ECONOMETRIC ANALYZES OF UNEMPLOYMENT IN GEORGIA

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Abstract. In this article we try to build up an econometric model, which shows influence of one percent changes in unemployment on the level of gross domestic product, taxes and wages in the country. We suggest Georgian reality adjusted economic policy on the bases of research of unemployed that has been conducted from September 2012 to January 2013. After offering a specific employment policy, we determine the total expected macroeconomic results of the policy offered. This total effect of the change of unemployment is calculated as a cumulative effect of initial consequences from decrease of unemployment and its consequential influence on the gross domestic product,taxes and wages, considering them in a statistically interrelated system.

Keywords and phrases: Unemployment, econometric analysis.

AMS subject classification: 74K25, 74B20.

Unemployment is acknowledged to be a huge problem of the world. The theory of economics suggests that it has an influential power on general macroeconomic stability and refers to a cornerstone indicator of social security and standards of life. In spite of this, the influence of unemployment on other macroeconomic indicators is not accordingly measured on the bases of empirical data of Georgia.To calculate the effect of decrease of unemployment on the macroeconomic indicators of the country, we build up the model describing the visible- effects and second tier on real GDP, Taxes and wages. First we start by Hodrick-Prescott filter, which enables smoothing of macroeconomic data and detaches the trend part and cyclical parts of the data. This filter takes the following measure for estimates of each point:

$$\min_{\tau} \sum_{t-1}^{T} (y_t - \tau(t))^2 + \lambda \sum_{t=2}^{T-1} [(\tau_{t+1} - \tau_t) - (\tau_t - \tau_{t-1}]^2$$

$t = 1 \ldots T$ is a time span; $y_t = \tau_t + C_t$ is logarithm of a time series variable; $y_t - \tau_t$ is cyclical component $(C_t; [(\tau_{t+1} - \tau_t) - (\tau_t - \tau_{t-1}]$ is trend component's second difference; λ is multiplier. In this article we analyze only the trend part of the data received from the HP filter, while it enables us to exclude the short-term shocks not caused by economic policy, levels off and has random character. We transform all the variables into Z scores and make the linear OLS regression in identical measure units. Finally, by doing regressions between standardized trend parts of the variables we establish the very core relationships between these variables and see real Georgian macroeconomic tendencies. The results received from regression are shown in the tables below:

$$GDP_t = b_0 + b_1 U_t + e$$

Variables	Coefficients(standard errors)	T statistics	P-value
Constant	-5,6278e-16 (0,2477)	-2.2712e-15	0.9999
Standardized trend of U	-0.3804 (0.2565)	- 1.4833	0.1618

$$WAGES_t = a_0 + a_1 U + e$$

Variables	Coefficients(standard errors)	T statistics	P-value
Constant	-2.0066e-15(0.0071)	-2.8076e-13	0.9999
Standardized trend of U	0.9996(0.0074)	135.1248	7.5132e-22

$$VAT_t = 1.188 - 0.064U_t + e$$

Variables	Coefficients(standard errors)	T statistics	P-value
Constant	1.188(0.605)	1.9643	0.0903
Standardized trend of U	-0.064(0.0417)	-1.5474	0.1657

Fisher test confirms the validity of the regression Models. As we can see the sign of correlation between GDP and unemployment does not coincide with suggestions of economic theory and is positive. In order to explain this we examine whether any high order correlation exists between these variables. To this end, we introduce Augmented Dickey-Fuller test. The main purpose of the test is to evince n^{th} order correlation between the variables. Augmented Dickey-Fuller test for unit root and tests significance of b_1, b_2, b_n , coefficients. For our model Dickey-Fuller formula has the following form:

$$GDP_{t+1} = c + au_t + b_1\Delta u_t + b_2\Delta u_{t-1} + ... + b_p\Delta u_{t-p} + e_t$$

where: GDP_{t+1} is gross domestic product; u_t is unemployment and t time period. According to the results of Dickey-Fuller test, it can be concluded, that there is a first degree autocorrelation between unemployment and GDP. In order to determine the strength and significance of the relationship between lag variables of GDP and unemployment we build up an autocorrelation graph. It is obvious from the results that there exists correlation between unemployment in time span t and in following time span and the effects is significant only in $(t + 1)$ period.
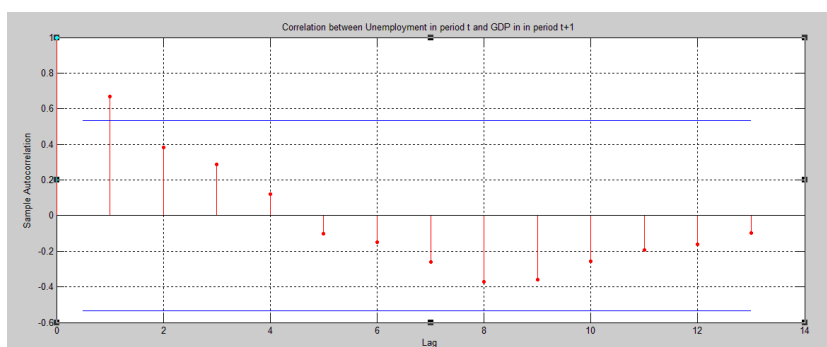

Fig. 1.

More precisely increase of unemployment this year has a negative effect on gross domestic product next year. The equation has the following form

$$U_t = 13.5553145987040 - 6.129GDP_{t+1}$$

Where U_t is unemployment in current period; GDP_{t+1} is gross domestic product in (t+1) time period. Thus, we ascertain that unemployment does have negative cumulative effect on GDP.If we consider the total effect we will see that even one percent decrease in the trend of unemployment will, in the end, result in 5,27 percent increase of GDP in current and the next year. Dependent variable GDP in period after t.

variables	Coefficients and std error	t statistics	P-value
Constant	-0.028(0.249)	-0.113	0.9116
std trend of Unemployment	-0.565(0.281)	-2.0088	0.0676

Based on the results of our research we believe the following measures should be taken: The first measure is to help unemployed people start up their own small businesses, through consulting and easier access to the financial funds. To this purpose the target segment of the unemployed includes those who have tried to start up their business and failed due to lacking business education. The survey of unemployed showed, that this segment comprises 28% of unemployed. To calculate the results of the policy we introduce probability of success of the policy. The second policy is training, but not of a salary subsidy type program (salary subsidiary program was not effective in Turkey). 40% of the unemployed consider training as a good measure and 44 % of inquired state that they have had difficulties in finding a job fitting to their skills and education, intersection of those who would participate in training and have had problems finding an appropriate job constituted 33.66%.Thus,the target of the second measure is (same) about 33. 66% of unemployed. However, because the simultaneous membership of two groups (6.43%) , the total percentage of the unemployed who would be treated by these policies will be 55.17%. To assess the rate of success of this policy we should look at the experience of similar countries to Georgia. Here we take into the account the efficiency of training policies in the following countries: Ukraine, Czech Republic, Poland and Hungary, these were mainly calculated from the data provided in the Social Protection Discussion Paper $N9915$.

Conclusion. In the pessimistic scenario the policy measures would decrease unemployment by at least 11,95% of unemployed. The level of unemployment will be decreased by 1,8 % and new level of unemployment will be 13,31%. But in realistic scenario (success rate of the policy equals to 19,78%) it will be decreased by almost 3%.

country	success rates	Impact of the policy	Changes of level of U
Czech Republic	24,76%	13,66%	-2,06%
Hungary	35,85%	19,78%	-2,99%
Poland	21,66%	11,95%	-1,80%
Ukraine	48%	26,48%	-4%

If we take the relationships between the level of unemployment and other macroeconomic indicators we have discussed above, the total effect on the economy will be

the following:

Impact on unemployment	change in GDP	change in wages	change in VAT
-2,06%	1,95%	-2,06%	0,13%
-2,99%	2,82%	-2,99%	0,19%
-1,80%	1,71%	-1,80%	0,12%
-4,00%	3,78%	-4,00%	0,26%

So, the policy is believed to be beneficial.

R E F E R E N C E S

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