Are Minimum Wage Increases Responsible for Increasing the Unemployment Rate?

Alex Hiidel

Aph26@zips.uakron.edu

Dr. Renna

College of Business Administration

259 South Broadway St.

Akron, OH 44325

Abstract

In this paper the research question addressed of the effects of the minimum wage on unemployment is tested along with other variables to determine if minimum wage does play the largest role in increasing the unemployment rate. In the OLS regression model ran all variables tested were significant at the 99 percent confidence level, with minimum wage having the highest significance. When using the one-way fixed effects model minimum wage was again statistically significant at the 99 percent confidence level, but its effect on unemployment was decreased. To reduce the adverse effects of a minimum wage increase on employees the increase should be small to allow firms time to adjust to increasing expenditures. If a labor market is relatively more elastic a minimum wage increase may not be of any benefit to workers, since firms will demand less labor as the price level increases.

Table of Contents

I.	Motivation	Pg. 4
II.	Review of the Literature	Pg. 5
III.	Model	Pg. 8
IV.	Methodology	Pg. 9
V.	Results	Pg. 10
VI.	Conclusion	Pg. 13
VII.	References	Pg. 15

Motivation

The unemployment rate is the measure of people in the labor force that are currently without work, and is affected by multiple factors. This paper will exam the factors that affect the unemployment rate, and in particular will look at how the minimum wage affects the unemployment rate. Theory predicts that as the minimum wage increases, labor force participation would increase, the quantity demanded would decrease, driving a wedge between the supply of and demand for labor ultimately leading to an increase in unemployment. In the research conducted for this paper, it is expected that the results will coincide with the theory of demand for labor. It is expected that the coefficient for minimum wage will be positive. This paper will examine how the minimum wage affects unemployment and if this is the largest factor is the fluctuations of the unemployment rate.

This study expects to find a positive relationship between minimum wage increases and the unemployment rate. A review of the literature done by Belman, Wolfson, & Nawakitphaitoon (2015) have found many studies to have conflicting results when looking at the effects of the minimum wage on the number of hours worked by teenagers and young adults. They found that four studies reported a negative effect, two reported no effect, one reported a positive effect, and one reported a mixed effect. If the market is competitive, economic theory would expect that as the minimum wage increases, employers will reduce both the number of hours worked, and the number of workers employed post increase. This is a simple supply and demand theory used to explain the effects of a minimum wage increase.

This study will look to expand upon research previously done on the effects that minimum wage has on unemployment by determining if changes in the minimum wage are good indicators of fluctuations in the unemployment rate. Other variables will factor into an

increasing unemployment rate, but the interaction between minimum wage and unemployment is the main area of study. If this study does not coincide with economic theory, it can be concluded that other factors play a substantial role in determining the unemployment. This study will look to confirm what theory predicts, as minimum wage increases the unemployment rate will also increase. While theory predicts a positive effect between unemployment and minimum wage, studies previously done have not always found theory to be true. Based on the economic theory discussed above, I hypothesize that as the minimum wage increases between years, the unemployment rate will follow a similar trend. In his study, Wessels (2005) found that increases in the minimum wage decrease labor force participation, and I expect the same to be true when comparing the effects of an increasing minimum wage to the unemployment rate.

Review of the Literature

Using Mincer's "pull-push" theory, Wessels (2005) hypothesizes that an increase in the minimum wage can lead to a decrease or an increase in the labor force participation depending on whether the reduction in employment caused by the increase in the minimum wage is larger or smaller than the corresponding increase in minimum wage. Using data at the state level on teenager labor force participation from 1979 to 1999, he ran a first difference model with AR(8). He checked the robustness of his results with a 2SLS. Throughout the results Wessels consistently finds a negative effect of minimum wage on labor force participation, in particular a 10 percent increase in minimum wage is found to decrease teenager's labor force participation by 1.6 percent. Throughout his research Wessels (2005) also finds that a 10 percent increase in minimum wage reduces new entrants by 5 percent.

In research done by Lopresti and Mumford (2015) they found that the size of a minimum wage increase can have either a negative or positive effect on the upward mobility of low-wage workers. The upward mobility discussed by Lopresti and Mumford (2015) refers to the ability of a worker to move from a lower income bracket to a higher one. If they face adverse consequences due to an increase in minimum wage, workers may be prevented from moving to a higher income bracket which contributes to the negative effect that minimum wage can have on upward mobility. Lopresti and Mumford (2015) found that a minimum wage increases in excess of 20 percent provided the strongest positive wage affects to workers, but small increases in the minimum wage (less than 20 percent) reduced a worker's annual wage growth when looking at low-wage workers. Using state level data collected by the CPS, they observed individuals between August 2005 and June 2008, who were 16 and older and employed during the time of both interviews. Lopresti and Mumford (2015) ran two models, first an OLS model, and second a Median Regression model. The dependent variable is the fractional wage change between interviews, and the observable variable is an indicator variable equal to one if the individual *I* has a wage in the range of wage group *j* at the time of the first interview. While Lopresi and Mumford did not use minimum wage as their dependent variable as I am in my study, they do study how changes in the wage can affect a worker from year to year. To test the robustness of the fractional wage change, they repeat the estimation using median regression excluding states that raise the minimum wage in each year of their sample, as well as those that did not change the wage at all.

One main concern when raising the minimum wage is that it does not affectively target the groups that would benefit most from an increase in their wages. Raising the minimum wage to $9.50 an hour does not target the working poor efficiently, Sabia, & Burkhauser (2010) found

that only 11.3 percent of people affected by this minimum wage increase are living in a poor household. The authors pooled data from the March 2004 through March 2008 CPS to estimate a fixed effects model. They also used a simulation to show the effects of increasing the minimum wage. Their results showed that increasing the minimum wage to $9.50 an hour will lead to a loss of 1.3 million jobs, including 168,000 jobs currently held by the working poor. They also find the increase would not diminish poverty significantly, since the minimum wage does a poor job of targeting the working poor.

The restaurant industry employs nearly half of all U.S. workers paid at or below the federal minimum wage. Even, & Macpherson (2014) found that in a competitive labor market an increase in the minimum wage for tipped employees leads to a decrease in employment as well as the number of hours worked for those employees. Using state level data, the authors used a Difference-in-difference estimation to examine the effect of higher minimum wages for tipped workers on employment or earnings. The authors also implemented falsification tests to determine whether they find effects of the tipped minimum wage in occupations and industries where there should be no effect. Even, & Macpherson (2014) determine that increasing the minimum wage for tipped employees does in fact increase earnings, but it does reduce employment, similar to the effects of the minimum wage.

The minimum wage does not only increase unemployment, but also could lead to longer spells of unemployment. Partridge, & Partridge (1999) using state level data, used a lagged variable model to determine how an increase in the minimum wage will affect long term unemployment. The authors determine that regardless of whether you use the competitive model or monopsony model the unemployment rate is determined by the amount of labor supplied and

labor demanded in each state. The results confirm a negative interaction between minimum wage and unemployment.

Model

The theory used to explain the effects of the minimum wage on the unemployment rate will be a simple supply and demand model. This theory also explains the interaction between the supply and demand when the minimum wage is increased. When the minimum wage is raised and becomes a binding wage, this will drive a wedge between the demand for labor and supply of labor, the resulting consequence is a rise in the unemployment rate. The elasticity of labor demanded will also determine how a proposed minimum wage increase will affect unemployment. If the elasticity is high (greater than one) the quantity of labor demanded will decrease by a larger percentage than the minimum wage increase. The opposite will be true if the elasticity is small.

The study will make use of both the minimum wage and unemployment rate of each state. The minimum wage changes are measured over several years, in each U.S. state. Also, the unemployment rate is measured on a yearly basis, and for each U.S. state. Other variables are used to determine if minimum wage is a large determinant in the unemployment rate.

The dependent variable in this study will be unemployment rate (*Urate*). The variables responsible for raising the unemployment rate that will be measured are real minimum wage (*Minwage*), gross state product per capita in thousands of dollars (*GSP*), poverty rate (*Prate*), the log of the number of TANF recipients per capita (*TANF*), and the log of the number of SNAP benefit recipients per capita (*SNAP*). The economic model used is as follows:

$$\text{Urate} = \beta_0 + \beta_1\text{Minwage} + \beta_2\text{GSP} + \beta_3\text{Prate} + \beta_4\text{Log(TANF)} + \beta_5\text{Log(SNAP)} + \varepsilon$$

This model is used to run both an OLS regression and a one-way fixed effects model.

Methodology

The data used in this study was collected by The University of Kentucky Center for Poverty Research (UKCPR) and includes state level data for all 50 U.S. states and the District of Columbia. The data set totals 1,836 observations ranging from 1980 to 2015. *Table 1* indicates the variables currently being used in this study and a brief description of each. Column 3 in *Table 1* shows the descriptive statistics of each variable. From the top down the statistics are, the mean, standard deviation, minimum, and maximum.

Table 1

Variable	Description	Descriptive Statistics
Minimum Wage	Real minimum wage (2015 base year)	7.47 (0.73) 6.05 - 10.50
Unemployment Rate	State level unemployment rate per year	6.08 (2.10) 2.30 - 17.80
Poverty Rate	State level poverty rate	13.17 (3.89) 2.90 - 27.20
Gross State Product	Gross state product per capita in thousands	33.37 (19.16) 8.47 – 182.24
SNAP Benefit Recipients	Log of the percentage of the population that receives SNAP benefits per year	0.09 (0.04) 0.017 – 0.224
TANF Recipients	Log of the percentage of the population that receives TANF benefits per year	0.03 (0.02) 0.0009 – 0.1335

Results

All variables used in the OLS regression are significant at the 99% confidence level, and all variables signs were as expected which can be seen in *Table 2*. The only variable used that has a negative effect on the unemployment rate in GSP per capita. With regards to GSP per capita as it increases by one dollar, the unemployment rate decreases by roughly 0.01 percentage points. This negative effect is expected since a state that has a lower unemployment rate would be able to increase spending relative to states with a higher unemployment rate.

As the minimum wage increases by $1 unemployment increases by about 1 percentage points which is the expected result. This result aligns with the theory of supply and demand. As discussed earlier as the minimum wage increases a wedge is driven between labor demanded and labor supplied increasing the unemployment rate.

Two other variables are worth noting due to their relatively high T-Value. The poverty rate has a positive effect with unemployment rate, as the poverty rate increases by 1 percent the unemployment rate decreases by 0.18 percentage points. Also, the log of the percent of the population that is a recipient of SNAP benefits has a positive effect with unemployment. As the log of the percent of SNAP recipients increases by 1 percent the unemployment rate also increases by about 1.25 percent.

When running the OLS regression using the model represents roughly about 44 percent of the variance when predicting the unemployment rate. Also, the Root MSE which measures how far a data point lies from the line of fit is relatively average.

Table 2: OLS Regression

Variable	Parameter Estimate	Standard Error	T-Value
Intercept	0.58828	0.66855	0.88
GSP Per Capita	-0.01372	0.00223	-6.15
Poverty Rate	0.17651	0.01329	13.29
Real Minimum Wage	1.00487	0.05168	19.44
Log(TANF)	0.21103	0.04871	4.33
Log(SNAP)	1.25036	0.12306	10.16

Root MSE	R-Squared
1.57	0.44

Table 3 represents the results from the one-way fixed effects model. The fixed effects model is used to minimize any omitted variable bias, and corrects for error term correlation over time. In the OLS model unobservable factors that are correlated between variables are not accounted for. The fixed effects model accounts for the variation between categories, and attempts to minimize the effects of omitted variable bias. For example, the unemployment rate for Ohio could have increased from 2010 to 2011 because the quality of workers that firms hired was superior relative to the quality of employees available to a firm in the past resulting in firm's reducing the number of employees they need. The quality of those workers is difficult to measure and would be an omitted variable in the normal OLS model, but the fixed effects model looks at within group variation over time and minimizes the effects. For this reason, the fixed effects model may be a better way to measure how minimum wage affects unemployment. For the one-way fixed effects model, the economic model used was:

$$Urate_{i,t} = \beta_0 + \beta_1 Minwage_{i,t} + \beta_2 GSP_{i,t} + \beta_3 Prate_{i,t} + \beta_4 Log(TANF)_{i,t} + \beta_5 Log(SNAP)_{i,t} + \varepsilon_{i,t}$$

Where “i” represents states and “t” represents the year. This economic model was used for the following output which can be found in *Table 3*.

Again, in this model all variables used are significant at the 99% confidence level. When using the one-way fixed effects model, the effects that the minimum wage has on the unemployment rate is decreases. As the minimum wage increases by $1 the unemployment rate increases by 0.66 percentage points. Also, the T-Value decreases from 19.44 in *Table 2* to 13.62 in *Table 3*. The effects of the minimum wage are reduced in the one-way fixed effects model relative to the OLS model used earlier.

The log of the percent of the population that receives SNAP benefits is more significant in the one-way fixed effects model. As the percentage of SNAP benefit recipients increases by 1 percent the unemployment rate will increase by 2.07 percentage points. The impact of the SNAP benefits is roughly 65% larger when using the one-way fixed effects model relative to the OLS model used previously. Also, in the fixed effects model the poverty rate has nearly twice the impact as it did in the OLS model. In the fixed effects model as the poverty rate increases by 1 percent the unemployment rate increases by roughly 0.32 percentage points.

In the one-way fixed effects model, the R-squared represents roughly 64 percent of the variance when predicting the unemployment rate.

Table 3: One-Way Fixed Effects Model

Variable	Parameter Estimate	Standard Error	T-Value
Intercept	3.311526	0.7392	4.48
GSP Per Capita	-0.04323	0.00342	-12.63
Poverty Rate	0.320781	0.0175	18.33
Real Minimum Wage	0.658565	0.0484	13.62
Log(TANF)	-0.29481	0.0664	-4.44
Log(SNAP)	2.069494	0.1357	15.25

Root MSE	R-Squared
1.27	0.64

Conclusion

This study attempts to expand upon the current collection of minimum wage and unemployment research. The purpose of this study is to examine if the minimum wage is the main component affecting the unemployment rate. Based on theory using the supply and demand model, a binding minimum wage should lead to an increase in unemployment as the minimum wage is increased. This paper uses both an OLS regression model and a one-way fixed effects model to measure the impact of different variables on unemployment. The impact that minimum wage had on unemployment was small relative to other variables used in the model. Minimum wage does affect the unemployment rate, but does not account for as much of the unemployment rate as predicted.

This study can also be used for policy implications. The minimum wage is one factor that determines how the unemployment rate will react to fluctuations in the labor market. If a minimum wage increase is too significant the effects may be devastating to those it is intended to help. For example, firms may reduce the amount of labor demanded, cut the hours of their

current employees, or a worker could be moved into a higher tax bracket. For a worker in a labor market where demand for labor is relatively more elastic the consequences of a minimum wage increase could be detrimental. If the market is highly elastic, as the minimum wage increases firms will reduce the amount of employment significantly. For a minimum wage increase to be effective the current market must be examined. If the market is relatively more elastic a minimum wage increase should be implemented by individual firms instead of at a state or federal level. Also, a minimum wage increase should be small allowing firms to adjust so that workers do not receive less hours or reduced employment.

Two limitations in this study is that an education variable is not included to obtain the real minimum wage the country wide yearly average CPI is used. In future studies an education variable should be included to consider any signaling affect to employers. Also, if possible the CPI used to obtain real wage should be state level data, like the rest of the variables used.

References

Belman, D., Wolfson, P., & Nawakitphaitoon, K. (2015). Who is affected by the minimum wage? *Industrial Relations, 54*(4), 582-621. Retrieved from http://ezproxy.uakron.edu:2048/login?url=https://search-proquest-com.ezproxy.uakron.edu:2443/docview/1761435440?accountid=14471

Even, W., & Macpherson, D. (2014). The Effect of the Tipped Minimum Wage on Employees in the U.S. Restaurant Industry. *Southern Economic Journal, 80*(3), 633-655. Retrieved from http://www.jstor.org/stable/23809644

Lopresti, J. W., & Mumford, K. J. (2015). *Who benefits from a minimum wage increase?* W.E. Upjohn Institute for Employment Research, Upjohn Working Papers and Journal Articles: 15-224. Retrieved from http://ezproxy.uakron.edu:2048/login?url=https://search-proquest-com.ezproxy.uakron.edu:2443/docview/1684397764?accountid=14471

Partridge, M. D., & Partridge, J. S. (1999). Do minimum wage hikes raise US long term unemployment? evidence using state minimum wage rates. *Regional Studies, 33*(8), 713-726. Retrieved from http://ezproxy.uakron.edu:2048/login?url=https://search-proquest-com.ezproxy.uakron.edu:2443/docview/208878912?accountid=14471

Sabia, J., & Burkhauser, R. (2010). Minimum Wages and Poverty: Will a $9.50 Federal Minimum Wage Really Help the Working Poor? *Southern Economic Journal, 76*(3), 592-623. Retrieved from http://www.jstor.org/stable/27751487

University of Kentucky Center for Poverty Research. 2017. “UKCPR National Welfare Data, 1980-2016.” Gatton College of Business and Economics, University of Kentucky, Lexington, KY. http://www.ukcpr.org/data (accessed <today’s date>)

Wessels, W. J. (2005). Does the minimum wage drive teenagers out of the labor force? *Journal of Labor Research, 26*(1), 169-176. Retrieved from http://ezproxy.uakron.edu:2048/login?url=https://search-proquest-com.ezproxy.uakron.edu:2443/docview/56420745?accountid=14471