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# Testing the Influential Factors of Unemployment in the Developed World

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***ABSTRACT.*** *This study tests a set of theoretically influential factors of unemployment with a 16-year long panel consisting 32 OECD countries. These factors include government policies, union power, real per capita GDP growth and internet access. Both an OLS and a 2SLS model are estimated to address simultaneity bias. It finds that while expenditure on active labor market programs (ALMP) is negatively associated with the unemployment rate, unemployment benefits, wage bargaining, labor market regulations and hiring firing restrictions are positively associated with the unemployment rate. However, these results are subjected to bias and may not be completely trustworthy.*

***KEYWORDS:*** *Influential factors, Unemployment rate, OLS model, 2SLS model*

## 1. Introduction

Having a large number of laid-out workers in the labor force is a serious socio-economic issue, for it not only leads to a loss of productivity but also incurs costs for the unemployed as well as the government. During the 2008 Great Recession, many economies around the world suffered from high unemployment: In the United States, the unemployment rate soared to 10% in October 2009, which is the highest level ever seen since 1982. In the Euro area, the overall unemployment rate peaked at 12% in 2012 with Spain reaching 26.1% and Greece hitting a striking 27.5% (DataBank). Although the U.S. unemployment rate has dropped below the pre-recession level in November 2016, the number of unemployed workers in the economy and the annual government expenditure on unemployed benefits still seem formidable by their absolute numbers: According to the U.S. Department of Labor, there were approximately 6.31 million unemployed workers in the United States in 2018, which costs the federal government 27.82 billion dollars on unemployment insurance and ALMPs. In other parts of the world such as Africa, Latin America, and the Caribbean countries, unemployment rates

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remain persistently high despite business cycles, and the high unemployment rates in these countries are closely associated with poverty, political instability, and violent crimes (Human Rights Watch).

Since the time of Lord John Maynard Keynes, economists have been particularly concerned with the issue of unemployment and have proposed several influential factors. For example, the classical theory attributes unemployment to minimum wage and the presence of trade unions. The New-Keynesian theory, however, focuses on the turnover cost and efficiency wage. The business cycle has long been recognized as a determining factor of unemployment, and its formidable power has been fully displayed in the Great Recession. Besides, factors such as the amount of unemployment benefits and job-searching costs are also considered to have an impact on the unemployment rate. But while the impact of business cycle on unemployment is indisputable, the effects of many other theoretical factors remain contentious: In 2014, the U.S. Congress failed to extend the unemployment insurance duration, which sparked a heated public debate on how much unemployment benefits disincentivizes job search ("7 Reasons"). In 2018, a proposal about creating an EU-wide unemployment benefit triggered similar debates among EU members about the possible consequences of this unemployment benefit on EU's already high unemployment rate ("Germany's").

Do these theoretically sound factors have an impact on unemployment in the real world? This study attempts to answer this question by constructing an econometric model predicting the unemployment rate with a variety of theoretical factors. Some of these factors capture the effects of government policies, such as labor market regulations, unemployment benefits, and ALMP expenditures. Others characterize the impacts of trade unions, including union density and percentage of collective bargaining. Internet access is also included since it reduces job search costs and may thus decrease frictional unemployment. I will fit the model with a panel dataset of 32 developed economies from 2000 to 2015, test each variable's statistical significance, and interpret the coefficients. These selected countries all have credible and detailed labor statistics and other national-level data, thus they are suitable for an econometric approach. To address potential simultaneity in my model, I will perform both an OLS estimation and a 2SLS estimation and compare their results. By identifying the significant variables from a variety of potentially influential factors, this study would help policymakers optimize their labor market policies and target the true causes of unemployment.

## 2. Literature Review

There is a large body of literature studying the influential factors of unemployment. However, empirical works based on different approaches and different datasets sometimes do not confirm with one another. On the impact of unemployment benefits, an earlier study by Abbring, H. Jaap et al. using Netherland unemployment data found

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that unemployment benefit sanctions substantially increase the re-employment rate [1]. Eight years later, three European economists derive the similar result using an OECD dataset, but they also noticed that, while cutting unemployment benefits reduces unemployment, the earnings and overall qualities of the workers' post-employment jobs tend to be lower than their pre-employment ones [2]. On the contrary to these two previous studies, a recent study on the macroeconomic effects of unemployment benefits in Denmark indicates that a reduction of unemployment benefit has little impact on the aggregate unemployment rate [3].

As for the impact of ALMPs on unemployment, David Card et al. evaluated the labor market outcomes of 199 different ALMPs from 1995 to 2007 and concluded that in the short run, most ALMPs have limited impact on workers' re-employment. However, some programs appear to have a positive impact on re-employment three to five years later[4]. A recent study controlling more macroeconomic factors, however, shows that the ALMPs, especially start-up incentives, significantly reduces an economies' unemployment rate[5].

Many empirical studies also investigate the impact of labor market regulations and union presence on unemployment. A study based on a panel dataset of 17 developed economies shows that Employment Protection Legislation (EPL) seems to be improving labor market outcomes by reducing excess firings[6]. In contrast, another study based on data from new EU member states shows that protective labor market institutions tend to negatively impact labor market performances [7]. As for the effect of labor union, two recent studies both indicates that union density and collective bargaining increases unemployment: A study based on Overlapping Generations (OLG) model indicates that union preference plays a critical role in determining the unemployment rate [8] , another paper also revealed that higher unionization leads to higher unemployment rate [10].

Another influential factor that this study investigates is internet access. While one study on Craigslist, a job searching website, indicated that online job searching has no effect on the unemployment rate [11], another study that was not limited to a single website reported a different outcome-it found that unemployed persons who look for work online are re-employed about 25% faster than comparable workers who do not search online [11]. The conflicting results of previous studies make it necessary to further investigate the relationship between online job search and unemployment.

Although a large amount of research has been done in this area, my study can still contribute to the existent literature in two ways: First of all, this study tests a full range of potentially influential variables, whereas most previous studies focus on variables of one or two categories. By including more variables in the model, the result of this study is subjected to a smaller omitted variable bias compared with other studies that use non-experimental data. Second, this study uses a panel data set of 32 developed countries from 2000 to 2015, including observations from East Asia, West Asia, and Oceania, whereas most previous studies used older datasets and focused on a smaller geographic

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region (primarily in Western and Northern Europe). Thus, by using more recent data covering a larger geographic area, this study is expected to produce more updated and generalizable estimation results than previous studies.

## 3. Data and Methods

### *3.1 Data Description*

This study sets up a 16-year long panel of 32 developed economies from 2000 to 2015. All of the economies in the dataset are members of the Organization of Economic Cooperation and Development (OECD), an intergovernmental economic organization consisting primarily developed countries. Table 1 lists these countries by region:

*Table 1 Countries Included In the Dataset by Geographic Regions*

| Region | Countries included |
|---|---|
| Europe (25) | Austria, Belgium, Czechia, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland, United Kingdom |
| North America (2) | Canada, United States |
| East Asia (2) | Japan, South Korea |
| West Asia (1) | Israel |
| Oceania (2) | Australia, New Zealand |
| Total: 32 | |

As Table 1 indicates, while about 80% of the countries are in Europe, developed countries in other parts the world are also represented in the sample. These 32 countries are selected because of their detailed, credible, and continuous labor market statistics, which reduces measurement errors and allows the panel strongly balanced. However, by including only developed countries in the dataset, the findings of this study can only be applied to the developed world.

This dataset includes a variety of variables collected from different sources: First, to obtain ALMP and unemployment benefits per unemployed worker, I collected statistics on total government expenditure on ALMP and unemployment benefits, unemployment

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rate, total population, and labor force participation rate (LFPR), from the OECD.STAT database, the official database of the OECD. Then I calculated ALMP and unemployment benefits per unemployed worker using the following equations:

$$\#unemployed = total\ population \times LFPR \times unemployment\ rate \quad (3.1)$$

$$ALMP\ per\ unemployed\ worker = total\ ALMP\ /\ \#unemployed \quad (3.2)$$

$$benefits\ per\ unemployed\ worker = total\ benefits\ /\#unemployed \quad (3.3)$$

Note that both variables are measured in U.S. dollars based on the purchasing power parity (PPP) of 2010, thus the price level and purchasing power are both controlled. I decided to use ALMP and unemployment benefits per unemployed worker instead of their total values, for the size of the unemployed population is different across countries.

Next, I obtained the union density data from the International Labor Organization's ILOSTAT database. "Per capita real GDP growth" and "the percentage of the population using the internet" were then acquired from the World Bank's online databased DataBank. Labor market indexes, including "hiring and firing restrictions," "central collective bargaining," "mandated dismissal cost," and "overall labor market regulations," were drawn from the Fraser Institute's Economic Freedom Dataset. These indexes range from 1 to 10 with a score of 10 indicating minimal labor market regulation and a score of 1 indicating extremely heavy labor market restrictions. Besides, a dummy variable indicating EU membership is also included in the dataset. The variable descriptions, as well as their shortened names, are summarized in Table 2, and Table 3 is the descriptive statistics of these variables:

*Table 2 Variable Description*

| Type | Name | Description |
|---|---|---|
| Dependent variable | Urate | The harmonized unemployment rate measures the percentage of unemployed workers in the labor force (%) |
| Business cycle | grGDP | The growth rate of real GDP adjusted with Purchasing Power Parity (PPP) in USD in 2010 (%) |
| Government factors | benefit | Unemployment benefits per unemployed worker in 100 USD, PPP 2010 |
| | ALMP | ALMP expenditure per unemployed worker in 100 USD, PPP 2010 |
| | hirefire | An index ranging from 1 to 10 with 1 indicating the strictest hiring and firing regulations and 10 indicating little to no hiring or firing regulations |
| | dismissal | An index ranging from 1 to 10 with 1 denoting extremely high mandated cost of dismissing workers and 10 denoting little to no mandated cost of dismissing workers |

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| | | |
|---|---|---|
| | regulation | An index ranging from 1 to 10 with 1 denoting the strictest labor market regulation and 10 denoting little labor market regulation. |
| Regional dummy | EU | A dummy variable. EU=1 if the country is a European Union member and EU=0 otherwise |
| Union factors | union | The number of trade union employees as a percentage of the total number of employees in an economy in a given country (%) |
| | bargain | An index ranging from 1 to 10 with 1 indicating that central collective bargaining is extremely prevalent and 10 indicating that collective bargaining is extremely rare. |
| Search cost factor | internet | The number of people using the internet as a percentage of the total population (%) |
| | | |

*Table 3 Descriptive Statistics*

| | (1) | (2) | (3) |
|---|---|---|---|
| VARIABLES | N | mean | std |
| | | | |
| Urate | 512 | 7.791 | 4.217 |
| grGDP | 512 | 1.746 | 3.286 |
| hirefire | 512 | 4.303 | 1.552 |
| dismissal | 505 | 7.771 | 2.355 |
| regulation | 512 | 6.451 | 1.409 |
| union | 467 | 30.96 | 20.976 |
| bargain | 512 | 5.932 | 1.768 |
| internet | 509 | 63.12 | 22.594 |
| EU | 512 | 0.727 | 0.446 |
| benefit | 511 | 321.4 | 302.021 |
| ALMP | 508 | 205.2 | 176.374 |
| | | | |

As Table 3 shows, the unemployment rate, growth rate of real GDP per capita, ALMP and unemployment benefits all have relatively high standard deviations, indicating that these variables vary considerably across observations. The mean of per capita real GDP growth is a little lower than 2%, the “ideal” growth rate of developed economies. In comparison, labor market regulation and mandated dismissal cost both have relatively small standard deviations. Two factors may contribute to these small standard deviations: First, 72% of these countries in the sample are EU members (interpreted from the mean of EU), who abide by the same labor law set by the European

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Commission. Second, once passed by the legislature, laws are often not easy to be altered or overthrown, thus labor market regulations in a country tend to be stable across time. In terms of union-related factors, while union density has a large standard deviation, the prevalence of central collective bargaining exhibits less variation, which may be the result of measuring collective bargaining with standardized indexes instead of percentages.

### *3.2 Estimation Methods*

To answer the question of which variables have a significant impact on the unemployment rate, we need to first fit a model predicting the unemployment rate with a group of dependent variables. As a common estimation method for linear models, Ordinary Least Squares (OLS) gives the Best Linear Unbiased Estimator (BLUE) when the first six assumptions of the Gauss Markov Theorem are satisfied. Also, OLS is simple to use, and its coefficients can be easily interpreted. Thus, I first fit an OLS model using equation (3.4).

$$Urate = \beta_0 + \beta_1 grGDP + \beta_2 \ln(ALMP) + \beta_3 \ln(benefit) + \beta_4 hirefire + \beta_5 dismissal + \beta_6 regulation + \beta_7 union + \beta_8 bargain + \beta_9 internet + \beta_{10} EU + \varepsilon_1 \quad (3.4)$$

Although there are already ten predictors in the model, due to the complex causes of unemployment, there are still omitted variables that are not included in the model. The most obvious ones are the unemployment rates in the previous periods. Since some of the unemployed workers of the previous periods will stay unemployed, Urates in the previous years will impact the current Urate. However, by including a vector of lag variables, OLS will no longer be an appropriate estimator. Also, including lag Urates raises the question of how many previous period's Urate should be included in the model. Due to the limited time to complete this study and my limited knowledge about time-series analysis, I decided to not include the lags variables of Urate in my model.

The second problem with this model is the serial correlation. Figure 1 plots the residuals of this OLS model against time. As this figure indicates, there is a positive serial correlation in the model. This violates the assumption that error terms are uncorrelated and makes OLS no longer the minimum variance estimator. As a remedy for serial correlation, I estimated the OLS model using robust standard errors, however, the best way to address this question is to use a method other than OLS. By using the robust standard errors, I also fixed the heteroskedasticity present in the model.

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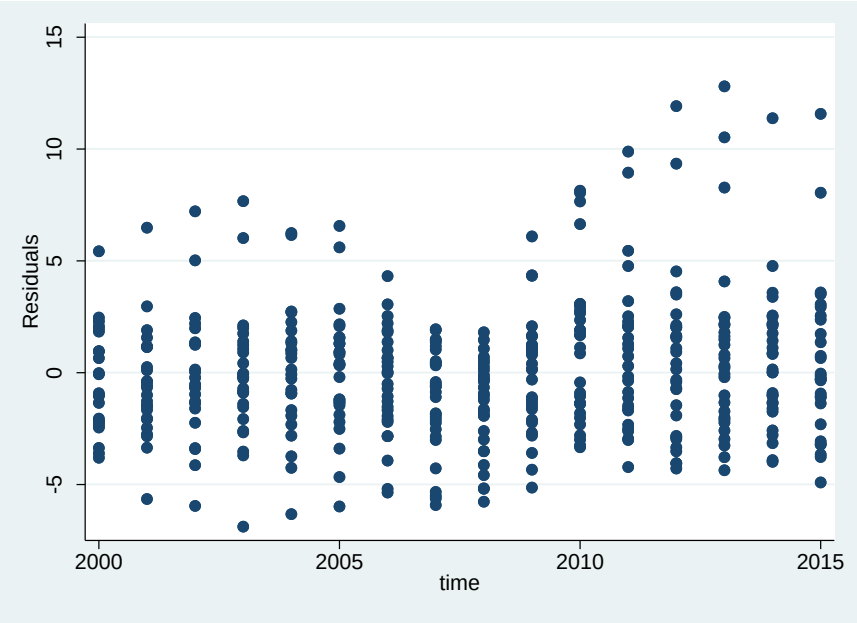


*Fig.1 Residual Vs. Time Plot for the Ols Model*

The third problem with this OLS model is simultaneity: Not only can ALMP and unemployment benefits impact the unemployment rate, but a high unemployment rate can also incentivize the government to increase its expenditures on ALMP and unemployment benefits. Thus, unemployment is simultaneously determined with ln(ALMP) and ln(benefit). Due to the presence of simultaneity, all coefficients in the OLS model are subjected to potential bias.

To address simultaneity, this study also estimates a Two-Stage Least Squares (2SLS) regression with instrumental variables. Instrumental variables (IV) are variables that are highly associated with the endogenous explanatory variables but unassociated with other explanatory variables. By fitting ln(ALMP) and ln(benefit) with instrumental variables (first stage) and predict Urate with the fitted values (second stage), endogeneity can be largely removed. This study uses the lag of ln(ALMP) and the lag of ln(benefit)-the ln(ALMP) and ln(benefit) of the last year-as instruments to predict current ln(ALMP) and ln(benefit). lagbenefit is expected to be highly associated with ln(benefit), for the amount of unemployment benefit one person receives is set by the law. lagALMP should be highly associated with ln(ALMP), for ALMPs are implemented by the government, and government policies tend to be stable.

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Equation 3.5 and 3.6 are the first stages of the regression. All exogenous variables are included to produce the best fits. Equation 3.7 is the second stage regression in which Urate is predicted with fitted values of ln(ALMP) and ln(benefit). Only the $\beta$s in 3.7 are in the interest of this study. Since IV does not reduce serial correlation, so equation 3.7 still needs to be estimated with robust standard errors.

$$\ln(ALMP) = \beta_0 + \beta_1 lagALMP + \beta_2 lagbenefit + \beta_3 grGDP + \beta_4 hirefire + \beta_5 dismissal + \beta_6 regulation + \beta_7 union + \beta_8 bargain + \beta_9 internet + \beta_{10} EU + \varepsilon_2 \quad (3.5)$$

$$\ln(benefit) = \beta_0 + \beta_1 lagALMP + \beta_2 lagbenefit + \beta_3 grGDP + \beta_4 hirefire + \beta_5 dismissal + \beta_6 regulation + \beta_7 union + \beta_8 bargain + \beta_9 internet + \beta_{10} EU + \varepsilon_3 \quad (3.6)$$

$$Urate = \beta_0 + \beta_1 grGDP + \beta_2 \ln(\widehat{ALMP}) + \beta_3 \ln(\widehat{benefit}) + \beta_4 hirefire + \beta_5 dismissal + \beta_6 regulation + \beta_7 union + \beta_8 bargain + \beta_9 internet + \beta_{10} EU + \varepsilon_4 \quad (3.7)$$

However, even if the two instruments are not correlated with the exogenous variables in the model, they are still correlated with the Urates of the previous period, which is an omitted variable. This means that lagALMP and lagbenefit can impact Urate through not only ln(ALMP) and ln(benefit) but also lagUrate. Thus, these two instruments are, in fact, not valid. Figure 2 illustrates the two channels lagALMP and lagbenefit may impact Urate.

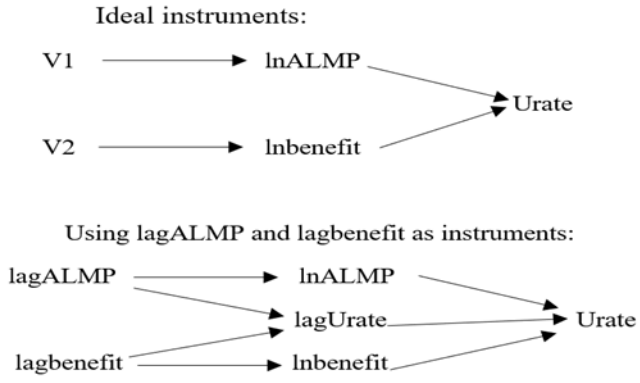


*Fig.2 The Casual Relationships of Lagalmp and Lagbenefit*

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Despite the omitted variable bias and simultaneity, we expect the coefficient of each variable to take the same sign in the OLS model as well as in the 2SLS model. The coefficient of grGDP, $\beta_1$, is expected to be negative -a higher GDP growth indicates economic expansion, which increases firms' demand for labor and decreases unemployment. The coefficient of ln(ALMP), $\beta_2$, is expected to be negative, because ALMPs are designed by the government to help unemployed workers find new jobs. On the contrary, higher unemployment benefits may disincentivize unemployed workers to find new jobs and increases unemployment, hence the sign for $\beta_3$ is expected to be positive. Note that ALMP and benefit are logged in both models so that a change in these two variables represents a percentage change instead of a change in dollar value.

Based on the classical theory of unemployment, an increase in hirefire, dismissal, regulation should all increase Urate, for these labor market restrictions create frictions in the labor market and prevent the market from clearing. Thus $\beta_4, \beta_5, \beta_6$ are all expected to have positive signs. Similarly, union and bargain should both have positive coefficients: Unions' collective bargaining pulls wage above the equilibrium, which forces firms to hire fewer workers and hire only the members of the unions. In places where union density is higher, unions have more bargaining power over the firms and the wage should be even higher. Thus, $\beta_7$ and $\beta_8$ should both be positive. We expect better internet access to decrease unemployment by reducing the cost of searching for new jobs, hence $\beta_9$ should have a negative sign. Real-world data have shown that EU members have significantly higher unemployment, thus EU is included in the model to control for special characteristics that are only shared among EU member countries. The sign of $\beta_{10}$ is expected to be positive based on the empirics.

## 4. Results

Table 4 shows the results of the first stage regressions from the 2SLS model. The first column indicates that the coefficient of lagALMP is statistically significant with a p-value smaller than 0.01, and the R-squared of the model is as high as 0.86. Similarly, lnbenefit in (2) is also significant with $p < 0.01$, and the model has a R-squared of 0.908. Thus, both instruments are highly relevant to their corresponding endogenous explanatory variables.

*Table 4 Results of The First-Stage Regressions*

| | (1) | (2) |
|---|---|---|
| VARIABLES | lnALMP | lnbenefit |
| | | |
| lagALMP | 0.861*** | 0.0214 |
| | [0.0302] | [0.0230] |

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| | | |
|---|---|---|
| lagbenefit | 0.0164 | 0.890*** |
| | [0.0330] | [0.0252] |
| grGDP | 0.0285*** | -0.00380 |
| | [0.00599] | [0.00456] |
| hirefire | 0.0169 | 0.0268** |
| | [0.0166] | [0.0127] |
| dismissal | 0.0156 | -0.00747 |
| | [0.0116] | [0.00887] |
| regulation | -0.0295 | 0.00774 |
| | [0.0238] | [0.0181] |
| union | -0.00187 | 1.90e-05 |
| | [0.00124] | [0.000947] |
| bargain | -0.0530*** | -0.0387*** |
| | [0.0175] | [0.0133] |
| internet | 0.00145 | 0.000159 |
| | [0.00101] | [0.000770] |
| EU | 0.0679 | 0.0472 |
| | [0.0475] | [0.0359] |
| Constant | 1.139*** | 0.834*** |
| | [0.259] | [0.196] |
| | | |
| Observations | 434 | 434 |
| R-squared | 0.860 | 0.908 |
| Standard errors in brackets | | |
| *** p<0.01, ** p<0.05, * p<0.1 | | |

Table5 on page 17 shows the regression results of the OLS estimation as well as 2SLS regression. First of all, lnALMP, union density, bargain, and EU membership are all statistically significant at a 99% confidence level, and their coefficients in the two models are nearly the same with the 2SLS coefficients slightly greater in absolute values. The table shows that all else equal, a 1% increase in ALMP per unemployed worker decreases the unemployment rate by 3.171 percentage points according to the OLS model and 3.526 percentage points according to the 2SLS model, and EU members have on average 2.6% higher unemployment rate compared to non-EU countries. Also, as the collective bargain index increases by 1 point (which indicates a decrease in collective bargaining), the unemployment rate will decrease on average by 0.527 percentage points in the OLS model and 0.449 in the 2SLS model, holding everything else constant. Also, all else equal, a 1 percentage point increase in union density is associated with a 0.05 percentage point decrease in unemployment. The results indicate that an increase in government spending on ALMP, a decrease in collective bargaining, and an increase in

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union density decrease unemployment, and EU countries tend to have high unemployment rates.

Secondly, hirefire is significant at a 95% confidence level in both models, lnbenefit is only significant at a 95% confidence level in the 2SLS model, and regulation is significant at a 95% confidence level in 2SLS but significant at only a 90% confidence level in OLS. All else equal, a 1-point increase of the score in the hiring-firing restriction index (less hiring-firing restriction) leads to a 0.235 percentage point decrease in unemployment in the OLS model and a 0.277 percentage point decrease in unemployment in the 2SLS model; a 1-point increase in the regulation index (less labor market regulation) decreases unemployment by 0.323 percentage points in the OLS model and 0.392 percentage points in the 2SLS model; a 1% increase in the unemployment benefits received per worker increases unemployment by 0.677 percentage points in the 2SLS model but has an insignificant effect in the OLS model. These results mean that reducing unemployment benefits and loosen hiring-firing restrictions and overall labor market regulations decrease the unemployment rate.

Besides, grGDP, dismissal index, and internet access are statistically significant in neither OLS nor 2SLS models. These results mean that the unemployment rate is not affected by the growth rate of real GDP per capita, laws regarding worker dismissal, and internet access.

*Table 5 Ols and 2sls Regression Results*

| | OLS | 2SLS |
|---|---|---|
| VARIABLES | Urate | Urate |
| | | |
| lnALMP | -3.171*** | -3.526*** |
| | [0.334] | [0.412] |
| lnbenefit | 0.120 | 0.677** |
| | [0.294] | [0.343] |
| grGDP | -0.102 | -0.0831 |
| | [0.0628] | [0.0602] |
| hirefire | -0.235** | -0.277** |
| | [0.109] | [0.110] |
| dismissal | 0.0895 | 0.107 |
| | [0.0819] | [0.0861] |
| regulation | -0.323* | -0.392** |
| | [0.171] | [0.186] |
| union | -0.0510*** | -0.0545*** |
| | [0.0105] | [0.0112] |
| bargain | -0.527*** | -0.449*** |

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| | | |
|---|---|---|
| | [0.112] | [0.113] |
| internet | 0.000451 | 0.000814 |
| | [0.00746] | [0.00762] |
| EU | 2.581*** | 2.607*** |
| | [0.354] | [0.367] |
| Constant | 36.73*** | 34.93*** |
| | [2.680] | [2.814] |
| | | |
| Observations | 439 | 433 |
| R-squared | 0.503 | 0.496 |
| Robust standard errors in brackets | | |
| *** p<0.01, ** p<0.05, * p<0.1 | | |

## 5. Conclusions

While the coefficients of ln(ALMP), ln(benefit), labor market regulations, collective bargaining, and EU membership matches the theories, the other coefficients fail to support and even contradict the theories. First, union density has a positive, significant relationship with unemployment in the two models, which contradicts the classical theory as well as previous empirical studies. Second, it is widely recognized that the business cycle plays a huge role in determining the unemployment rate, but the growth rate of GDP per capita appears to be insignificant. The weird coefficient of union density and insignificance of GDP growth might be a result of simultaneity bias, omitted variable bias, or a product of both. Also, as an economy recovers from a recession, GDP often recovers before the unemployment rate decrease, thus grGDP may not fully capture the impact of the business cycle on unemployment. Also, we expect better internet access and a looser worker dismissal regulation to decrease unemployment, but the regression result shows that these two variables are insignificant. However, due to the presence of omitted variable bias, endogeneity, and serial correlation, these “findings” cannot be completely trusted.

This study makes two small contributions to the literature on unemployment. First, it further shows that ALMPs, unemployment benefits, bargaining, labor market regulations, and hiring-firing restrictions still have the same significant relationship predicted by the theories even when multiple biases present in the model. Second, this study discusses several problems that can occur when predicting unemployment with non-experimental data, such as serial correlation, simultaneity, omitted variable bias. Thus, this study may help future researchers avoid these pitfalls.

The major takeaway message of this study is that while ALMP is effective in decreasing the unemployment rate, more unemployment benefits, higher wage

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bargaining, stricter labor market regulations and hiring firing restrictions can increase the unemployment rate. This result is meaningful since it implies that the governments of developed countries may still be able to reduce their unemployment in the post-Great Recession era by changing their labor market policies and loosening their labor laws.

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