



Relationship between Youth Unemployment and Minimum Real Wage: An Empirical Analysis of the Hungarian Labor Market Using Multivariate Least Squares Regression Analysis

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Abstract: One of the best known predictions of standard economic theory is that an increase of minimum wage decreases employment and thus job opportunities of low-skilled, low-experienced workers. This paper provides an in depth analysis of the dynamics of the Hungarian youth employment. An econometric model is set up, and a Multivariate Least Squares Regression Analysis was performed to describe and predict the market's behavior. It is found that if minimum real wage increases by one percent, youth unemployment will increase by approximately one percent as well. Therefore, the results of the regression analysis supports the theory. It is also shown how the financial crisis, investment, and the number of students studying at universities impact the labor market.

Keywords: Real Minimum Wage, Youth Unemployment

1 Introduction

The labor market has a tremendous impact on the economy on many different levels. Having a job is a necessity, therefore everyone has a stake in the market. Due to its extraordinary impact on education and the well-being of the society, the effect of minimum wage on youth unemployment has been studied extensively; there are over thirty published time-series studies conducted only in the U.S. since 1970.

Studies on the labor market has found different results.

Robert H. Meyer and David A. Wise have concluded that without minimum wage, out-of-school youth employment would be four to six percent higher. [1]

Charles Brown, Curtis Gilroy, Andrew Kohen have found that minimum wage reduces teenage employment, however, the magnitude is questionable, therefore researchers should be more careful analyzing the effect of minimum wage on youth unemployment. They also examined the relative importance of changing the level and coverage of the minimum wage; the timing of responses to a change in the minimum; effects on part-time and full-time work; and effects on young adults aged between 20 and 24. [2]

David Card, Alan B. Krueger argued that there is a need to control for bias, and the evidence that an increase in minimum wage decreases youth unemployment is not that significant. [3]

One of the most recent research project conducted by David Neumark, William Wascher have found that an increase in minimum wages cause employment losses among youths. [4]

All of these claims and theories show the true complexity of modeling a market that has as many different determining factors - f.e. investment, GDP growth, number of students at universities - as the labor market. These complex economic relations drive youth unemployment. An econometric model is presented as the basis of the analysis and prediction of future market behavior. The model is imperfect; however it captures several of the significant contributing factors. In this research a perfectly competitive labor market is assumed in order to best understand the dynamics of the market.

2 Procedure

2.1. Background and Data

The primary dataset used was supplied by the Central Hungarian Statistical Institution (KSH), a government organization that provides data regarding the labor market. The dataset provided by the KSH is a publicly available standardized electronic record, starts from 1998 and ranges till 2012.

Youth unemployment is divided into two groups: teenagers (15-19 years old) and young adults (20-24 years old). It is calculated as follows: the number of youths looking for jobs divided by the youth labor force, and then multiplied by one hundred to acquire a percentage rather than a decimal. The minimum real wage is given in units (1 Unit = 1 HuF), and uses a CPI base of 1960 and calculated accordingly. Investment uses 1960 as its base year and given in units. The financial crisis is applied as a dummy binary variable; it is given a value of 1 during 2008 and 2012, and 0 otherwise. This data set allowed to compare the theoretical model's predictions with the actual behavior of the market.

2.2 Linear Regression

A linear correlation was found between the youth unemployment and minimum real wage. The linear regression determined the correlation to be 0.9878. This result justifies

that youth unemployment and minimum real wage have an endogenous interrelationship.

3 Economic Theory

To show how changes in minimum wage affects youth unemployment, the theory of aggregate demand and aggregate supply model is used in this section.

Macroeconomists believe that the key difference between the short run and the long run is the behavior of prices. Over long periods of time, prices are flexible, the aggregate supply curve is vertical, and changes in aggregate demand affect the price level but not output. Over short periods of time, prices are sticky, the aggregate supply curve is flat, and changes in aggregate demand do affect the economy's output of goods and services.

Fluctuations in the economy as a whole come from changes in aggregate supply or aggregate demand. Economists call exogenous events that shift these curves shocks to the economy. [5]

An increase of minimum wage is considered as a supply shock. This shock shifts the short run aggregate supply curve upward, which generates a loss in output, therefore it causes a recession. To solve this problem aggregate demand needs to be stimulated or minimum real wage has to be reduced. Due to the debatable effects of increasing minimum real wage, government policies often opt to increase it.

4 Econometric Analysis

In this section, an econometric analysis is carried out to determine whether there is a relationship between youth unemployment, minimum real wage, the financial crisis, investment and the number of students currently enrolled in universities. Econometric models can be written of the form:

$$(4.1) \quad \ln(Y)_t = \alpha_0 + \alpha_1 * \ln(mw) + \alpha_2 * inv + \alpha_3 * inv^2 + \alpha_4 * fc$$

$$(4.2) \quad \ln(Y)_t = \alpha_0 + \alpha_1 * \ln(mw) + \alpha_2 * ns + \alpha_3 * fc$$

where $\ln(Y)$ represents the natural log of youth unemployment rate, $\ln(mw)$ represents the natural log of the minimum real wage, ns represents the number of students currently studying at universities, inv represents investment, and fc the financial crisis, applied as a binary dummy variable. A regression was conducted separately for youths ages between 15 and 19, and ages between 19 and 24. The result of these regressions can be found in the Appendix.

4.1. Regression Interpretation I

A MLS regression was conducted for equation (4.1). There exists a positive relationship between youth unemployment, financial crisis and minimum real wage; an inverse relationship between youth unemployment and investment. 78.4% of the changes in youth unemployment are caused by changes in minimum real wage, investment, and the financial crisis, as indicated by R-squared for youths aged between 15 and 19.

A 1% increase in minimum real wage leads to a 1.05 % increase in youth unemployment. Analysis of the regression results indicates that the slope parameter is significantly different from zero at the 0.2% level. Therefore, there is a significant relationship between minimum real wage and youths unemployment. The 95% confidence interval around our slope parameter suggests that a 1% increase in minimum real wage can increase youth unemployment anywhere from 0.48% to 1.63%.

Similarly to minimum real wage, the financial crisis had a positive relationship to youth unemployment. The financial crisis is applied as a dummy binary variable, therefore the interpretation is as follows: during the financial crisis youth unemployment was 27% higher. Analysis of the regression results shows that the slope parameter is significantly different from zero at the 1% level; thus there is a significant relationship between youth unemployment and the financial crisis. The 95% confidence interval around our slope parameter suggests that the financial crisis increased youth unemployment anywhere from 7.2% to 46.7%.

On the other hand, investment and youth unemployment are inversely related. A 1 billion unit increase in investment decreases youth unemployment by approximately 3%. Analysis of the regression results shows that the slope parameter is significantly different from zero at the 7.2% level; thus there is a significant relationship between youth unemployment and investment. However, this statistical significance is not as stark as it is with the financial crisis and minimum real wage. The 95% confidence interval around our slope parameter suggests that investment decreases youth unemployment anywhere from 6.8% to 0%.

4.2 Regression Interpretation II

A MLS regression was conducted for equation (4.2). This regression was computed using youth unemployment for the population between 19 and 24 years old, as the number of students studying at universities is related to this age group. There exists a positive relationship between youth unemployment, financial crisis and minimum real wage; an inverse relationship between youth unemployment and the number of students studying at universities. 76.3% of the changes in youth unemployment are caused by changes in minimum real wage, number of students studying at universities, and the financial crisis, as indicated by R-squared for youths aged between 19 and 24.

A 1% increase in minimum real wage leads to a 1.10 % increase in youth unemployment. Analysis of the regression results indicates that the slope parameter is significantly different from zero at the 0.9% level. Therefore, there is a significant

relationship between minimum real wage and youth unemployment. The 95% confidence interval around our slope parameter implies that a 1% increase in minimum real wage can increase youth unemployment anywhere from 0.33% to 1.87%.

Similarly to Regression Interpretation I, financial crisis had a positive relationship to youth unemployment. During the financial crisis youth unemployment was 35.7% higher. Analysis of the regression results shows that the slope parameter is significantly different from zero at the 1.5% level; thus there is a significant relationship between youth unemployment and the financial crisis. The 95% confidence interval around our slope parameter suggests that the financial crisis increased youth unemployment anywhere from 8.3% to 63.1%.

Moreover, the number of students studying at universities and youth unemployment are inversely related. An increase of 100,000 students studying at universities decreases youth unemployment by approximately 24.8%. Analysis of the regression results shows that the slope parameter is significantly different from zero at the 15.7% level; thus there is not any statistically significant relationship between youth unemployment the number of students studying at universities. The result is economically significant, since an increase in the number of students decreases the youth labor force, therefore decreases youth unemployment.

5 Conclusions

Econometric models have been presented in order to examine the labor market's behavior. Due to its nonlinear behavior and broad spectrum of driving factors the labor market is very hard to predict. The presented model is by no means perfect; however, it serves a purpose for understanding the market's behavior. A reliable model would prove useful tool in the prediction of the labor market's future dynamics. According to the MLS regression presented, an 1% increase in minimum real wage increases youth unemployment by approximately 1%. To progress with labor market modeling, several other factors need to be considered. In spite of the progress made, there is room for further research in this complex system.

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