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Macroeconomic Stability and Its Impact on the Economic Growth of the Country

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ABSTRACT

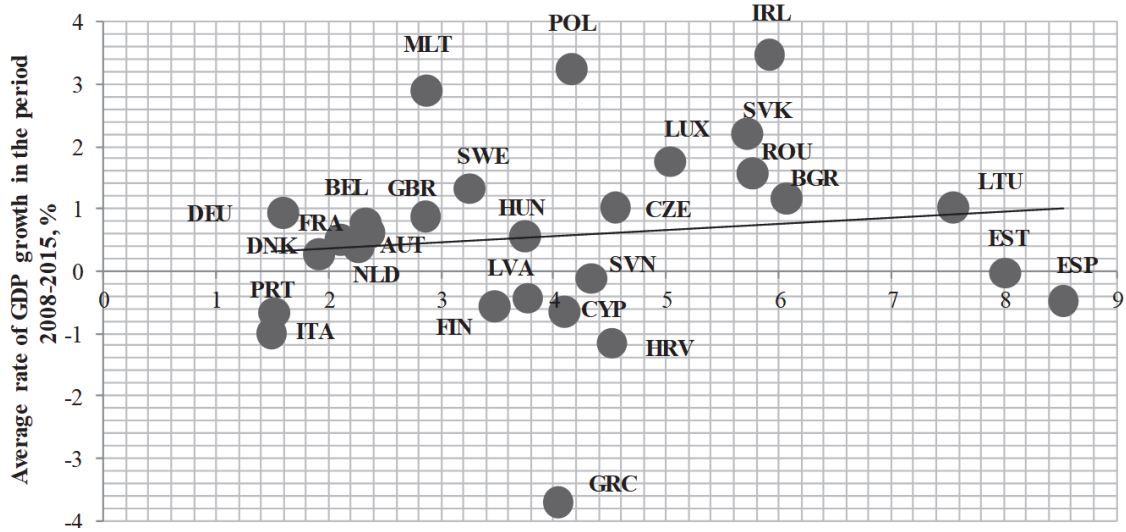
The main purpose of this research is to study the role and impact force of macroeconomic stability on economic growth in the period from 2000 to 2016, using the modified Cobb–Douglas production function. The results of Global Competitiveness Report, published by World Economic Forum, demonstrated that at the existing level of economic growth in Ukraine the basic drivers for improvement of the country's competitiveness are necessary to be considered for building of the production function. Basing on the analysis performed, the author created odified Cobb–Douglas production function where Macroeconomic stability, openness of the economy and foreign direct investments are used as additional explanatory variables of Cobb–Douglas production function. Obtained findings indicate the high level of compliance of the built model with the initial data. Herewith, the assessment of the elasticity of macroeconomic stability is positive and statistically significant.

INTRODUCTION

Current trends of global economic growth indicate the gradual economic recovery after global financial and economic crisis. Thus, in 2013-2015 the growth of world's GDP accounted for 2.5-2.7% compared to the previous years. Similar trends are also observed in EU member states, where average rate of economic growth for 2013-2015 amounted to 1.35% (2013: 0.22%, 2014 – 1.61%, 2015 – 2.23%) (World Bank, 2017). However, despite the positive dynamics of GDP

growth, this level remains significantly lower than it was before the crisis (Fig. 1). The highest average growth rate in 2008-2015 was registered in Ireland (3.47%). In 2015, economic growth rate in this country amounted to almost 26,3%, and GDP per capita - 60 664,1 US dollars. In turn, ten EU member states in 2008-2015 showed negative average rate of economic growth and the largest reduction was recorded in Greece - 3.71% (Cyprus - 0.65%, Spain - 0.44% , Estonia - 0.04%, Finland - 0.57%, Croatia - 1.16%, Italy - 0.99%, Latvia - 0.47%, Portugal - 0.67, Slovenia - 0.12). It should be mentioned, that Greece is the only EU member state that in 2015 maintained negative economic growth tendency.

Figure 1. Comparison of the average GDP growth rates in EU member states in 2000-2007 and 2008-2015.



Austria–AUT; Belgium–BEL; Bulgaria–BGR; Cyprus–CYP; Czech Republic–CZE; Germany–DEU; Denmark–DNK; Spain–ESP; Estonia–EST; Finland–FIN; France–FRA; United Kingdom–GBR; Greece–GRC; Croatia–HRV; Hungary–HUN; Ireland–IRL; Italy–ITA; Lithuania–LTU; Luxembourg–LUX; Latvia–LVA; Malta–MLT; Netherlands–NLD; Poland–POL; Portugal–PRT; Romania–ROU; Slovak Republic–SVK; Slovenia–SVN; Sweden–SWE.

Source: own calculations based on (World Bank, 2017)

In Ukraine in the period from 2000 to 2007, the average GDP growth accounted for more than 7.0% annually. In 2004, the economic growth reached the highest level – 12.1%, but since 2006 its level has began to fall systematically, and in 2009 the GDP declined to 14.8%. Despite the gradual recovery of the global economy, the military actions in Donbass and the annexation of the Crimea affected preservation of negative tendencies in economic recession in the period from 2013 to 2015 (average value of the indicator was -5.48%). The decline in nominal GDP in 2015 in our country amounted to 9.8% compared with the previous period (2013 – 0.027%, 2014 - 6.55%), and GDP per capita - 980 US dollars (in 2014 this indicator declined to 925 US dollars).

In 2016 the GDP per capita was 2185,728 US dollars (in 2015 – 2124.663 US dollars) and according to World Economic Forum's Global Competitiveness Report (WEF, 2017). Ukraine is in the transition phase from factor-driven economy to efficiency-driven economy, which is 40-60% dependent from the basic factors of the competitiveness: institutes; infrastructure; macroeconomic stability; health care and primary education (Table 1).

Table 1. Classification of competitiveness factors according to the World Economic Forum's Methodology

Global Competitiveness index					
Basic factors		*Efficiency enhancers*		*Innovation and sophistication factors*	
– institutions – infrastructure – macroeconomic environment – health protection and primary education		– higher education and training – labor market efficiency – financial market development		– business sophistication – innovativeness	
Factor-driven economy		*Efficiency-driven economy*		*Innovation-driven economy*	
Stages of competitiveness development	Stage 1	Transition from stage1 to stage 2	Stage 2	Transition from stage 2 to stage 3	Stage 3
GDP per capita (US$) thresholds	<2,000	2,000–2,999	3,000–8,999	9,000–17,000	>17,000
weight for basic factors	60%	40-60%	40%	20-40%	20%
weight for efficiency enhancers	35%	35-50%	50%	50%	50%
weight for innovativeness and sophistication factors	5%	5-10%	10%	10-30%	30%

Source: WEF, 2017

According to the Global Competitiveness Index 2014-2015 ranking, Ukraine was ranked 76th among 143 countries of the world, having received 4.1 out of seven scores. At the same time, the sub-index of macroeconomic stability decreased by 0.1 and 0.3 points compared with the data of 2014-2013 and 2013-2012 reports, respectively.

1. PROBLEM DEFINITION

In the work (Pedraza, 2012) the author studies the impact of macroeconomic instability on economic growth in Columbia over the period from 1950 to 2009. Using Cobb–Douglas production function, the results of the study show significant and negative impact of macroeconomic instability on the economy growth potential in Colombia over this period. It was found that the growth of macroeconomic instability index by 0.1 point leads to the decrease in the economic growth of Colombia by 2.25%. To calculate the macroeconomic instability index, the author uses the methodology for Human Development Index assessment of United Nations Development Program (HDI, 2017) that is based on four macroeconomic indicators: inflation rate, budget deficit in relation to GDP, foreign debt to GDP and exchange rate changes. This methodology was used due to the need to normalize the parameters of macroeconomic instability index that have different measurement units and the range of fluctuations. Therefore, the macroeconomic instability index MII is calculated in two stages. At the first stage all sub-indexes of MII undergo the normalization procedure:

$$I_t = \frac{X_t - X_{min}}{X_{max} - X_{min}}$$

Wherein, I_i refers to normalized sub-index of "X" index (inflation rate, budget deficit in relation to GDP, the ratio of foreign debt to GDP and exchange rate changes) in "t" year, "X_t" represents the real value of "X" in "t" year; X_{min} and X_{max} – maximum and minimum values of "X" index over the whole studied period.

At the second stage the MII is calculated by obtaining the average of normalized sub-indexes of "X" index (inflation rate, budget deficit in relation to GDP, the ratio of foreign debt to GDP and exchange rate deviation) in "t" year (Pedraza, 2012).

Iranian scientists studied the problem of macroeconomic instability and its impact on Iran's economic growth in the period from 1974 to 2008 (Sameti, Isfahani and Haghighi, 2012) and have concluded that there is a close correlation between macroeconomic stability and corresponding GDP growth. The calculation of the MII, which combines inflation rate (inf), budget deficit (bd), exchange rate volatility (ex) and trading balance (tot), is obtained according to the modified methodology for assessment of the Human Development Index:

$$MII_t = \alpha\left(\frac{\inf_t - \inf_{min}}{\inf_{max} - \inf_{min}}\right) + \beta\left(\frac{bd_t - bd_{min}}{bd_{max} - bd_{min}}\right) + \gamma\left(\frac{ex_t - ex_{min}}{ex_{max} - ex_{min}}\right) + \varphi\left(\frac{tot_t - tot_{min}}{tot_{max} - tot_{min}}\right) \quad (2)$$

Wherein, $\alpha + \beta + \gamma + \varphi = 1$.

The study of the correlation between two variables MII and economic growth demonstrates significant negative correlation (-0.6) for Iran over the period from 1974 to 2008.
Using the methodology for calculation of macroeconomic instability, which is similar to (Sameti, Isfahani and Haghighi, 2012) work, the study (Haghighi, Sameti and Isfahani, 2012) also prove the long-term relationship between economic growth and macroeconomic instability on the example of Iran. The scientists studied this long-term relationship between economic growth and macroeconomic instability using Cobb–Douglas production function, which after all transformations takes the following form:

$$PCRYGt = \eta 1 ELGt + \eta 2 PIYt + \eta 3 GIYt + \eta 4 SSERt + \theta 1 MII\ t + \varepsilon t\ ,$$

Wherein, PCRYG refers to GDP per capita growth; ELG – coefficient of overall population growth (employee population); PIY – private investments as percentage to GDP; GIY – governmental investments as percentage to GDP; SSER –human capital development index; MII – macroeconomic instability index.

The study of impact of macroeconomic instability on economic growth by using Cobb–Douglas production function is also described in the works (Antwi, Mills and Zhao, 2013; Ali and Rehman, 2015). Empirical evidences in the work (Ali and Rehman, 2015) show that both in short and long terms, macroeconomic instability has significant and negative impact on economic growth of Pakistan's economy. According to the scientists, the main factors of the studied model (4) include: gross domestic product (GDP), number of people enrolled in secondary school (SSE), financial development (FIN), total labor force (TLF), macroeconomic instability (MII) and foreign direct investments (FDI). At the same time, the check of the cause-and-effect relationship between the time series of the proposed model factors (4) according to Granger test showed the causal relations between GDP of Pakistan and all independent variables. This confirms that the achievement of the target level of the country's economic growth should be accompanied by appropriate policy to ensure macroeconomic stability, financial development and proper education (Ali and Rehman, 2015).

$$\mathrm{GPD}_t = \alpha_0 \mathrm{SSE}^{\alpha_1} \mathrm{FIN}^{\alpha_2} \mathrm{TLF}^{\alpha_3} \mathrm{MII}^{\alpha_4} \mathrm{FDI}^{\alpha_5} e^{t\alpha_6} \quad (4)$$

To study the impact of macroeconomic factors on economic growth in Ghana in the period from 1980 to 2010 the scientists from the Jiangsu University in China similar to the works of (Treisman, 2000; King and Ma, 2001, Neyapti, 2004; Shah, 2006; Thornton, 2007) have used the inflation rate index as an indicator of macroeconomic stability (Antwi, Mills and Zhao, 2013). At the same time, the authors noted that inflation, as well as economic growth rate, are two the most

important and most approached macroeconomic variables (Antwi, Mills and Zhao, 2013).

In the work (Šokčević and Štokovac, 2011), the economic growth in some European transition countries (Hungary, Estonia, Latvia, Lithuania, Poland, Slovakia, Slovenia, Czech Republic) in the period from 1991 to 2008 was analyzed. The analysis has been carried out by using the regression equations with different independent variables depending on the studied period from 1991to 2000 and from 2001 to 2008. For the first period the authors selected the following explanatory variables: inflation rate, budget deficit, foreign direct investment, exports per capita and current accounts balance, while for the second period: unemployment rate, direct foreign investment per capita, exports per capita and labor productivity. Obtained results confirmed theoretical hypothesis regarding the direction and significance of the impact of inflation, budget deficit, current accounts balance, unemployment rate, foreign direct investment, exports and labor productivity on the economic growth in studied countries. Positive correlation between economic growth and macroeconomic stability is confirmed by the results of the analysis of 70 developing countries in the work (Sirimaneetham & Temple, 2009). According to the authors, the increase of economic growth rate by 0.5-0.7% is linked to the improvement of one-standard-deviation of macroeconomic stability. The *object* of this paper is to study the impact of macroeconomic stability on economic growth in the period from 2000 to 2016, by using the modified Cobb–Douglas production function.

2. STUDY RESULTS

In economy, the functional form of Cobb–Douglas production function is widely used to represent the relationship between production amount and two production factors – capital and labor. General function presented by American scholars Cobb and Douglas in 1928 (Melnyk, Kubatko and Pysarenko, 2014), based on USA economy data in the period from 1899 to 1922 was the following:

$$Q = AL^{\alpha}K^{\beta} \quad (5)$$

Wherein, Q refers to the total production (GDP); L – labor input; K – physical capital input; α and β - coefficients of elasticity in relation to the capital and labor; A – proportion ratio that allows comparing the product volume in different periods.

The results of the World Economic Forum's Global Competitiveness Report revealed the need to take into account the increase of the competitiveness of the country for building the production function of basic drivers, in terms of existent rate of economic growth in Ukraine. In our research, we will study the impact of macroeconomic stability on the economic growth. As a measure of macroeconomic stability, we will use Misery Index, which is represented by the sum of unemployment rate and inflation rate (Martinez-Vazquez and Macnab, 2006; Iqbal and Nawaz, 2010):

$$MI = UR + INF \quad (6)$$

Wherein MI is Misery Index, UR is unemployment rate and INF is inflation rate of the economy.

The use of this index is based on the theoretical hypothesis about the negative impact on economic growth in relation to the high inflation rate and increasing rate of unemployment. Along with the indicated index, the study of economic development models (Skrypnychenko et al., 2012) indicates the need to take into account the openness of the economy as an indicator of the impact of exogenous factors on the economy and its growth. It is considered that the openness to international trade leads to the growth in GDP volatility (Caselli, 2015).

Foreign direct investments, along with the openness of the economy have strong and statistically significant causative impact on macroeconomic stability and economic growth of a country (Alfaro, Chanda, Kalemli-Ozcan and Sayek, 2006; Khaliq and Noy, 2007; Melnyk, Kubatko and

Pysarenko, 2014). The overview of the economic literature on the relation between foreign direct investment and economic growth in the work (Almfraji and Almsafir, 2014) indicates the positive and statistically significant impact in the majority of studies conducted in the period from 1994 to 2012. At the same time, the openness of the economy along with market structure and human capital are important factors of the impact of foreign direct investment on the economic growth. Thus, taking into account the abovementioned factors and following the approaches to the correlation and regression analysis from the works of (Pedraza, 2012; Sameti, Isfahani and Haghighi, 2012; Haghighi, Sameti and Isfahani, 2012; Antwi, Mills and Zhao, 2013; Ali and Rehman, 2015) the form of Cobb-Douglas equation is calculated as following:

$$GDP_t = a_0 + a_1 K_t + a_2 L_t + a_3 MS_t + a_4 Open_t + a_5 \mathrm{FDI}_t + e_t \quad (7)$$

Wherein, GDP_t – logarithm of GDP per capita in t period; K_t – logarithm of the capital costs in t period (gross fixed capital formation); L_t – logarithm of labor input (economically active population aged 15 years and above); MS_t – macroeconomic stability in t period (calculated as a logarithm from the sum of unemployment rate and inflation rate); $Open_t$ – openness of the economy in t period (logarithm from the part of sum of exports and imports in GDP); FDI_t– foreign direct investments at t moment (logarithm of Foreign Direct Investment as a percentage of GDP).

To assess the relation between economic growth and indicated factors, we have selected those European countries that, based on the World Economic Forum's Global Competitiveness Report (WEF, 2017), are at the stage of transition from factor-driven economy to efficiency-driven economy (2000 < GDP per capita, US dollars <3000) and at the initial stage of efficiency-driven economy (3000≤GDP per capita, US dollars < 9000): Armenia (ARM); Bulgaria (BGR); Georgia (GEO); Macedonia (MKD); Moldova (MDA); Montenegro (MNE); Romania (ROU); Serbia (SRB); Ukraine (UKR). The statistical analysis of the mean value, standard deviation and coefficient of variation of the variables of equation (7) for different countries is presented in Table 2.

Table 2. Descriptive statistics of the used variables in logarithm in the period from 2000 to 2016

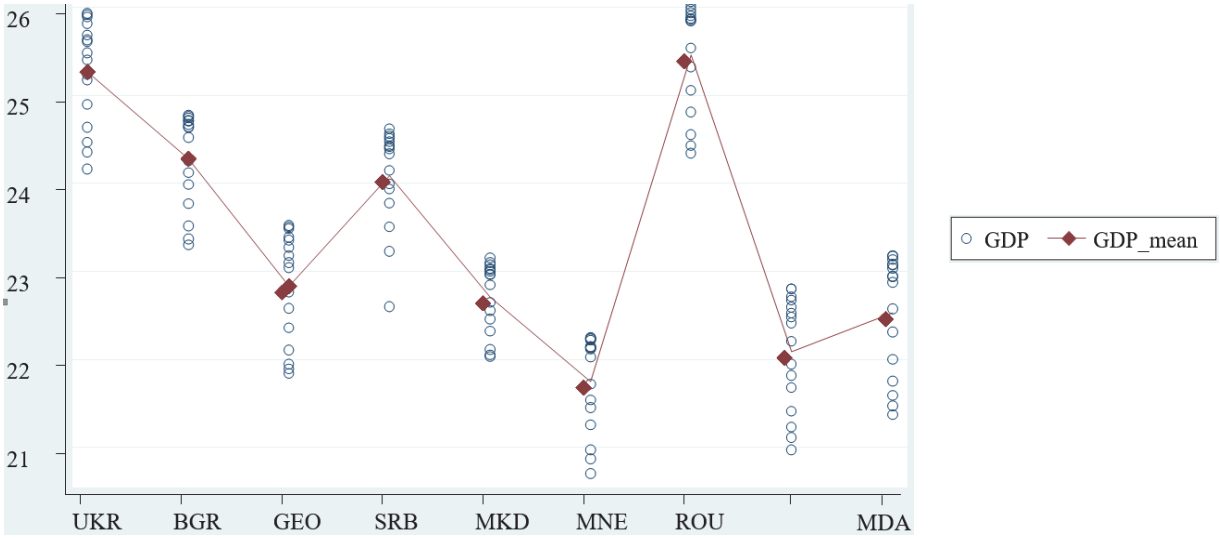
Country	*Descriptive statistics*	*GDP*	*K*	*L*	*MS*	*Open*	*FDI*
UKR	Mean	25.27086	23.638	16.9033	2.92914	4.63427	1.19521
	Std. Dev.	0.5928598	0.61712	0.02827	0.54471	0.07817	0.6549
	CV	0.02346021	0.02611	0.00167	0.18596	0.01687	0.54794
BGR	Mean	24.28228	22.7915	15.0448	2.74638	4.64208	2.02737
	Std. Dev.	0.5345565	0.64753	0.02197	0.32907	0.20217	0.72181
	CV	0.02201426	0.02841	0.00146	0.11982	0.04355	0.35603
GEO	Mean	22.83506	21.413	14.5674	2.90164	4.44244	2.04982
	Std. Dev.	0.6248025	0.58684	0.02813	0.22986	0.1615	0.46765
	CV	0.02736154	0.02741	0.00193	0.07922	0.03635	0.22814
SRB	Mean	24.09262	22.4162	14.9831	3.47166	4.28955	1.5757
	Std. Dev.	0.5686582	0.70272	0.03797	0.46109	0.33763	0.7424
	CV	0.023603	0.03135	0.00253	0.13282	0.07871	0.47115
MKD	Mean	22.70882	21.2088	13.7153	3.54905	4.53441	1.33408
	Std. Dev.	0.3999435	0.45968	0.0534	0.12937	0.17907	0.71043
	CV	0.01761181	0.02167	0.00389	0.03645	0.03949	0.53253

MNE	Mean	21.75154	20.1594	12.4188	3.03527	4.64572	2.45026
	Std. Dev.	0.5447627	0.74651	0.00492	0.10939	0.14098	0.772
	CV	0.02504479	0.03703	0.0004	0.03604	0.03035	0.31507
ROU	Mean	25.46288	24.0898	16.0897	2.74363	4.31909	1.16765
	Std. Dev.	0.6180559	0.75861	0.07627	0.57306	0.08118	0.60582
	CV	0.02427282	0.03149	0.00474	0.20887	0.01879	0.51883
MDA	Mean	22.08651	20.5927	14.1056	2.70711	4.85492	1.72174
	Std. Dev.	0.6381159	0.83473	0.06286	0.42451	0.07671	0.43701
	CV	0.02889166	0.04054	0.00446	0.15681	0.0158	0.25382
ARM	Mean	22.53387	21.179	14.1081	3.06783	4.24523	1.61949
	Std. Dev.	0.6741747	0.83752	0.03718	0.13285	0.1144	0.43124
	CV	0.02991828	0.03954	0.00264	0.0433	0.02695	0.26628

Source: authours' calculations based on the World Bank data.

Among the important indicators for measuring volatility, there are standard deviation and coefficient of variation. For example, in the work (Acemoglu, Johnson, Robinson and Thaicharoen, 2003), the authors assess the macroeconomic instability by using standard deviations of GDP growth rates and terms of trade. Giovanni and Levchenko (Giovanni and Levchenko, 2010) also use the standard deviation of GDP per inhabitant and exports as one of the indicators for assessment of macroeconomic instability. Among the analyzed countries, Armenia (0.0299183) and Moldova (0.02889166) have the highest GDP variation coefficient due to the high rate of uncertainty of economic growth, as shown in Fig. 2.

Figure 2. Distribution of the analyzed countries on the GDP level and its mean value in the period from 2000 to 2016



Source: authours' calculations based on the World Bank data.

On the other hand, the indicators of the economically active population (coefficient of variation for Montenegro is 0.0004) and direct foreign investment (coefficient of variation for Moldova is 0.0158) have the lowest variability among all factors of equation (7). Ukraine has the highest indicator of dispersion value of foreign direct investment to the mean value (0.54794), as well as Romania (0.51883) and Macedonia (0.53253). However, the coefficient of variation less than 33% is observed for the totality of data of GDP, K, L, MS, Open that indicate their homogeneity. The indicators of equations (7) are expressed in natural logarithms that allow to avoid the problems of dynamic properties of the series of panel data. The results of the unit root tests by using Levin, Lin & Chu (LLC), Breitung, Hadri LM, Im-Pesaran-Shin (IPS) tests for GDP, K, L, MS, Open, FDI variables are shown in Table 3.

Table 3. Panel unit root results for GDP, K, L, MS, Open, FDI

	Unit root test				
	Levin, Lin & Chu (LLC)	*Breitung*	*Hadri LM*	*Im-Pesaran-Shin (IPS)*	
				Level	*First difference*
GDP	-5.5171 (0.0000)*	-3.0822 (0.0010)*	23.0478 (0.0000)*	-2.7732 (0.0028)*	-2.1586 (0.0154)**
K	-4.3649 (0.0000)*	-4.2202 (0.0000)*	19.1760 (0.0000)*	-1.9968 (0.0229)**	-2.6678 (0.0038)*
L	-4.3710 (0.0000)*	-4.6683 (0.0000)*	21.7481 (0.0000)*	-0.0008 (0.4997)	-4.2810 (0.0000)*
MS	-4.7392 (0.0000)*	-1.8425 (0.032)**	10.4880 (0.0000)*	-2.0667 (0.0194)**	-2.8062 (0.0025)*
Open	-2.2972 (0.0108)**	-3.6758 (0.0001)*	14.4808 (0.0000)*	-1.3383 (0.0904)***	-4.9680 (0.0000)*
FDI	-2.6829 (0.0036)*	-5.9422 (0.0000)*	5.5603 (0.0000)*	-1.1399 (0.1272)	-5.1298 (0.0000)*

Note: the asterisks *, ** and *** represent the significance at 1%, 5% and 10% levels respectively.

Source: authours' calculations based on the World Bank data

All tests, except Im-Pesaran-Shin (IPS) test reject the null hypothesis of non-stationary variables. The results of the research from the work (Hlouskova and Wagner, 2006) show that the Breitung panel unit root test has the highest power and smallest size distortion. As it is shown in Table. 3 according to the Breitung panel unit root test, the GDP per capita, gross fixed capital accumulation, economically active population, openness of the economy and direct foreign investment have a stationary path at 1% significance level and macroeconomic stability has stationary path at 5% significance level.

According to Hadri LM panel unit root test, all variables have a stationary path at 1% significance. These results allow assessing the statistically significant a_1, a_2, a_3, a_4, a_5 coefficients for independent variables K, L, MS, Open, FDI of the equation (7).

The assessment of a_0, a_1, a_2, a_3, a_4, a_5 coefficients for independent variables K, L, MS, Open, FDI of the equation (7) using ordinary least square (OLS), fixed effects and random effects models, shown in the Tables 4-6.

Table 4. The OLS regression model of GDP for the panel of 9 selected countries

GDP	*Coef.*	*Std. Err.*	*t*	*P>t*	*[95% Conf. Interval]*	
K	0.896041	0.0194005	46.19	0.000	0.85768	0.934401
L	0.090735	0.0234183	3.87	0.000	0.04443	0.13704
MS	0.123836	0.0670929	1.85	0.067	-0.00883	0.256499
Open	-0.09524	0.0240847	-3.95	0.000	-0.14286	-0.04761
FDI	0.094548	0.0375187	2.52	0.013	0.020362	0.168734
const	1.771336	0.4792369	3.70	0.000	0.82374	2.718933
F(5, 138) = 1600.85; Prob > F = 0.000; R-squared = 0.9831; Adj R-squared = 0.9824; Root MSE = 0.18726						

Source: authours' calculations based on the World Bank data

Table 5. The fixed effects regression model of GDP for the panel of 9 selected countries

GDP	*Coef.*	*Std. Err.*	*t*	*P>t*	*[95% Conf. Interval]*	
K	0.8036575	0.0214127	37.53	0.000	0.761295	0.8460201
L	-0.8152515	0.3109556	-2.62	0.010	-1.43044	-0.2000631
MS	0.1963446	0.0780659	2.52	0.013	.0419006	0.3507886
Open	-0.1116702	0.0202456	-5.52	0.000	-.1517236	-0.0716168
FDI	0.0309958	0.0393868	0.79	0.433	-.0469263	0.1089179
const	16.97208	4.573408	3.71	0.000	7.924144	26.02002
sigma_u	1.3113731					
sigma_e	0.13773699					
F(8, 130) = 15.63 Prob > F = 0.0000						

Source: authours' calculations based on the World Bank data

Table 6. The random effects regression model of GDP for the panel of 9 selected countries

GDP	*Coef.*	*Std. Err.*	*t*	*P>t*	*[95% Conf. Interval]*	
K	0.8420492	0.0202257	41.63	0.000	0.8024077	0.881691
L	0.1280253	0.0332761	3.85	0.000	0.0628053	0.193245
MS	0.1163215	0.0739674	1.57	0.116	-0.0286519	0.261295
Open	-0.1116877	0.0212246	-5.26	0.000	-0.1532871	-0.07009
FDI	0.0152942	0.0371561	0.41	0.681	-0.0575304	0.088119
const	2.710085	0.5705435	4.75	0.000	1.59184	3.82833
sigma_u	0.08565822					

sigma_e	0.13773699
rho	0.27889253
R-sq: within = 0.9419, between = 0.9899, overall = 0.9819; Prob > chi2 = 0.0000	

Source: authours' calculations based on the World Bank data

R-squared coefficient of determination is at a high level, regardless of the chosen model for economic growth assessment. Table 4 shows that 98.31% of variation in GDP is caused by the changes in K, L, MS, Open, FDI factors (R-squared = 0.9831). Test (F) demonstrates that all coefficients in the models shown in Tables 4-6 are different than zero (for ordinary least square (OLS) - Prob> F = 0.000, fixed effects - Prob> F = 0.0000, random effects Prob> chi2 = 0.0000). Three variables in OLS regression model, namely gross fixed capital formation, economically active population and openness of economy are significant at 1% level.

Macroeconomic stability is significant at 10% level and foreign direct investments – at 5% level. a_4 coefficient has the negative sign that means that the openness of economy has negative impact on the GDP growth, but at the same time the other coefficients a_1, a_2, a_3, a_5 (gross fixed capital formation, economically active population aged 15 years and above, macroeconomic stability and foreign direct investments) have positive sign and positive impact on the GDP growth. In analysis of European countries that are on the transition stage from factor-driven economy to efficiency-driven economy, the negative sign of a_4 coefficient confirm the theoretical hypothesis [Francesco] on the growth of GDP volatility.

Statistically insignificant impact of foreign direct investments in fixed effects and random effects models (P>t amounted to 0.433 and 0.681 respectevely) and macroeconomic instability for random effects models (P>t amounted to 0.116) also should be mentioned. Assessment of elasticity of macroeconomic stability is positive and statistically significant using ordinary least square (OLS) and fixed effects models at 10% and 5 % levels and varies from 0.123836 to 0.1963446.

Table 4 demonstrates that 1% growth of GVA leads to the growth of GDP per capita by 0.896041%, 1% growth of economically active population aged 15 years and above reflects on the growth of GDP per capita by 0.090735%, and 1% growth of foreign direct investment – by 0.094548%. 1% growth of macroeconomic stability will lead to the growth of GDP per capita by 0.123836%, 0.1963446% and 0.1163215 depending on the chosen model (Table 4-6).

It should be mentioned that 1% growth of macroeconomic stability has a more positive impact on GDP growth in comparison to foreign direct investments that indicate that the relevant macroeconomic policies of governments should be implemented to ensure the prospects for economic growth in studied countries.

CONCLUSIONS

In this paper, by using the modified Cobb–Douglas production function, we have studied the impact of macroeconomic stability on economic growth in European countries that according to the results of the World Economic Forum's (WEF) Global Competitiveness Report are at the transition stage from factor-driven economy to efficiency-driven economy (2000 <GDP per capita, US dollars <3000) and at the first stage of efficiency-driven economy (3000 ≤ GDP per capita, US dollars <9000): Armenia; Bulgaria; Georgia; Macedonia; Moldova; Montenegro; Romania; Serbia; Ukraine in the period from 2000 to 2016.

Assessment of the elasticity coefficients for independent logarithmic variables of capital costs (gross fixed capital accumulation), labor input (economically active population aged 15 years and older); macroeconomic stability (the sum of unemployment rate and inflation rate), openness of

the economy (part from the sum of exports and imports in GDP); Foreign Direct Investment as a percentage of GDP using ordinary least square (OLS), fixed effects and random effects models indicate the high degree of correspondence of the model with the initial data (R-squared = 0.9831).

Herewith, all factors of the regression equation (7) according to the Breitung panel unit root test have a stationary path at 1% and 5% significance level. According to Hadri LM panel unit root test all variables have a stationary path at 1% significance.

Assessment of the elasticity of macroeconomic stability is positive and statistically significant using the ordinary least square (OLS) and fixed effects models at the level of 10% and 5%, that allows to confirm that GDP per capita increases by 0.123836% and 0.1963446% respectively with the 1% growth of macroeconomic stability. It should be mentioned that 1% growth of macroeconomic stability has a more positive impact on GDP growth compared to foreign direct investments, indicating the need for implementation of the appropriate macroeconomic policies of governments to ensure the prospects for economic growth in studied countries.

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