MACROECNOMIC VOLATILITY AND ECONOMIC GROWTH: EMPIRICAL ESTIMATION FOR THE CEE REGION

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Abstract: *Scientific research has questioned the role and importance of macroeconomic policy as a determinant of long-term economic growth.A macroeconomic policy framework conducive to growth can be characterized by five features: a low and predictable inflation rate; an appropriate real interest rate; a stable and sustainable fiscal policy; a competitive and predictable real exchange rate; and a balance of payments that is regarded as viable. While there seems to be a correlation between macroeconomic variables and economic growth (for instance, negative and statistically significant correlation between inflation rate, government size and economic growth), this correlation might disappear when controlling for the fundamental factors that determine growth (institutions, human capital, R&D). In that regard, maybe the macroeconomic volatility, rather than the macroeconomic performance does matter for growth. The main goal of this paper is to investigate how macroeconomic volatility affectseconomic growth by applying panel regression analysis for a group of CEE countries with special focus on the Republic of Macedonia. As proxy variables for the macroeconomic volatility in the research, we take the standard deviation of inflation rates, discretional fiscal policy, government size and output volatility. Also, we investigate the volatility of the cyclical components of some important macroeconomic variables for countries in our sample before and during the global economic crisis, so as to see how the business cycles detriment the economic growth. Additionally, we use the so-called Hodrick-Prescott filter as a very useful method to analyze the cyclical component and variation in the growth trend.*

Keywords: Economic growth, macroeconomic performance, volatility, OLS panel regression, cross-country data.

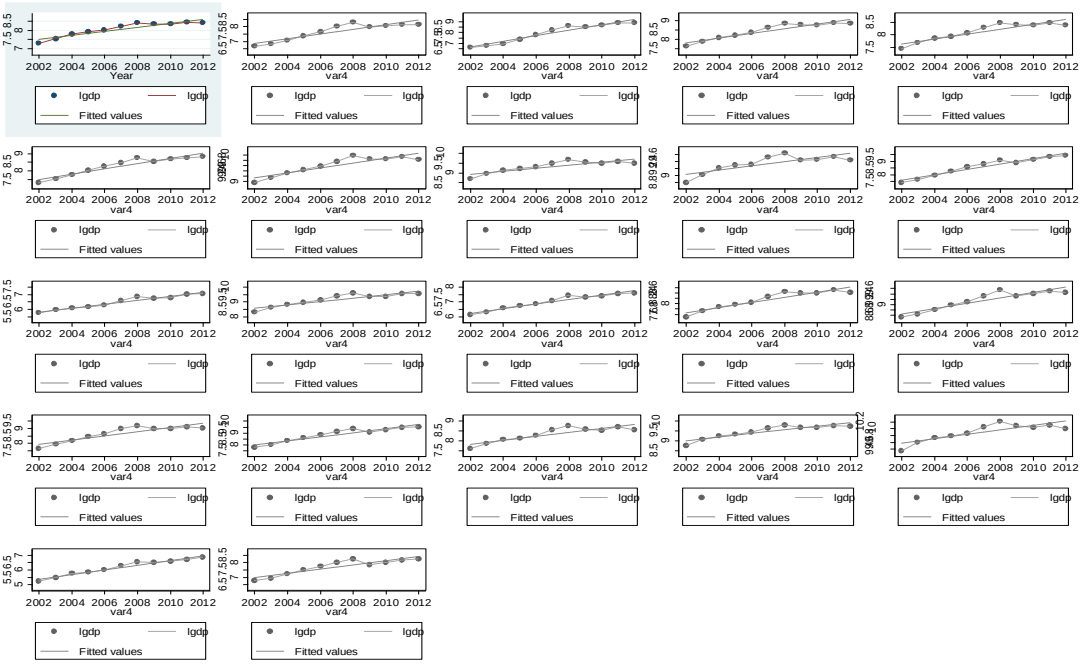
JEL Classification: E32, 011, 047

1. MACROECONOMIC PERFORMANCE AND ECONOMIC GROWTHIN THE CEE COUNTRIES

There is a consensus in economic theory about the role and importance of macroeconomic policy for economic growth. A macroeconomic policy framework conducive to growth can be characterized by the following five features: a low and predictable inflation rate; an appropriate real interest rate; a stable and sustainable fiscal policy; a competitive and predictable real exchange rate; and a balance of payments that is regarded as viable. Countries that create macroeconomic environment with above mentioned characteristics tend to have a more dynamic growth, even though there are individual cases where fulfilling these macroeconomics goals is not enough sufficient long-run growth[1].

In this section our task will be to analyze the key macroeconomic characteristics and macroeconomic performance of the countries in the CEE region and to investigate how does that performance affecteconomic growth. First, we present output fluctuations(output volatility) of the CEE countries and the long-term growth path (the cyclical and trend component of real GDP per capita).

Picture 1:The real GDP per capita and the underlined trend (for 22 CEE countries) in 2002-2012 period

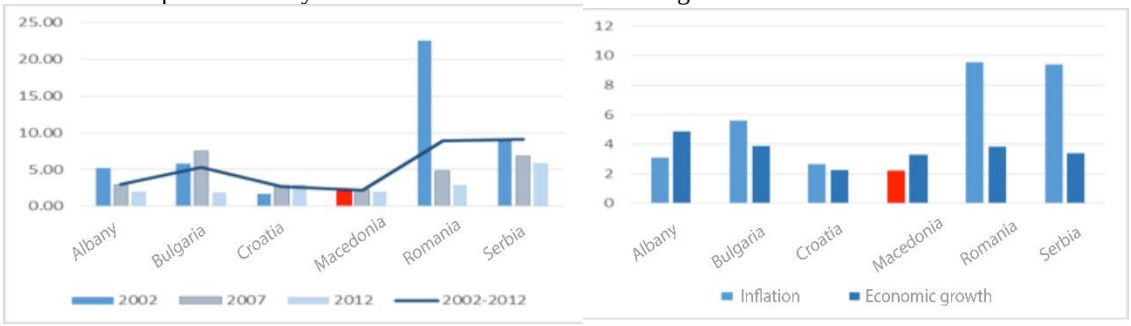


[1]Palle Andersen and David Gruen (1995),"*Macroeconomic policies and economic growth*", Reserve Bank of Australia.

The straight regression line represents the trend value of output and the deviation form that hypothetical steady state growth path measures the cyclical component of GDP. The Picture above shows that in countries where the output deviation is smaller, the growth trend is stronger. Additionally, it is obvious from the Picture that almost all countries in our sample experienced stagnation during global economic crisisperiod (the actual real GDP is below the potential GDP).

One of the monetary performance instruments is the inflation rate level. The comparative analysis of inflation rate and economic growth is focused on several countries from the CEE region.

Picture 2: Comparative analysis of inflation rate and economic growth

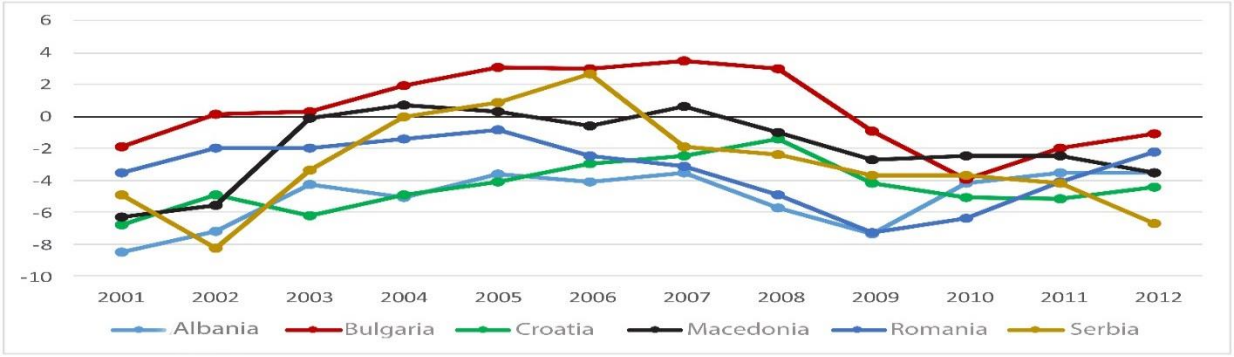


Source:World Bank Indicators

The results show that there is no negative correlation between inflation rate and economic growth in the analyzed period which is at odds with the standard macroeconomic theory. The analysis indicates that countries with higher inflation rate have experienced higher growth rates.

The fiscal performance instrument that we use in macroeconomic performance comparative analysis is budget deficit. In the Picture 3 below the budget deficit for a sample of CEE countriesis presented.

Picture 3: Comparative analysis of budget deficit



Source:EIU Country Data, EBRD, IMF.

2. BUSINESS CYCLES, MACROECONOMIC VOLATILITY AND ECONOMIC GROWTH: LITERATURE REVIEW

One of the key challenges in the macroeconomic and growth theory is the relationship between business cycles and long-run economic growth. Within the classical growth theory framework the costs of economic fluctuations can only be related to the uncertainty they generate and the resulting fluctuations in investment, and in the earlier works these costs had been estimated as very small. If we move away from the classical growth theory the costs of volatility can be much higher as there is a possibility that growth rates were affected by fluctuations.

There are several ways of modifying the analysis so that volatility and uncertainty become detrimental to investment and long-term growth. The first is very mechanical and consists of thinking about fluctuations as asymmetric. What if more fluctuations meant deeper recessions relative to unchanged expansions? Rodrik (1991) or De Long and Summers (1988) follow this path. The link between volatility and growth could also be happening through uncertainty. Feeney (1999) argues that risk sharing (through trade) and the associated decrease in uncertainty and volatility can have positive effects on growth.

An endogenous growth model can also introduce general equilibrium effects of uncertainty on growth through investment, consumer behavior, and labor supply, as in Barlevy (2004), Jones et al. (2005), or de Hek and Roy (2001). More recently, Aghion et al. (2005) show that a key to understanding the link between volatility and growth is the level of financial development. They show both theoretically and empirically that the presence of credit constraints makes volatility costly for growth. In their model productive long-term investment is wasted when firms face a negative productivity shock in the presence of liquidity constraints. Because of the restrictive role of credit constraints on firms, investment and growth are lower in economies with higher volatility.

Fatas and Mihov (2006) investigate the correlation and causality between macroeconomic volatility and economic growth using a cross-country regression. They have found robust negative correlation between fiscal policy volatility and economic growth.

3. EMPIRICAL STUDY OF MACROECONOMIC VOLATILITY AND ECONOMIC GROWTH FOR A SAMPLE OF CEE COUNTRIES

In this empirical study we test the correlation between macroeconomic performance and economic growth, and more importantly we address the question whether macroeconomic volatility influences economic growth for a sample of CEE countries. The issue that is of interest in our empirical research is how do we measure macroeconomic performance and macroeconomic volatility? The macroeconomic performance is measured in levels. For example, fiscal policy performance is defined as government size (e.g. expenditures as a percent of GDP), tax rates, budget deficit or central government debt. Exchange rate performance is measured by distortions in the official market for exchange rates. Monetary policy performance is measured by the inflation rate or interest rate level. Our realconcern here is how to measure macroeconomic volatility as a main interest variable in this empirical research.

The difficulty of looking at monetary policy is that it is not easy to define the instruments of monetary policy. One solution is to take the rate of inflation as an outcome of monetary policy. In that case, the standard deviation of inflation rate is the most representative variable that measures the monetary policy volatility.

While it is straightforward to think about budgetary outcomes as a characterization of fiscal policy, there is still an open question about how to summarize fiscal policy actions with one single variable. Once we decide which budgetary variables to choose as an indicator of fiscal policy we need to worry about the fact that fiscal policy variables react endogenously to economic outcomes and, therefore, measuring their changes will not be an appropriate indicator of policy volatility. To overcome the endogeneity problem, we regress the economic output with the central government debt, where the regression residual presents the discretionary response of governments to economic fluctuations (the changes in fiscal policy that are not related to the cyclical position of the economy).

In the sections below we analyze the influence of monetary policy and fiscal policy volatility on economic growth for a sample of 22 CEE countries by applying the panel regressions (OLS and GMM).

3.1 Methodology of research

The empirical research in this paper uses panel datarelated to the countries in the sample. Because they are bound to heterogeneity in data for different countries, panel data estimation seems appropriate since it takes into account individual heterogeneity. Panel data are also more informative data; they include more variability, less colinearity and more efficiency. The question which researcher faces is which estimator to use: Ordinary Least Square (OLS) or Random Effects Model (RE). If there is no evidence of significant differences across countries, one could run a simple OLS regression. In our case, the fact that sample countries are similar to some extent, OLS is more appropriate econometric method.

Next, to test for the robustness of the results and to solve the endogeneity problem, Dynamic panel data estimator namely Arellano/Bond GMM estimator is the most appropriate model. The basic model with lagged dependent variables is:

$$y_{it} = a_i + \gamma y_{it-1} + u_{it}, t = 1,2...T \qquad (1)$$

In the previous equation residuals are assumed to follow normal distribution, i.e. $u_{it}, \sim (0, \sigma_u^2)$. Here y_{it-1} depends positively on a_i, this is easy to see when we are inspecting the model for t-1 period:

$$\gamma y_{it-1} = a_i + \gamma y_{it-2} + u_{it-1}, t = 1,2...T \qquad (2)$$

So there exist endogeneity problem and OLS and GLS, i.e. FE and RE are not consistent. But the Arellano/Bond GMM estimator is consistent. The moment conditions use the properties of the instruments, and the instruments in the GMM Arellano/Bond model are the differenced explanatory variables:

$$y_{it-m}; m \geq 2 \quad (3)$$

Now the instruments are uncorrelated with the future errors u_{it} and u_{it-1}. The increasing number of moment of conditions is $t = 3,4...T$. GMM estimation is combined with RE and FE estimator because as $T \to \infty$,estimates of the RE and FE model begin to converge.

3.2 Monetary policy, volatility and growth

Since data cover 22 countries, and the period from 2002 to 2012, we apply panel estimation techniques. The econometric models that we estimate to test the influence of monetary policy volatility to economic growth for a sample of CEE countrieshave the following structure:

$$g = \gamma_0 + \gamma_1 \ln Init + \gamma_2 \log Bank + \gamma_3 WGI + \gamma_4 \log Ex + \gamma_5 Invest + \gamma_6 Inf + \varepsilon_i \quad (4)$$

$$g = \gamma_0 + \gamma_1 \ln Init + \gamma_2 \log Bank + \gamma_3 WGI + \gamma_4 \log Ex + \gamma_5 Invest + \gamma_6 Volatility + \varepsilon_i \quad (5)$$

The outcome variable in the model is the rate of economic growth (growth rate of real GDP per capita), while the independent variables as determinants of economic growth for analyzed group of the CEE countries are: 1) *Initial GDP per capita* (logarithm of initial real GDP per capita; 2) Growth rate of *bank credit to private sector*; 3) *Institutional quality* measured by WorldWide Governance Indicators – WG*I*; 4) *Export growth*; 5) The growth rate of *investment (*private and public capital investment); 6) *Inflation rate*; and 7) *Monetary policy volatility* measured by the standard deviation of inflation rate.[2]

The estimated result from the empirical study that we have partly done by using data for a group of CEE countries in OLS regression analysis in 2002-2012 time period indicates that inflation rate,contrary to the standard macroeconomic theory has positive and statistical significant correlation with the rate of economic growth. We can provide logical explanation about this result by analyzing the current growth model of the CEE countries based on boosting aggregate demand. On the other hand, the results of the second regression model, where our focus is on the monetary policy volatility rather than monetary performance measured by the level of inflation rate, indicate that monetary policy volatility measured by the standard deviation of inflation rate has negative and statistically significant correlation at 95%and 99% levelwith the rate of economic growth for a same sample of countries (the regression coefficients between monetary policy volatility and economic growth are -0.00885 and -0.00885, respectively). The results of our empirical studyprovide a prooffor the hypothesis that monetary policy volatility

[2]The database is composed by combination of sources from relevant specialised agencies and international institutions: World Bank, IMF, EBRD.

rather than inflation rate determines negatively economic growth. In the Table 1 below we present the estimated results using OLS regression and OLS with robust standard errors.

Table 1: OLS estimation results

VARIABLES	(1) Growth rate	(2) Growth rate	(3) Growth rate (Robust stand. errors)	(4) Growth rate (Robust stand. errors)
Initial GDP per capita	-0.0158	-0.0343***	-0.0158*	-0.0343***
	(0.00994)	(0.0103)	(0.00953)	(0.00948)
Bankcredit growth	0.199***	0.176***	0.199**	0.176**
	(0.0611)	(0.0650)	(0.0876)	(0.0840)
WGI	0.173	0.187	0.173	0.187
	(0.151)	(0.162)	(0.158)	(0.160)
Export growth	0.00407**	0.00461**	0.00407*	0.00461***
	(0.00176)	(0.00180)	(0.00207)	(0.00171)
Investment growth	0.00815***	0.00685**	0.00815*	0.00685
	(0.00283)	(0.00295)	(0.00488)	(0.00491)
Inflation rate	0.00384***		0.00384**	
	(0.00147)		(0.00190)	
Monetary policy volatility		-0.00885***		-0.00885**
		(0.00334)		(0.00345)
Ramsey reset test (Ho: model has no omitted variables)				
Prob>F	0.0496	0.1665		
Link test (Ho: there in not specification error) p-value of _hatsq	0.002	0.044		
Breusch-Pagan / Cook-Weisberg test for heteroskedasticity (Ho: Constant variance)				
Prob> chi2	0.000	0.0031		
Constant	0.198**	0.379***	0.198**	0.379***
	(0.0798)	(0.0803)	(0.0801)	(0.0767)
Observations	205	186	205	186
R-squared	0.4954	0.5195	0.4954	0.5195

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Correlation between institutional quality measured by the WGI and economic growth is relatively significant an increase of institutional quality by 1 point will contribute by 0.173 and 0.187 percent to the increase in the rate of economic growth, respectively in the first two models that we have estimated. The role ofinvestment (private and public) to economic growth is well known based on the standard growth models. The regression results show that an increase of

investment by1% will increase the rate of economic growth by 0.00815 and 0.00685 percent, respectively. These correlations are statistically significant at the 95% and 99% level.

Most of the countries in our sample are small open economies and it is likely that there is positive and statistically significant link between export growth and economic growth. Bank credits to the private sector as a main source for financing investment in CEE counties have important role for economic growth. Countries with market oriented financial sector which provide support to the private sector and businesses have better chances for economic growth. This conclusion can be proved by econometric results that we have obtained - efficiency of the financial sector presented by bank credit to private sector is positively and statistically significantly correlated with economic growth in our sample of countries over the period (2002-2012).

The most serious problems that we have addressed in our models are the problems of heteroskedasticity (not constant variance) and the omitted variables problem in the first model. To overcome the heteroskedasticity problem we used robust standard errors.

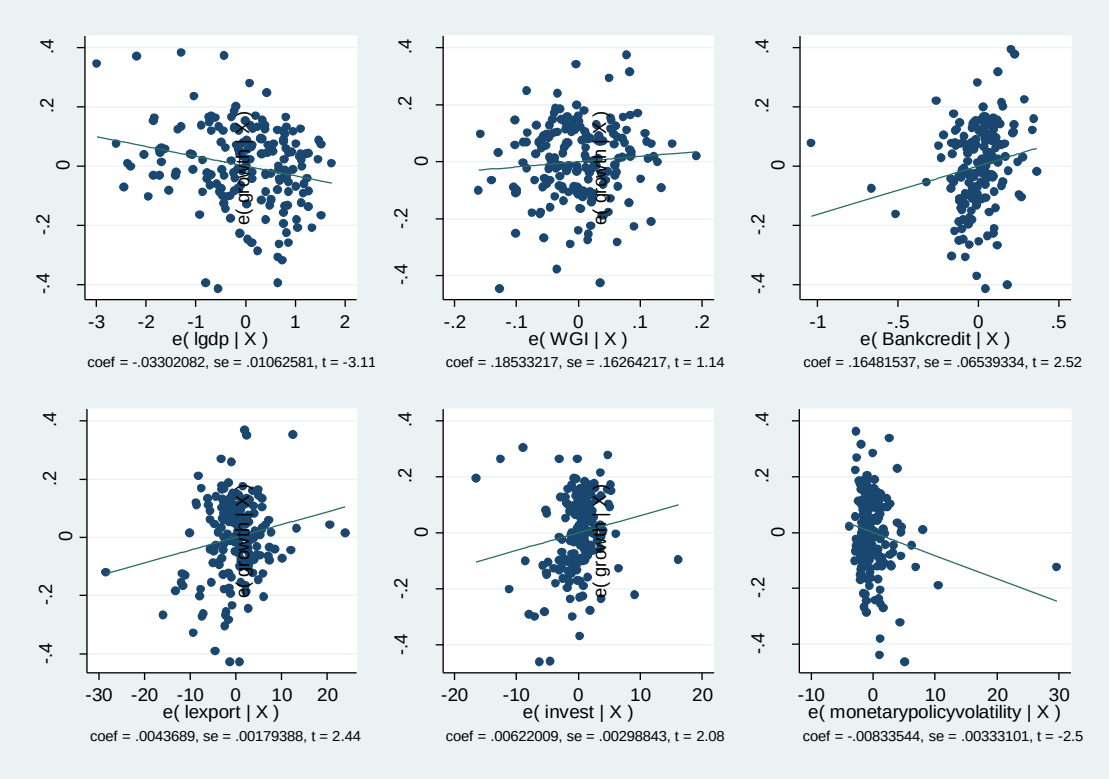
Our estimation might be biased due to counties' fixed effects and endogeneity problems on the explanatory variables. We tackle these issues by including internal instruments (GMM).

Table 2: GMM estimation results

	(1)	(2)
VARIABLES	Growth rate	Growth rate
Growth rate	0.205***	0.203***
L1.	(0.0195)	(0.0242)
Initial GDP per capita	-0.0745***	-0.0757***
	(0.0119)	(0.0147)
WGI	0.273***	0.425***
	(0.0506)	(0.0615)
Export growth	0.00733***	0.00727***
	(0.000613)	(0.000787)
Investment growth	0.0168***	0.0141***
	(0.00232)	(0.00246)
Inflation rate	0.00767***	
	(0.00125)	
Monetary policy volatility		-0.0177***
		(0.00292)
Sargan test of overidentifying restrictions (H0: overidentifying restrictions are valid)		
Prob> chi2	0.9976	0.9663
Observations	162	160
R-squared		
Number of ctry	22	22
Standard errors in parentheses		
*** p<0.01, ** p<0.05, * p<0.1		

The Sargan test for over identifying restrictions does not reject the null hypothesis that our instruments are appropriate, indicating that the GMM estimation is consistent. Additionally, the regression coefficient between monetary policy volatility and economic growth obtained with the GMM estimator appears higher in the negative context, and it is not significantly different from the one obtained based on OLS regressions. This suggests that our indicator does not suffer from endogeneity problems.

Picture 3: Estimated regression results (monetary policy volatility and economic growth)



The regression results presented in the table and the graph above show that the institutions measured by the *WorldWide Governance Indicators (WGI)*, bank credit to private sector, export growth, and investment growth rate have positive and statistical significant correlation with the rate of economic growth. Also, the estimated results show that there is convergence in the model i.e. countries with higher initial real GDP per capita have experienced slower economic growth during the analyzed period.

3.3 Fiscal policy, volatility and growth

The second hypothesis of our research is to test the relationship between fiscal policy volatility and economic growth for a sample of CEE countries. In order to do the estimation, we have to create a variable so as to measure the fiscal policy volatility. Actually, the standard macroeconomic models use budget balance, budget deficit, and public debt as indicators of the fiscal policy stance. But, in that case we need to worry about the fact that fiscal policy variables react endogenously to economic outcomes and, therefore, measuring their changes will not be an appropriate indicator of policy volatility.

In that context, we can summarize a fiscal policy rule and the automatic fiscal stabilizers by the following econometric equation:

$$Fiscal\ policy_t = \alpha + \beta Economic\ activity_{i,t} + \varepsilon_i \qquad (6)$$

where, *"Fiscal Policy"* can be the overall central government balance or one of its components and *"Economic Activity"* is a measure of the cyclical stance of the economy (such as the output gap or output growth), The parameter β measures the elasticity of budget components regarding economic fluctuations and economic outcomes, while the residual of the equation above, can be interpreted as the exogenous discretionary changes in fiscal policy. The variable created by the methodology presented above extracts the budget component (fiscal policy changes for reasons other than macroeconomic stabilization) that is not related in any way to the stage of the business cycle. This variable addresses the problems of endogeneity that are likely to appear in the econometric analysis and present the fiscal policy volatility in our estimation.

The estimated result from the empirical study that we have done to test the fiscal policy performance and fiscal policy volatility as factors of economic growth for a sample of CEE countries, by using the OLS and GMM methods is presented in the table below.

Table 3: OLS estimation results

VARIABLES	(1) Growth rate	(2) Growth rate	(3) Growth rate (Robust stand. errors)	(4) Growth rate (Robust stand. errors)
Initial GDP per capita	-0.0420***	0.292***	-0.0420***	0.292***
	(0.00996)	(0.0615)	(0.00963)	(0.0582)
Bankcredit growth, %	0.147**	0.147**	0.147*	0.147*
	(0.0603)	(0.0603)	(0.0784)	(0.0784)
Institutional quality (rule of law)	0.179	0.179	0.179*	0.179*
	(0.109)	(0.109)	(0.107)	(0.107)
Export growth, %	0.00570***	0.00570***	0.00570***	0.00570***
	(0.00167)	(0.00167)	(0.00177)	(0.00177)
Investment growth, %	0.00624**	0.00624**	0.00624	0.00624
	(0.00273)	(0.00273)	(0.00450)	(0.00450)
Central Government debt	-0.00287***		-0.00287***	
	(0.000530)		(0.000520)	
Fiscal policy volatility		-0.334***		-0.334***
		(0.0617)		(0.0605)
Ramsey reset test (Ho: model has no omitted variables)Prob>F	0.6859	0.6859		
Link test (Ho: there in not specification error)p-value of _hatsq	0.843	0.843		
Breusch-Pagan Lagrange Multiplier LM test (Ho: Variances across entities is zero) Prob> chi2	0.2849	0.2849		
Constant	0.577***	-2.299***	0.577***	-2.299***
	(0.0906)	(0.512)	(0.0960)	(0.482)
Observations	186	186	186	186
R-squared	0.316	0.316	0.316	0.316

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The first important question here is choosing an appropriate model for the estimation. The Breusch-Pagan LM test shows that there is no significant difference of variance across countries i.e. we can use simple OLS, instead the random effects model. The Ramsay reset test shows that there is no omitted variable in our models (we fail to reject the null hypothesis that the model has no omitted variables) and the Link test shows that there is not specification problem and the models are well specified (we fail to reject the null hypothesis that there is not specification error).

In order to increase the validity of our results about the fiscal policy volatility and economic growth we have applied dynamic panel regression analysis by using the GMM (General Method of Moments) model. The regression results are presented in the Table below.

Table 4: GMM estimation results

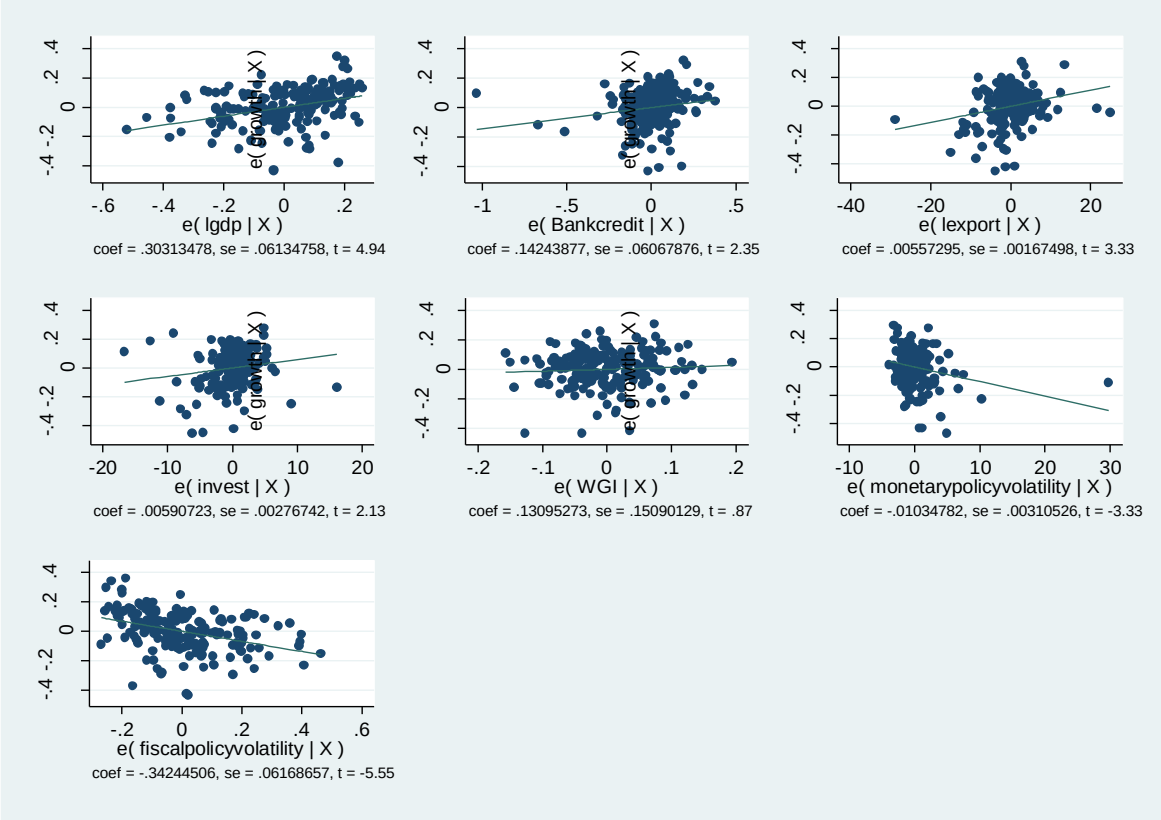
VARIABLES	(1) Growth rate	(2) Growth rate
Growth rate	0.132***	0.135***
L1.	(0.0377)	(0.0195)
Institutional quality (rule of law)	0.282***	0.345***
	(0.0777)	(0.0438)
Investment growth	0.0148***	0.0123***
	(0.00240)	(0.00268)
Bank credit to private sector	0.0758*	0.145***
	(0.0434)	(0.0387)
Monetary policy volatility	-0.0150***	-0.0154***
	(0.00137)	(0.00250)
Central Government debt	-0.00680***	
	(0.000945)	
Fiscal policy volatility		-0.0828***
		(0.0216)
Constant	0.334***	0.128***
	(0.0366)	(0.0120)
Sargan test of overidentifying restrictions (H0: overidentifying restrictions are valid)		
Prob> chi2	0.9731	0.9784
Observations	160	160
R-squared		
Number of ctry	22	22
Standard errors in parentheses		
*** p<0.01, ** p<0.05, * p<0.1		

The econometric results estimated by using OLS and GMM indicate that central government debt as one of the fiscal policy performance measurements has negative statistically significant correlation regarding the economic growth, which is in accordancewith the macroeconomic models (an increase in the central government debt level will decrease the rate of economic growth for 0.00287 and 0.00680, respectively).

Instead of the fiscal policy performance, our focus in this empirical research is the question does fiscal policy volatility matter for economic growth? We see a strong negative correlation between discretionary fiscal policy (measured by residual of the estimated model above) and economic growth. An increase in fiscal policy volatility by one point will decrease

the economic growth by -0.0828 percent). There is, of course, a potential problemwith the direction of causation, but the use of dynamic panel regression (GMM) confirms that the relationship is robust and goes from fiscal policy to output volatility

Picture 4: Estimated regression results (fiscal policy volatility and economic growth)



4. CONCLUSION: HOW MACROECONOMIC VOLATILITY AFFECTS ECONOMIC GROWTH IN THE CEE REGION

The role and importance of macroeconomic performance as a determinant of long-term economic growth is widely accepted by the standard macroeconomic theory and empirical works.The main goal of this paper is not to deny the role of macroeconomic performance for economic growth, but to look at the growth effects of macroeconomic volatility. In that context, the central question in this research is how macroeconomic volatility affects economic growth for a sample of the CEE countries by applying the panel regression analysis (OLS and GMM).

The estimated empirical results about monetary and fiscal policy volatility and economic growth indicate that there is a negative and statistically significant correlation between macroeconomic volatility and growth. The empirical study of fiscal policy and discretion that governments have and exercise regarding changes in fiscal policy that are not related to the business cycle provide a strong message that the more discretion governments have, the more they will exercise it and it will cause unnecessary volatility and lower growth (an increase in fiscal policy volatility by 1 point will decrease the rate of economic growth by 0.334 and 0.0828 percent, respectively). Additionally, the research about monetary policy volatility and economic growth indicates that countries with higher monetary policy volatility (measured by the standard deviation of inflation rate), have experience lower growth rates in the analyzed period (an increase in monetary policy volatility by 1 point will decrease the rate of economic growth by 0.00885 and 0.0177 percent, respectively).

Though estimated results in this empirical work have validity to some extent, there are many areas of interest that remain open to further research: Are the results valid for other dimensions of monetary policy (interest rate, exchange rates etc.)? Is the fiscal policy volatility variable created in the model the best variable that represents discretionary fiscal policy? Could we include an additional instrument variable with regards to institutions to ensure implementation of prudent economic policy measures? All these questions should be of our interest in our research in the future.

Appendix 1
Descriptive statistics

	Variable	Mean	Stand. dev.	Min.	Max.	Obs.
Real GDP pc	Real GDP per capita, US$	6542.4	5762.4	191	27015	N = 253
Economic growth rate	The rate of economic growth of GDP per capita	4.797	5.198	-14.8	34.5	N = 253
LGDP pc	Log of GDP per capita, US$	8.3075	1.099	5.252	10.204	N = 253
Log Initial real GDP pc	Log of Initial real GDP pc, US$	7.4932	1.0725	5.252	9.358	N = 253
Growth rate, %	LGDP pc_t- LGDP pc_{t-1}	.12619	.14323	-.424	.449	N = 230
Export growth, %	Growth rate of export, %	8.0896	11.203	-22	50.7	N = 253
Bank credit growth,%	Growth rate of Bank credit to private sector as % of GDP	.0978	.1601	-.878	.462	N = 211
Investment growth,%	Fixed capital formation growth, %	8.154	16.588	-50.5	90.04	N = 253
Inflation rate, %	Inflation rate level, %	6.8999	7.1794	-1.15	59.22	N = 238
Central government debt	Central government debt as a percent of GDP	35.011	19.418	5.87	106.9	N = 251
WGI	World Wide Governance Indicators changes	.01078	.06501	-.186	.20333	N = 230
Fiscal policy volatility	Discretionary fiscal policy	-1.339	1.0901	-2.58	1.8956	N = 251
Monetary policy volatility	Standard deviation of inflation rate	2.4490	3.0974	0	32.17	N = 216

Appendix 2
Definitions and sources

Definition	Source	Further note
GPD per capita growth	World Development Indicators, WB	
Growth rate	World Development Indicators, WB	
Log of GDP per capita, US$	Calculated based on data from the World Development Indicators, WB	Taking log of GDP per capita,US$
Initial real GDP pc, US$	Calculated based on data from the World Development Indicators, WB	Taking log of Initial real GDP pc, US$
Export growth, %	World Development Indicators, WB	
Investment growth, %	World Development Indicators, WB	Fixed capital formation growth, %
WGI	Calculated based on data from the World Wide Governance Indicators, WB	Taking log of composed WGI
Bank credit to private sector	World Development Indicators, WB	Taking log and first difference of bank credit to private sector (% of GDP)
Inflation rate	World Development Indicators, WB	
Central government debt, % of GDP	World Development Indicators, WB	
Fiscal policy volatility	Calculated based on data from the World Development Indicators, WB	The residual of regression estimated the output growth and budget deficit
Monetary policy volatility	Calculated based on data from the World Development Indicators, WB	The standard deviation of inflation rate

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