The Minimum Wage: Effects on Employment, Future

Earnings, and Wage Growth

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1. Introduction

Since its implementation, the minimum wage has remained a fiercely debated topic in the United States' political sphere. Liberals support it as part of a broader set of anti-poverty policies, arguing that a minimum wage increase will provide additional income to millions of impoverished, working families ("Raise the Wage"). In response to this claim, conservatives appeal to intuitive economic theory, arguing that, as the cost of labor rises, firms will reduce the number of workers they employ and face unnecessary financial burden (Sherk 2013). Furthermore, conservatives cite anecdotal evidence about minimum wage workers, portraying them as economically-secure teenagers who work part-time at fast food establishments (Sherk 2013). Refuting these two notions, liberals reference the body of research that concludes minimum wage increases do not lead to unemployment and claim that 88 percent of those who would be affected by an increase are above the age of 20 (on average 35) and a majority are working full-time (Cooper and Essraw 2013).

Conservatives and liberals continue to go back and forth, arguing about unemployment effects and workforce characteristics. But, by and large, this is the extent of the minimum wage debate. To provide evidence for each side's position, a wealth of research has been conducted on the minimum wage, specifically for its effect on unemployment. However, assuming that the majority of minimum wage earners are primarily both adults and full-time employees, there lies an entirely new, untapped facet of the minimum wage debate: its long-term effects. If a position at the minimum wage marks the beginning of a career path, rather than a job for supplemental income, it may have an effect on a worker's labor market outcome (employment status, wage, etc.). This broader perspective on the minimum wage's effects produces a myriad of questions

and thus demands extensive analysis, which the current literature has failed to provide.

Analyzing labor market outcomes with this largely untapped approach will not only serve as an addition to the minimum wage literature, but also provide evidence for or against the minimum wage. If the research finds that such an increase has a negative or negligible effect on one's income growth, this would suggest minimum wage increases do not make a recipient better off in the long-run. This conclusion would bolster the conservative position against the minimum wage, leaving alternative anti-poverty measures to be pursued (educational investment, EITC funding, etc.). However, if a minimum wage increase leads to a steeper income trajectory, this would provide evidence in favor of its implementation. An approach focused on future outcomes would help answer questions about the long-term implications of the minimum wage and provide further information for the formulation of anti-poverty policy.

2. Literature Review

The argument regarding the minimum wage's negative effect on employment has long been supported by David Neumark's research (1995, 1996, 2007). Neumark (2007) addresses the long-term implications of youth employment at the minimum wage by suggesting that decreased earnings can be observed as early as an individual's late 20's. This research holds that if a high minimum wage leads to unemployment, a worker will not only lose their job, but also the opportunity to advance within that firm (a typical means of obtaining higher earnings). Furthermore, if they do re-acquire employment, they will not earn a wage significantly higher than that of their previous position. French, Mazumder, and Taber (2005) and Cooper (2014) have also determined that unemployment leads to decreased future earnings. However, the basis for Neumark's analysis (that a higher minimum wage causes unemployment) has yet to be

solidified within the literature. Cardoso (2009) and Card and Kreuger (1995) hold that modest minimum wage increases do not lead to discernible differences in unemployment. Despite this disagreement within the field, Neumark's broader conclusions about unemployment (regardless of its cause) and its effect on advancement and future earnings remain uncontested. These findings could offer an explanation for how unemployment, as a function of the minimum wage, helps explain labor market outcomes.

Similar to Neumark's findings on unemployment, Becker (1993) applies human capital theory to minimum wage increases. In the trade-off between increased wages or training, given the financial constraint of an increased minimum wage, Becker finds that firms will be forced to provide less training. With lower human capital (through lack of training), employees will face decreased future earnings in the labor market. Acemoglu and Pischke (1999) offer an opposing finding, arguing that firms will continue to provide general training since they extract the benefit: increased productivity. Employees can then transfer that human capital to other firms and receive higher earnings. While the departure of these employees serves as a disincentive to providing on-the-job training, the benefit received through increase productivity during their time of employment at that firm outweighs the minimal cost of simply general training. If a minimum wage increase leads to decreased future earnings, this result could be explained by Becker's theory. However, if it leads to increased future earnings, Acemoglu and Pischke's conclusions would still hold true.

Furthermore, given that a higher wage could draw more individuals into the labor force, the competition for that wage will increase. According to Cahuc and Michel (1996), workers may increase their investment in education to become more competitive candidates, raising their

human capital, and increasing their future earnings. Additionally, if firms decrease on-the-job training, education would provide an alternative for workers to increase their labor market desirability (Ravn and Sorensen, 1999). The dynamic between the minimum wage and educational attainment could play a role in my research. If a minimum wage increase does lead to increased future earnings, this could be explained, in part, by Cahuc and Michel's theory of educational investment.

In addition to literature on employment history and human capital, there is evidence to suggest that compensation received upon entering the labor market determines future earnings. According to Irons (2009), those who start their age-earnings profile at a lower compensation see smaller wage growth across the span of their lifetime. This concept is affirmed by Marks and Harold (2011) who determined that even slight differences in starting salary are indicative of a significant spread in wage growth. For example, a person who earns a marginally higher wage than someone else could see a significantly steeper income trajectory (growth in income over time). While this research focuses on salary data, the same reasoning could be applied to employment at the minimum wage to see how starting compensation affects future labor market outcomes. However, given that variances in starting salary are often explained by skill differentials, this theory might not hold for minimum wage increases, which are not based on human capital. Regardless, this theory could explain a future earnings differential between a group affected by a minimum wage increase and a group who is not, as the affected group is set on a higher income trajectory.

Neumark and Nizalova (2007), Cardoso (2009), and Clemens and Wither (2014) have conducted a similar analysis to the one proposed here. Neumark and Nizalova's and Cardoso's

analyses use a regression framework, while Clemens and Wither rely upon a difference-in-differences method. The addition of the difference-in-differences method extends the literature beyond simply how employment at the minimum wage affects future earnings, and considers the effect of minimum wage increases. While the literature in this field is advancing, it is still unsettled. Neumark and Nizalova's research concludes that minimum wage employment will lead to worsened labor market outcomes, but relies upon retrospective assumptions about wage data and does not account for employment history and human capital. While Cardoso's analysis considers more explanatory variables and reaches an opposing conclusion, it is the first of its kind and relies upon data from Portugal. The Clemens and Wither analysis relies upon data from the United States and reaches a conclusion in line with Neumark and Nizalova. The Clements and Wither study was released in November of last year, so the literature currently stands with Neumark and Nizalova, alongside Clements and Wither, against Cardoso. The most significant gap in this body of research is the existence of the research itself. With only three studies focusing on this topic in particular, I hope to test the limited conclusions available, and see if those results are consistent with data from the United States.

3. Research Design

To analyze the effect of raising the minimum wage, the increase observed in 2009 is used, since that year saw the largest nominal percentage change (from \$6.55 to \$7.25).[1] Given the severity of the increase, it is most likely to have a discernible impact on employment, future earnings, and wage growth. Data from the National Longitudinal Study of Youth 1997 (NLSY97) is used for this analysis.

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1   Given this year, the NLSY97 was more appropriate for use than the NLSY79. Choosing the later dataset allowed for more minimum wage observations, given that, in 2009, those in the NLSY97 were much younger.

In conducting this study, the observations were partitioned into three different groups, based on wages in 2008: Group A – earning between $5.25 and $7.25, Group B – earning between $7.25 and $9.25, and Group C – earning above $9.25. Group A is comprised of those who were affected by the 2009 increase, but only including those earning two dollars below the new minimum wage.[2] Group B consists of those similarly situated to members of Group A (i.e. low-wage workers), but earn up to two dollars above the new minimum wage. Group B serves as a comparison to Group A. The presence of Group C, given the height of its income range, is not useful for comparison, and was dropped from the sample.

4.1 Employment Probabilities – Outcomes by Group

Given that the wage increase took place in 2009, this analysis will consider how likely it is that a recipient is employed one period later (in 2010). Of those in Group A, 75.14 percent were employed in 2010. Of those in Group B, 76.92 percent were employed in 2010. Therefore, those in Group B were 1.79 percent more likely to be employed one period later.

4.2 Employment Probabilities – Probit Model

In determining whether the increase in the minimum wage affected employment status, the probit model shown in *Figure 1* below is used. This model relies upon the binary nature of Currie and Fallick's (1993) work, but targets the captured workers in a simpler manner[3]. Furthermore, it also borrows the benefit of controlling for changes in the labor market, since the entire sample is impacted.

Figure 1: Employment Probabilities – Probit Model

$$Employed_{2010} = B_0 + B_1 \, Group \, A_i + B_2 \, Education_i + B_3 \, Age_i + B_4 \, Gender_i + B_5 \, Ethnicity_i + error$$

2   No distinction is drawn between those earning tipped and non-tipped wages. Given that tipped workers are not bound by the non-tipped minimum wage, those who are present in Group A could lead to some measurement error.

3   Additionally, their model was used for the NLSY79, whereas this analysis uses the NLSY97.

Employment status in 2010 is measured by the binary variable *Employed.* The variable *Group A* is a binary determination of whether the individual was captured by the 2009 increase. *Education*, *Age*, and *Gender* are represented by their respective variables. *Ethnicity* is represented by three categories: Black, Hispanic, or non-Black/non-Hispanic[4].

4.3 Employment Probabilities – Empirical Analysis

The results of the probit model are shown in *Table 1* below. The robust tool is used to account for heteroskedasticity. The marginal effects show that *Group A* has a coefficient of -.015 and, with a p-value of .559, is statistically insignificant at a five percent significance level. These findings suggest that the increase did not affect how likely an individual was to be employed in 2010.

These results are quite surprising, as they contradict traditional economic theory. Theoretically, when the price of a worker rises, they are more prone to unemployment. Specifically, one of the more prevalent arguments against the minimum wage is that it negatively impacts those it is designed to help, by creating more unemployment among low-wage workers. However, this analysis would suggest that notion is inaccurate, given that the minimum wage increase did not play a discernible role in their employment status.

Table 1: Employment Probabilities – Probit Model with Robust Option: Marginal Effects

Variable	dy/dx[5]	P-Value
Group A	-.015187 (.0259115)	.559
Education	.028509 (.0136375)	.037
Age	-.026863 (.0150264)	.074

4   The NLSY97 does not provide any further breakdown of the non-Black/non-Hispanic category.
5   Standard errors are in parenthesis.

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Female	.0126704 (.0238003)	.594
Black	-.0663108 (.0260537)	.011
Hispanic	-.0207588 (.0322384)	.520

5.1 Future Earnings – Outcomes by Group

Given that the NLSY97's most recent data comes from 2011, earnings from two years after the increase can be examined. On average, those in Group A who were employed had a wage of $11.68. Contrarily, those in Group B and employed had an average wage of $13.54. Therefore, of those employed, Group B workers earned $1.86 more (on average) in 2011.

5.2 Future Earnings – Regression Model

To determine the impact of the minimum wage increase on future earnings, the regression model shown in *Figure 2* below is used.

Figure 2: Future Earnings – Regression Model[6]

$$\ln(Wage_{2011}) = B_0 + B_1 Group\ A_i + B_2 \ln(Wage_{2008})_i + B_3 \ln(Wage_{2009})_i + B_4 Education_i + B_5 Age_i + B_6 Gender_i + B_7 Ethnicity_i + error$$

The dependent variable *ln(Wage$_{2011}$)* is the log of wage in 2011. Similarly, *ln(Wage$_{2008}$)* and *ln(Wage$_{2009}$)* represent the log of wages in 2008 and 2009, respectively. These two independent variables are included to account for wages in previous years and isolate the effect of the minimum wage increase. All other variables (*Group A, Education, Age, Gender,* and *Ethnicity*) are the same as in the probit model above (see *Figure 1*).

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6   This model is run on only those who were employed in 2008, 2009, and 2011, in order to avoid skewing the effects of the variables.

5.3 Future Earnings – Empirical Analysis

The results of the regression model are shown in *Table 2* below. The robust tool is used to account for heteroskedasticity. The analysis shows that *Group A* has a coefficient of -.079 and, with a p-value of .082, is statistically insignificant at a five percent significance level.

These findings suggest that the increase did not affect an individual's earnings in 2011.This would contradict any research suggesting that a worker affected by a minimum wage increase would see higher or lower earnings in the future (two periods, in this case) because of that raise.

Table 2: Future Earnings – Regression Model with Robust Option

Variable	Coefficient[7]	P-Value
Constant	5.635788 (1.178792)	--
Group A	-.0787842 (.0452887)	.082
$\ln(\text{Wage}_{2008})$	.0914283 (.1488353)	.539
$\ln(\text{Wage}_{2009})$	.1525343 (.0731971)	.037
Education	.0225917 (.0137979)	.102
Age	-.0191148 (.0141117)	.176
Female	-.0668956 (.0240357)	.006
Black	.0048498 (.0267483)	.856
Hispanic	.0000211 (.0381945)	1.000

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7   Standard errors are in parenthesis.

6.1 Wage Growth – Outcomes by Group

Given that the minimum wage increase took place in 2009 (and the most recent NLSY97 data is for 2011), wage growth can be observed from 2009 to 2011. On average, those in Group A who were employed in both periods saw a wage growth of 6.55 percent. Contrarily, those in Group B and employed in both periods saw an average wage growth of 7.27 percent. Therefore, of those employed in both periods (in both groups), Group B workers saw a .72 percentage point higher wage growth.

6.2 Wage Growth – Economic Model

To determine the impact of receiving the 2009 minimum wage increase on wage growth, the regression model shown in *Figure 3* below is used.

Figure 3: Wage Growth – Regression Model[8]

$$\ln\left(Wage_{2011}\right) - \ln\left(Wage_{2009}\right) = B_0 + B_1\,Group\ A_i + B_2\,Education_i + B_3\,Age_i + B_4\,Gender_i + B_5\,Ethnicity_i + error$$

An individual's wage growth from 2009 to 2011 is measured by the left-side equation $\ln(Wage_{2011})$ - $\ln(Wage_{2009})$.[9] The remainder of the variables (*Group A*, *Education*, *Age*, *Gender*, and *Ethnicity*) are the same as those in the previous model (see *Figure 2*).

6.3 Wage Growth – Empirical Analysis

The results of the regression model are shown in *Table 3* below. The robust tool is used to account for heteroskedasticity. The results show that *Group A* has a coefficient of -.009 and, with a p-value of .831, is statistically insignificant at a five percent significance level.

These results fall in-between the divide of Neumark and Nizalova (2007), alongside

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8   This model is run on only those who were employed in 2008, 2009, and 2011, in order to avoid skewing the effects of the variables.
9   Ideally, this timespan would be longer. However, time may not be a concern, given the insignificance of receiving the increase on wages just two periods later.

Clemens and Wither (2014), versus Cardoso (2009). Without any statistical significance, there is no evidence to suggest that receiving a minimum wage increase has a positive or negative impact on wage growth over two periods.

Table 3: Wage Growth – Regression Output with Robust Option

Variable	Coefficient[10]	P-Value
Constant	.1085121 (.4848484)	--
Group A	-.0086005 (.0403051)	.831
Education	.0081935 (.0186399)	.660
Age	-.0041833 (.0203936)	.838
Female	-.0230077 (.035101)	.512
Black	.0334103 (.0387777)	.389
Hispanic	.0049849 (.0502532)	.921

6. Conclusion

This research has generated three key findings. First, despite what economic theory tells us about the minimum wage and unemployment, the increase did not affect how likely an individual was to be employed in 2010. If a modest minimum wage increase helps lift people out of poverty, without creating unemployment, this result would provide evidence in support of raising it.

Second, being captured by the minimum wage increase has a negligible impact on future earnings. This would suggest that raising the minimum wage will have no impact on a recipient's

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10 Standard errors are in parenthesis.

wage within two years. This means that, if policy-makers are looking to jump-start a worker's wage in the future, a minimum wage increase is not a successful means of accomplishing this goal.

Third, the minimum wage has no significant impact on one's wage growth over the two years after an increase. If raising the minimum wage has a negligible effect on wage growth, other anti-poverty programs (i.e. subsidized higher education) might be more effective in generating long-term wage growth.

Going forward, there are several other important topics for future research. One, for example, would be to examine different years in which the minimum wage was increased. Smaller increases might have a different impact on all of the variables tested here. Furthermore, using a time period longer than two years after an increase might generate different results and provide a more accurate picture of the minimum wage's long-term effects on future earnings, if any.

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