

The Research on the Relationship between Economic Growth and Unemployment in Spain

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Abstract. Spain's economy is so volatile that unemployment is extremely high. What's more, Spain has a dual labor market with many temporary contracts, which contributes to high unemployment. Thus, this study investigates the relationship between unemployment and GDP in Spain by implementing Okun's Law. Using annual data for the period 1972-2021, JMP was used to obtain a simple regression between unemployment rate and GDP and Inflation rate. Empirical results show that GDP is not related to unemployment. However, inflation is related to unemployment. Therefore, Okun's law cannot be confirmed by Spain, and the lack of GDP does not explain Spain's unemployment problem.

Keywords: GDP; Inflation rate; Unemployment rate; regression model; Spain.

1. Introduction

Spain is one of the world's recognized countries with high Unemployment, according to "Why Spain Routinely Has One of the Highest Unemployment Rates in Europe [1]", the author argues that unemployment is high because Spain has a dual labor market and has temporary contracts, and because employers find permanent employment costly. Another author described the problem of high unemployment and education in Spain in the article "Why is the Unemployment Rate in Spain so High? [2]". Spain has one of the highest school dropout rates in the European Union, and many of the unemployed are young people who have not received enough education because their education level prevents them from getting certain jobs. In addition to national policy and education factors, this study also wants to explore the relationship between the economic situation and the unemployment rate in Spain. In the articles "Okun's Law: Theoretical Foundations and Revised Estimates [3]" and "Okun's law establishes the link between unemployment and GDP and can help guide monetary policy [4]", both authors argue that Okun's Law validates the relationship between unemployment and GDP Relationship. In the article "The Evidence that Growth Creates Jobs: A New Look at an Old Relationship [5]", the author argues that although Okun's Law was established in the United States, after 2011 Okun's Law is no longer accurate and does not apply to all countries. Thus, this research will be going to analysis Okun's laws and to investigate whether it valid in Spain. Also, this study tries to find factors which affect Spain's unemployment rate by using JMP to build regression model between GDP, unemployment rate and inflation.

2. Data, hypothesis and method

2.1 Data

In the economic field, there is a well-known Okun's law, which describes that the growth rate of GDP increases employment and reduces unemployment. In the article "Okun's Law: Economic Growth and Unemployment [6]", Ryan Furhmann claims that the logic behind Okun's law is straightforward. The quantity of labor used in the production process is an important factor of output, and they have a positive correlation. The number of unemployed is equal to total employment minus the working population, so there is a negative correlation between output and unemployment.

Spain has one of the highest unemployment rates in the world because it suffers from a dual labor market system, with many temporary workers suffering due to economic shocks and recessions. Thus, the purpose of this study is to see if Okun's law is still valid in Spain. What's more, if Okun's Law

not fit for Spain, this research needs to analysis the reason and to find other variables which affect unemployment rate.

In this paper, the data set comes from World Bank [7]. Timeline we studied ranged from 1972 to 2021. The data displays that GDP is unstable, but the overall trend is that GDP in 1972-2021 is growing and the average of GDP is 7.30656E. Also, the percentage of unemployment is generally increasing, and the average rate is 15.1840. Then using these data to create a regression model to help us verify Okun's law. According to the currently accepted version of Okun's Law, real GDP would have to grow about 2 percentage points faster than potential GDP to reduce unemployment by 1 percentage point in a year.

According to "What Happens When Inflation and Unemployment Are Positively Correlated? [8]" and "How Inflation and Unemployment Are Related [9]," the authors claim that high unemployment is related to inflation. Spain's inflation rate from 1972 to 2021 and make a regression for inflation rate and unemployment rate. First, the null hypothesis is there having the relationship between inflation and unemployment rate. Also, assuming that inflation rate is independent variable and unemployment rate is dependent variable. For inflation and Unemployment, each of them is independent and satisfies the 10% condition because they both have 50 data, which is less than 10% of the historical dataset. Second, GDP and unemployment are independent of each other. In addition, since the central limit theorem applies when the sample size n (50) is greater than or equal to 30, the normality assumption is also satisfied.

2.2 Hypothesis

The first model assumes the null hypothesis that there is a relationship between GDP and unemployment. For GDP and Unemployment, which are independent of each other, they also meet their 10% condition because they each have 50 data points, less than 10% of the historical data set. Second, GDP and unemployment are independent of each other. More importantly, the normality assumption is also satisfied since the central limit theorem holds for sample sizes n (50) greater than or equal to 30.

The second model assumes the null hypothesis that there is a relationship between inflation and unemployment. They are independent for each of them, and their 10% condition is satisfied because they both have 50 data, which is less than 10% of the historical dataset. Second, GDP and unemployment are independent of each other. In addition, the normality assumption is satisfied because the central limit theorem holds for sample sizes n (50) greater than or equal to 30.

3. Empirical results

Using Fit Y by X in JMP to build regression model. Putting GDP in independent variable and Unemployment in dependent variable. The result shows in Figure 1. The regression model is $\text{Unemployment} = 12.250844 + 4.01e^{-12} * \text{GDP}$. It means when GDP increased by 1 unit, the unemployment rate will increase 12. Also, this study noticed that the $\text{Prob} > |t|$ is less than 0.0001 (Table2), which means that fail to reject our null hypothesis and we have enough evidence to claims that there has a relationship between Unemployment and GDP. However, we found that the $\text{Prob} > F$ is equal to 0.0260 (Table1), which is too big. This indicates that this regression model is not significant and means Okun's Law failed in Spain's data. Thus, this study need to find to other reasons which affect unemployment rate in Spain.

From the Figure 2, this study can find that the regression is $\text{Unemployment, total (\% of total labor force) (national estimate)} = 18.956379 - 0.5906781 * \text{Inflation, consumer prices (annual \%)}$. When inflation increases by 1 unit, the unemployment rate will decrease 0.5906791. When inflation rate equals to 0, the unemployment rate is 18.956379. What's more, both $\text{Prob} > |t|$ and $\text{Prob} > F$ is less than 0.0001 (Table3&4). Therefore, this study has enough evidence to conclude that there has the relationship between Inflation and unemployment.

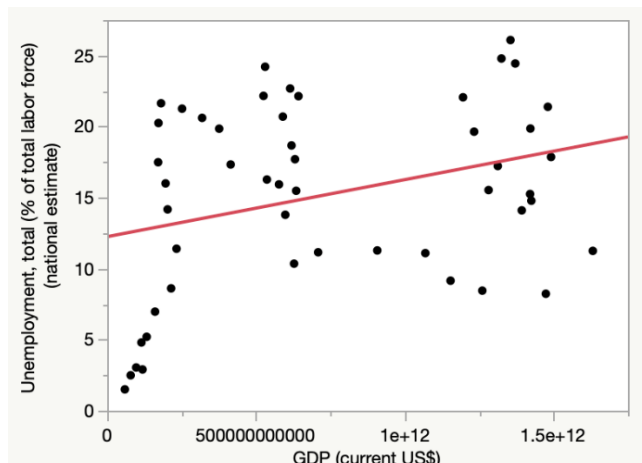


Figure 1. Regression Model for GDP and Unemployment.

Table 1. estimates results

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	1	206.9401	206.940	5.2802
Error	48	1881.2193	39.192	Prob > F
C. Total	49	2088.1594		0.0260*

Table 2. estimates results

Term	Estimate	Std Error	t Ratio	Prob> t
Intercept	12.250844	1.553457	7.89	<.0001*
GDP (current US\$)	4.014e-12	1.75e-12	2.30	0.0260*

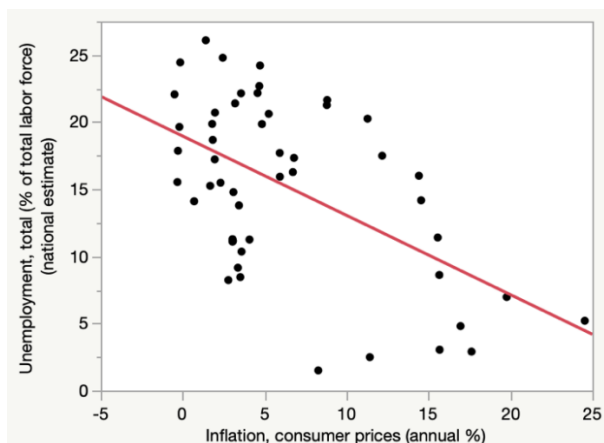


Figure 2. Regression Model for Inflation and Unemployment.

Table 3. estimates results

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	1	619.5981	619.598	20.2516
Error	48	1468.5613	30.595	Prob > F
C. Total	49	2088.1594		<.0001*

Table 4. estimates results

Term	Estimate	Std Error	t Ratio	Prob> t
Intercept	18.956379	1.146561	16.53	<.0001*
Inflation, consumer prices (annual %)	-0.590678	0.131257	-4.50	<.0001*

4. Conclusion

This study attempts to analyze the relationship between GDP and unemployment rate as well as inflation and unemployment rate in Spain during the period 1972-2021. The study also looked at whether Okun's law holds true in Spain. Our empirical analysis consists of a simple linear regression between unemployment and GDP. The results presented in this study show that unemployment rate and GDP are not correlated. Therefore, our results show that Okun's law is not valid for Spain. Therefore, this study needs to look for other factors related to the unemployment rate, so this study set up a simple regression model of inflation and unemployment again. The results show that there is a relationship between them, and the relationship is negative. It means that when inflation goes up, unemployment goes down. According to this introduction, the lack of effective employment policies in the Spanish labor market leads to high unemployment. The article "Spain's jobs market improves as reforms help offset strike, inflation [10]" shows Spain's unemployment rate fell in April 2022 as Spain weathered a spike in inflation, reducing the use of temporary contracts to some extent. Also, Spain can make some changes to the employment policy in the labor market, such as encouraging employers to hire workers and increasing government subsidies to workers, to rekindle workers' passion for labor.

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