanic	90.3
Full Time Part Time	100
Full Time Full Year	50.8
Part Time Full Year	17.4
Full Time Part Year	16.4
Part Time Part Year	15.9
Marital Status	100
Married	63.9
Separated/Divorced	20.7
Single	15.4
Region	100
Northeast	20.9
North Central/Midwest	27.3
South	31.6
West	20.2
Metropolitan Status	95.0
Metropolitan	66.0
Rural	29.0
Occupation	100
Sales	12.2
Administrative Work	11.6
Labor Intensive	17.5
Clerical	28.5
Service	26.4
Recessionary Status	100
Recession	20
Non-Recession	80