OKUN'S LAW IN EUROPEAN UNION

OKUNOV ZAKON U EUROPSKOJ UNIJI

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Abstract: *Okun's law is one of the best known concepts of macroeconomic theory that shows the quantitative relation between economic decline and unemployment rate developed upon empirical data for the United States. Since the economy of the European Union is much different than the American economy, this paper tests the applicability of the theory developed on American data in European economy. Using panel data analysis this paper shows that the wide use of the modern Okun's law concept in education of economists has to be reconsidered in the EU countries.*

Key words: *Okun's law, European Union, United States, economic theory*

Sažetak: *Okunov zakon je jedan od najpoznatijih makroekonomskih pojmova kojim se pokazuje kvantitativni odnos gospodarskog pada i porasta nezaposlenosti, a taj je pojam razvijen na empirijskim podacima za Sjedinjene Američke Države. Kako je gospodarstvo Europske Unije značajno drugačije od američkog, ovim će se radom testirati primjenjivost teorije razvijene na američkim podacima u europskom gospodarstvu. Korištenjem panel analize pokazalo se kako bi se trebalo preispitati općeprihvaćeno korištenje pojma modernog Okunovog zakona u obrazovanju ekonomista u zemljama Europske Unije.*

Ključne riječi*: Okunov zakon, Europska Unija, Sjedinjene Američke Države, ekonomska teorija*

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1. Introduction

The most common macroeconomic concepts, such as Phillips curve, Okun's law, Laffer curve, are created on the USA data. These concepts are empirically established, while the background theory was developed afterwards in order to fit the data. However, these empirically established concepts have entered a common economic literature, being the part of most basic economics textbooks (such as [2], [5], [6], [8]). Unfortunately most of these textbooks do not stress out the localization of these findings, but instead take it as a common rule. If the United States were an average world economy, that would be inductive approach more or less applicable to the entire world. But is the USA an average economy? With its GDP per capita, its size and level of macroeconomic development it is more of an outlier than the average.

The economy of European Union is, on average, similar to the USA economy in terms of GDP (EU: €12.894 trillion, USA: €12.936 trillion, y.2013, [3]), but the similarities seize at that point; GDP per capita differs significantly (EU: € 25276, USA: €40887, y.2013, [3]), just as the average unemployment rate. Also, European economy is very heterogeneous (GDP p.c. of Luxembourg being 15 times greater than the Bulgarian). Therefore one may conclude that the empirically obtained "laws" that hold for the USA might be entirely inapplicable not only for the EU economies, but also for the rest of the world which differs even more from the US economy characteristics.

Due to the reasons mentioned above, this paper will analyse one of the mentioned terms, the Okun's law in EU, and its differences from the American data. The results of this analysis will bring a new insight into EU economy and show a direction for the improvement of the economists' education.

2. General concept of Okun's law

Okun's law is a relationship between unemployment and gross domestic product decline. It was determined by Arthur Okun empirically on the United States statistical data and it shows that the higher the unemployment, the lower GDP. The name for this relation was made by Paul Samuelson and taken as a rule although it was not theoretically proven, but merely empirically [8].
The Okun's law can be expressed in levels or in rates. The level version states that a unit increase in the unemployment rate is related to the 2% gap between the actual and the potential GDP level [7].

The rate version is more common and it states that the change in the unemployment rate is equal to the coefficient a multiplied with the growth rate above the GDP growth rate $\overline{g_y}$ which maintains the current level of the unemployment rate. $\overline{g_y}$ is the sum of the labor force increase and the productivity increase.

$$u_t - u_{t-1} = -a(g_{yt} - \overline{q_y}) \quad (1)$$

Where u_t stands for the current unemployment rate, u_{t-1} for the unemployment in the previous period

Blanchard has reevaluated the previous equation in the United States in the period 1997 – 2000 and obtained the following relation [1]:

$$u_t - u_{t-1} = -0{,}4(g_{yt} - 3\%) \quad (2)$$

In other words, the growth rate had to cover for the efficiency growth rate and the labor growth rate (3% in total) in order to have at least the unchanged level of unemployment. If the growth rate exceeds 3%, for every 2,5% of growth rate above 3%, the unemployment rate would fall by 1%.

Bernanke [4] agrees on the level of the zero-change unemployment GDP growth rate (3%), but estimate *a* to 0,5 (2% increase in GDP above 3% causes an decrease in the unemployment rate by 2%).

3. Estimation of Okun's Law in EU

The Okun's Law is estimated using the expression (1), where u_t is the unemployment rate, u_{t-1} is the unemployment rate in the previous period, g_{yt} is the annual nominal GDP growth rate and $\overline{q_y}$ is the growth rate at which there is no change in the unemployment. It is equal to the sum of the labour force growth and the labour productivity growth. The data are obtained from Eurostat and OECD database [3].

The estimated model is:

$$du = c(1) * dg \quad (3)$$

where *du* stands for the annual change in the unemployment rate and *dg* stands for the gap between the stable-unemployment growth rate and the current growth rate. The model has no constant. The generalized least squares method is used in Stata 11. The dataset is a balanced panel for 28 countries of European Union across years 2005 - 2013 (9 years), but after lagging the unemployment rate variable the total number of data is 28×8 = 224.

The results of the first estimate were disappointing. After splitting the European Union into two segments, the OECD one and the non-OECD one, it appears that the results can be obtained. The model is consistent, without autocorrelation and with sensible direction of change (the c(1) coefficient).

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. xtgls du dg,noconstant

Cross-sectional time-series FGLS regression

Coefficients:  generalized least squares
Panels:        homoskedastic
Correlation:   no autocorrelation

Estimated covariances      =         1          Number of obs      =       188
Estimated autocorrelations =         0          Number of groups   =        21
Estimated coefficients     =         1          Obs per group: min =         8
                                                               avg =  8.952381
                                                               max =         9
                                                Wald chi2(1)       =      3.70
Log likelihood             =  -466.073          Prob > chi2        =    0.0543
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du	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
dg	-.2076739	.1079324	-1.92	0.054	-.4192176	.0038698

Table 1. The results of the estimated model (EU-OECD)

The $\overline{q_y}$ is, on average, 1.75%, but with substantial standard deviation (σ = 4.037). The estimated model is:

$$u_t - u_{t-1} = -1.92(g_{yt} - 1.75\%)$$

It shows that every percentage point of GDP growth above the required 1.75% (which covers for the increase in labour supply and its increase in productivity) causes the unemployment rate to fall by almost 2 percentage points. This result is much different than the US one.

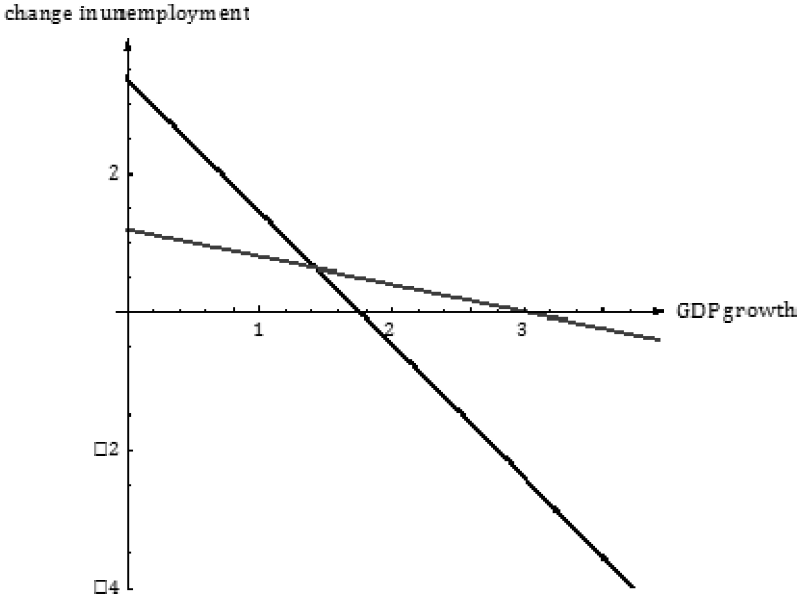

Figure 1. The Okun's lines for EU-OECD (black) and USA (grey)

The estimate was not significant for the non-OECD countries of European Union. Hence the Okun's Law should be interpreted only in the developed countries.

Figure 1 shows that in the USA the GDP growth rate above 3% diminishes the unemployment, but at a slower pace. In the OECD-EU countries this effect is reached as soon as 1,75% at the effect is stronger (the line segments in 4th quadrant show the area of economic prosperity). Although at first glance these findings suggest the situation in Europe is better, it also suggests that productivity of EU labour is smaller. The steeper Okun's curve in EU might also be caused by the fact there is much bigger unemployment in EU.

This analysis has suggested the following points:

- The Okun's law is very different even in the two most similar world economic areas: OECD countries of European Union and the United States.
- The Okun's law cannot be estimated for the less-developed economies of European Union.
- The value of the stable-unemployment GDP growth rate in this paper ($\overline{q_y} = 1{,}75\%$) can be disputed due to the high standard deviation.

4. Conclusion

The macroeconomic concepts such as Okun's Law are empirically based on the American economy, but used intensively in economics textbooks all over the world. This paper has shown that the applicability of the Okun's law is to be disputed since the results in developed EU (OECD only) countries differ significantly from the USA findings, showing that the effect of a GDP increase on the unemployment reduction is almost 5 times stronger in developed European countries than in USA.

5. Literature

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