

THE IMPACT OF FISCAL POLICY ON ECONOMIC GROWTH IN THE COUNTRIES OF EASTERN EUROPE

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Abstract

This paper deals with the effects of fiscal policy on economic growth in 10 countries of Eastern Europe. For this analysis we use two regression models. The results of the first model provide information on the factors that influence economic growth. Thus, direct taxes, indirect taxes, total income taxes, social contributions and the economic crisis had an effect on economic growth. Of these variables, total taxable income had a positive effect and indirect taxes and social contributions had a direct negative effect on economic growth. In the second model, the analysis confirmed that a significant effect on economic growth have had other direct taxes, social contributions of the employer and economic crisis, the first two being negatively correlated with GDP/capital.

Keywords: *fiscal policy, economic growth, Eastern Europe, expenditure*

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1. Introduction

In the current context, measuring the impact of fiscal policy on economic development is an important topic for researchers in economics and beyond, especially when public debt as a ratio of GDP reached the second

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highest level in the last 130 years. Fiscal policy has a key role in any state, and through it government implements macroeconomic policies that have an effect on employment, economic growth and sustainable development of the country, it controls price fluctuations, balance of payments, etc.

To achieve the objectives above mentioned states need financial resources to implement sustainable development projects. The government may obtain these resources from financial revenues it collects by applying fiscal measures and when it needs more resources than is available, it can borrow on financial markets.

Fiscal policy has the following attributes: classifies each type of tax revenues, distributes and allocates each category of revenue in the state budget that in the end will be used to determine economic development and to give social and political stability to the country.

Changes in fiscal policy have the effect of changing aggregate demand in a state and also income distribution. This affects the ability of the economy to produce goods and services for the public needs. In the short term, the change in the level of spending and taxation can change the size and structure of demand for goods and services. While aggregate demand affects the allocation of resources and the productive capacity of an economy through influence on earnings factors of production, human capital development, the allocation of capital expenditure and investment in innovative technologies. Tax rates have an impact on net earnings of the population, savings and investments and in the end have an influence on the allocation of production capacity.

Currently, European countries, in which we cannot exclude Eastern Europe, are facing serious financial constraints. The Treaty on Stability, Coordination and Governance in the European Union does not permit the same flexibility in the used of deficits to finance public spending. This new treaty signed by all EU countries except the UK and the Czech Republic, aimed at strengthening fiscal discipline at European level through the introduction of sanctions in a more automated and enhanced surveillance of Member States.

The new treaty includes the requirement that national budgets to be balanced or in surplus. This requirement will be met if the annual structural deficit should not exceed 0.5% of GDP. If a member country has significant public debt below 60% of GDP and the risks of long-term sustainability of public finances are low, it can have a greater structural deficit of 0.5% of GDP, but not more than 1% of GDP. This will help states to control their budget deficits and prevent the accumulation of massive sovereign debt.

A fiscal policy that resorts to increase public deficit will result in increased taxes for the population, compared to the situation in which the state would appeal to a policy of deficit reduction or capping.

In this paper we analyze the impact of fiscal policy on economic growth with an emphasis on developing states in Eastern Europe in the period 1996-2013. The sample of countries consists of Poland, Romania, Slovakia, Slovenia, Bulgaria, Czech Republic, Estonia, Hungary, Latvia and Lithuania. We chose this area because of the similarities in the economic development of the countries and the fiscal policy adopted by them in the period under review.

The paper is structured as follows. Section 2 presents the literature. Section 3 contains the presentation of data, methodology and empirical results of the econometric models chosen. Section 4 presents the conclusions of the study.

2. Literature overview

The literature that treats the impact of fiscal policy on economic growth is very broad. The most recent articles are based on linear regression panel data. They show a close relationship between fiscal policy and growth components, but the controversy relates to how these components influence economic growth.

Hussin Abdullah et al. (2008) investigated the relationship between fiscal policy of institutions (sum of indicators of corruption, bureaucracy quality, rule of law, government repudiation of contracts and the risk of expropriation) and growth in Asia in the period 1982-2001 through the application of Pedroni cointegration model. They investigated three different channels through which fiscal policy can affect economic growth in Asia in

the long run. The first deals with the influence of the components of fiscal policy on growth in real GDP per capita, the second channel discusses how the institutions included in the initial model affects real GDP per capita. The third channel captures the interaction between the institutions with total public expenditure and how the total public expenditure affects per capita real GDP. The Pedroni cointegration model results showed a long-term relationship between fiscal policy, institutions and economic growth. They found a close positive relationship between expenditure for health, education, total public expenditure and real per capita GDP. They also captured a close connection in statistical terms, but negative, between defense spending, income tax, revenue taxes, public deficit and social contributions and GDP per capita.

Hadera S. et al. (2010) studied the link between public spending and the size of the deficit and economic growth in the Albanian period of transition and other countries in Eastern Europe. The article tried to capture this effect using panel data technique for developing states in the region, like Albania, Bulgaria, Croatia, Czech Republic, Macedonia, Hungary, Poland, Romania, Slovenia and Slovakia between the years 1990-2007. The authors found a close link between public expenditure, public deficit and economic growth. The first component has negative effects on the economy, but taxation and deficit have positive effects on economic growth. Also dummy variable - tax evasion - is statistically significant and should be reduced by the countries of Eastern Europe for the government to better raise revenues.

Popescu M. (2011) has identified the effects that fiscal policy on economic growth in the EU, using a panel data for all 27 Member States during the period 1995-2009. The author used two econometric models for three sections of data, so for all the panel, for the Nordic countries and for Romania. The first model analyzed the influence of fiscal revenues on growth and the second model captures the influence of distorted income (income tax, revenue tax and social contributions), undistorted (VAT and excise duties) and other revenues on growth. For both models he used annual GDP growth rate and the growth rate of GDP per capita. The result suggested that fiscal revenues had a negative impact on growth in the EU and Romania, but there

was a positive influence for the Nordic states, which is an exception that doesn't confirm the rule. The same phenomenon can be observed for distorted income, but the non-distorted and other revenues were not statistically significant.

The research of the effects of fiscal policy on private investment and economic growth was undertaken also by Menjo KI, Kotut CS (2012) for Kenya, using a series of data from 1973 to 2009. The results indicate that fiscal policy has a significant impact on investment and investment plays a key role in the economic development of Kenya. The variables that have a negative effect on investment are the real interest rate, the deficit and the level of taxation. Also, investments were positively influenced by their value a year ago (lag t-1) and public expenditure had a positive effect on private investment. The statistical results show that the variables that have a significant effect on investment and growth are the allocating of public resources to a lag difference, public spending, real interest rates, public debt, public deficit, taxation and investment levels and the growth of exports. The authors propose that government address three goals: review of public spending to make them complementary investments, allocation of loans for the private sector and to create appropriate policies to deal with the high level of public debt and budget deficit.

Muinelo L. Roca-Sagales O. (2011) had studied from another point of view the role of fiscal policy. They wanted to determine the impact of different instruments of fiscal policy on inequality and growth using an unbalanced panel data set (variables calculated as the moving average 5 years) for 43 states with a degree of development above average between 1972-2006. Also they constructed two econometric equations for estimating inequality and growth. Results provided by the econometric models argue that the macroeconomic effects of fiscal policy should lead to lower direct taxes which would encourage economic growth, while increasing public spending would reduce the current growth.

The empirical results suggest that different fiscal policies affect differently income redistribution. For example, increased public expenditure

(current or investment) have significant effects in reducing income inequality, as has the increase in direct taxes. There is a mutual effect between inequality and economic growth. By reducing income inequality the state stimulates economic growth, while economic growth reduces economic inequality. This article also provides a fiscal policy perspective, by the fact that an increase in public sector (in current expenditure and direct taxes) improves income redistribution sacrificing economic growth. Indirect taxes are insignificant for growth. The only elements that favor economic efficiency and equality are public investments because their growth reduces inequality without affecting GDP.

Two representatives of the International Monetary Fund, Cottareli C. and L. Jaramillo (2012) have studied the role of fiscal policy consolidation, both in short term and long term and provided a series of steps forward. First, a fiscal adjustment strategy must take into account the short-term negative impact that it has. A small narrowing of taxation could have consequences on the credibility of the state, but too much adjustment could lead to losses of GDP and would be counterproductive in terms of market sentiment and economic policy. Therefore, the state must take appropriate measures for fiscal consolidation. The advanced economies in 2011-12 have adjusted their fiscal accounts by an average of 1 percentage point per year, being the most favorable percentage for a balance between consolidations and avoiding rapid withdrawal of stimulus in the economy. Another step forward would be for countries facing pressure from the markets to take steps to substantially reduce taxes, due to lack of funding at reasonable interest rates. It is important for the state to make a fiscal consolidation accompanied by adequate funding to provide confidence and maintain low funding costs until the effects of adjusting the fiscal accounts will materialize.

Another target for developed countries would be reducing public debt over time, because the current levels of debt have effects on potential growth. Finally, the reforms for goods, services and the public labor market will be very important for GDP growth and therefore would have short-term effects for fiscal consolidation. Countries should consider economic efficiency when

identifying structural reforms needed for fiscal adjustment. Not all measures taken are equally beneficial. In terms of income, we need tax cuts, to better combat tax evasion, reducing labor taxation to stimulate consumption and increasing property taxes. In terms of expenditure cuts the state should reduce defense spending, subsidies and those that do not target social spending.

M.K. Ocran (2009) considered that fiscal policy variables, gross fixed capital formation, tax revenues, deficit and public consumption expenditure, analyzing South Africa, a developing country, member of the BRIRCS. The period under review was between 1990 and 2004. He used quarterly data and a vector regression model. Results offer four conclusions. First, public spending on consumption had a significant positive effect on economic growth. Gross fixed capital formation was also a significant positive effect on the dependent variable, but lower than in consumer spending. The taxes have also had a favorable effect on growth, but the size of the public deficit had a insignificant influence on economic development.

3. Methodology and results

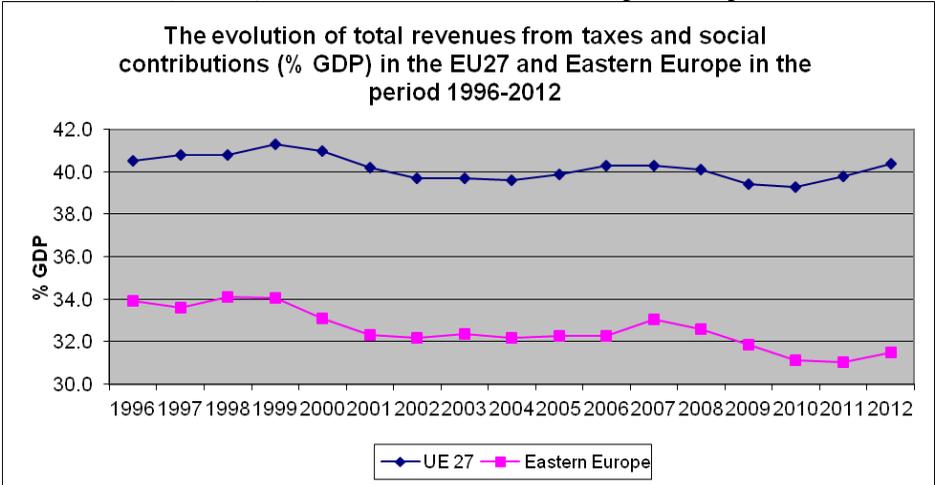
The article deals with the impact of fiscal policy on economic growth in the countries of Eastern Europe between 1996 and 2013.

The states included in the sample selected for the analysis are 10 developing countries in the European Union, namely: Poland, Romania, Slovakia, Slovenia, Bulgaria, Czech Republic, Estonia, Hungary, Latvia and Lithuania.

Data for the explanatory variables were collected from the Eurostat database for the period under review, and the rate of GDP per capita was collected from the site of the European Commission - Ameco.

To analyze the impact of fiscal policy on economic growth is necessary to know the evolution of total taxable income (direct + indirect) and total revenues from taxes and social contributions in the period 1996-2013.

Figure 1: The evolution of total revenues from taxes and social contributions (%GDP) in the EU 27 and Eastern Europe in the period 1996-2012

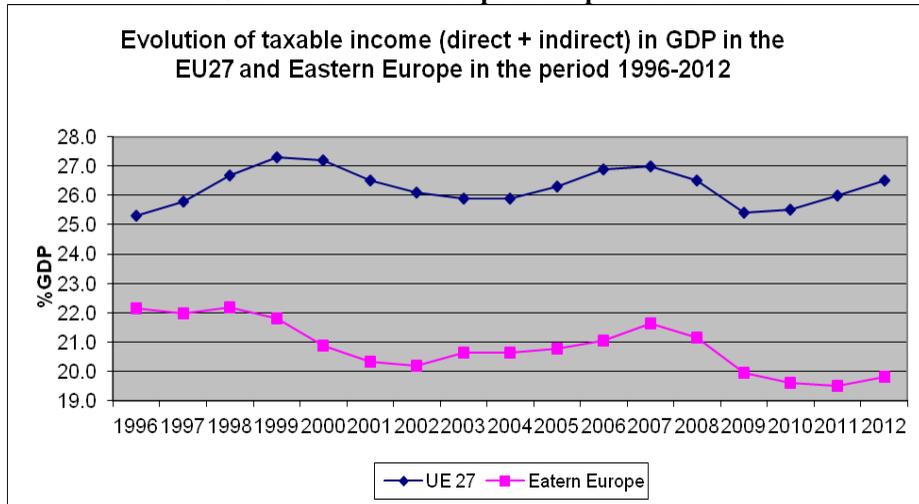


Source: (Data processed from the Eurostat database)

It can be seen from Figure 1 that the East European states have a lower rate of total revenues from taxes and social contributions in GDP compared with the European average. Also, the evolution is not identical to the European average ranging between 39% and 41%. There is a sharp drop in this indicator in the period under review for the countries of Eastern Europe from 34% to about 31.5%.

European states have the same gap when we relate to taxable income (direct + indirect) as percentage of GDP, which increases during the economic crisis started in 2008.

Figure 2: The Evolution of taxable income (direct + indirect) in GDP in the EU 27 and Eastern Europe in the period 1996-2012



Source: (Data processed from the Eurostat database)

To analyze the influence of fiscal policy on economic growth in Eastern Europe (10) from 1996 to 2012, we chose two multiple linear regression models using panel data, which have two indexes for its variables: the index i indicates the cross-sectional size and index t the time.

The explanatory variables are represented with one lag moved to $\ln(\text{GDP} / \text{capita})$ and real GDP growth, because the effects of taxation, public expenditure and revenue and deficit in year t are felt in $\text{GDP} / \text{capita}$ in year $t + 1$.

Model 1

The linear regression is as follows:

$$y_{it} = \beta_0 + \beta_1 pe_{it} + \beta_2 pr_{it} + \beta_3 tr_{it} + \beta_4 it_{it} + \beta_5 dt_{it} + \beta_6 sc_{it} + \beta_7 pd_{it} + \beta_8 Dit + u_{it} \quad (1)$$

where y - $\ln(\text{GDP}/\text{capita})$

pe – total public expenditures (%GDP)

pr – total public revenues (%GDP)

tr – total revenues from taxes and social contributions (total receipts from taxes and social contributions (including imputed social contributions) after deduction of amounts) (%GDP)

it – indirect taxes (taxes on production and imports (%GDP)

dt – direct taxes (current taxes on income, wealth, etc.) (%GDP)

sc – social contributions (%GDP)

pd – public deficit (%GDP)

D – a vector of dummy variables (economic crisis and the European integration)

uit - two-component vector for statistical errors

Index i tracks the cross-sectional dimension of the dataset from 1 to 10 (ten countries), while t is the time index running from 1996 to 2013.

(2)

μ_i = individual fixed effects, by a normal distribution law ()

ϵ_{it} - error term, by a normal distribution law ()

Model 2

The linear regression is as follows:

$$y_{it} = \beta_0 + \beta_1 \text{vat}_{it} + \beta_2 \text{ec}_{it} + \beta_3 \text{ot}_{it} + \beta_4 \text{ht}_{it} + \beta_5 \text{it}_{it} + \beta_6 \text{oct}_{it} + \beta_7 \text{esc}_{it} + \beta_8 \text{D}_{it} + \text{uit} \quad (3)$$

where y- $\ln(\text{GDP/capita})$

vat – value added taxes (%GDP)

ec - excise duties and consumption taxes (%GDP)

ot - other taxes on production (%GDP)

ht - taxes on individual or household income including holding gains (%GDP)

it - taxes on the income or profits of corporations including holding gains (%GDP)

aid - other current taxes (%GDP)

esc – employers' actual social contributions (%GDP)

D – a vector of dummy variables (economic crisis and the European integration)

uit - two-component vector for statistical errors

Index i tracks the cross-sectional dimension of the dataset from 1 to 10 (ten countries), while t is the time index running from 1996 to 2013.

(4)

μ_i = individual fixed effects, by a normal distribution law ()

ϵ_{it} - error term, by a normal distribution law ()

The models contain the following dummy variables:

Crisis - reflects the emergence of the economic and financial crisis, so we want to observe its impact on economic growth. In the period 1996-2013, if

the country is in recession after 2008 the dummy variable has the value 1 and if not, in the rest of the period has the value 0;

Member States - we wanted to analyze whether the EU accession for the countries of the sample has an influence on economic growth. The variable takes the value 1 for the years when the state analyzed is part of the European community, and 0 for the years when the state was not a part of the European Union;

To see if we have to use fixed effects models or random effects, we perform the Hausman test, with the dependent variable $\ln(\text{GDP} / \text{capita})$.

Model 1

Test: Ho: difference in coefficients not systematic

$$\chi^2(9) = (b-B)'[(V_b-V_B)^{-1}](b-B)$$

$$= 95.54$$

$$\text{Prob}>\chi^2 = 0.0000$$

(V_b-V_B is not positive definite)

Model 2

Test: Ho: difference in coefficients not systematic

$$\chi^2(9) = (b-B)'[(V_b-V_B)^{-1}](b-B)$$

$$= 447.53$$

$$\text{Prob}>\chi^2 = 0.0000$$

(V_b-V_B is not positive definite)

By applying the Hausman test for the two models, we see that both have the probability less than 5% ($\text{Prob}> \chi^2 = 0.0000 / \text{Prob}> \chi^2 = 0.0002$). For the panel data regression model it is suitable to use fixed effects. Their presence explains the existence of invariant effects for specific countries that have influence on the dependent variable.

Next we tested whether or not the models are homoskedastic. To determine these influences we perform the Wald test.

Model 1

Modified Wald test for groupwise heteroskedasticity
in fixed effect regression model

H0: $\sigma(i)^2 = \sigma^2$ for all i

$$\chi^2(10) = 49.11$$

$$\text{Prob}>\chi^2 = 0.0000$$

Model 2

Modified Wald test for groupwise heteroskedasticity in fixed effect regression model

$H_0: \sigma(i)^2 = \sigma^2$ for all i

$\chi^2(10) = 36.60$

$\text{Prob} > \chi^2 = 0.0001$

Since the probability is less than 5% significance threshold (> 0.0000) the null hypothesis that states the presence of homoskedasticity phenomenon is rejected, so the panel data reviewed affirms the presence of heteroskedasticity.

In general, the failure of the homoskedasticity hypothesis is based on two categories of factors: the wrong specification of the regression model or the nature of the phenomenon studied. In the presence of heteroskedasticity, standard errors of the estimators are misplaced and we should use robust errors to correct the phenomenon. The most likely deviation from homoskedastic errors in the context of panel data is due to specific individual variance. When errors are homoskedastic in cross-sectional units, but their variance is different between units we are dealing with heteroscedasticity between groups.

Because the available data forms a micro panel we consider that testing for stationarity is not necessary and also cross-sectional dependencies. These tests are suited for macro-panel data with variables analyzed over a longer period (20-30 years).

To see if we use dummy variables and fixed effects in the two regression models, we used Stata v12 Parm test. Dummy variables chosen are:

D1- the start of the economic and financial crisis. From 2008-2013 the dummy variable takes the value 1 if the country is in economic recession and for the rest of the period the variable takes the value 0;

D2 – the European accession of the countries of the sample to the European Union. The dummy variable takes the value 1 for the years when the state is part of the European community and 0 for the years when the state doesn't belong to the European Union.

Model 1

$F(17, 144) = 26.22$

$\text{Prob} > F = 0.0000$

Model 2

$F(17, 143) = 24.51$

$\text{Prob} > F = 0.0000$

The results show that the hypothesis H0 is not confirmed. Therefore we can use dummy variables.

After the Hausman , Wald and Parm tests, both models use fixed effects and robust error dummy variables. After the validation of the model we will continue our analysis with the quantification of the impact that the explanatory variables have on economic growth.

Table 1. Table regression with fixed effects and robust error for the first model

Variable	Estimated coefficient	Standard error
total public expenditures (pe)***	0.3124683	0.1691061
	-0.317541	0.1761707
total public revenues (pr) ***	0.2367616	0.1433065
total revenues from taxes and social contributions (tr)	-0.2209133	0.1401091
indirect taxes (it)	-0.2561702	0.1415547
direct taxes (dt) ***	-0.264555	0.1451033
social contributions (sc) ***	0.3044724	0.1667303
public deficit (pd) ***	-0.170744	0.0480353
Crisis (d1)*	-0.0002298	0.0481308
Member states (d2)	8.33585	0.3215126
constant		
N	180	
\bar{R}^2	0.9755	

Legend: *1%, ** 5%, *** 10%

Source: (Stata v.12)

For Model 1 we have a total of 180 observations. The coefficient of determination, R2 shows the percentage of total variation in the dependent variable explained by the independent variables chosen. Thus, approximately 97.55% of the variation of this ratio is explained by exogenous variables included in the model.

areg y3 ct vt tt ii id cs dp dum1 dum2 i.An ,absorb(Country)

Fisher test examines the hypothesis that all slope coefficients of the regression equation to be simultaneously zero, the independent variables do not affect in any way the dependent variable. $\text{Prob} > F$ is in this case 0. Therefore, we can reject the null hypothesis and conclude that at least one of 9 variables is statistically significant.

Next we analyze the significance threshold of p regression table. This shows whether the variables have or not have an effect on the dependent variable. Also, it should be noted that, although in theory the threshold is considered to be 0.05 to 5%, we consider a threshold of 10%, ie 0.1.

The first model offers conclusive result for the impact of the fiscal variable on economic growth. Public expenditures and the public deficit had a positive impact of above 0.3% on growth for the countries of Eastern Europe. This is in part because of the catching up effect between them and the rest of the countries in the European Union. Also, we can note that the European Accession didn't have any effect on growth so this can be an important fact that European skepticism is now in the spot light.

Indirect taxes, social contribution and total revenues impacted negatively economic growth, reducing it by more than 0.2% for each variable. There can be an important step in understanding way fiscal policy doesn't have an impact on growth. Popescu M. (2011) has also found that for Europe, in his model, the European countries use fiscal policy in the wrong way.

Also, in our model total revenues from taxes and social contributions and indirect taxes had no significant influence on economic growth.

Regarding the dummy variables, like we already mention, the European Integration didn't have any effect on economic growth. Also, with the smallest P value of only 0.6%, the economic crisis that started in 2008 had a negative impact on growth for all the countries in the panel.

We will continue with fixed effects regression analysis, error robust and dummy variables to capture the relationship between the dependent variable, ln GDP / capita and independent variables for the second model.

Tabel 2. Table regression with fixed effects and robust error for the second model

Variable	Estimated coefficient	Standard error
value added taxes (vat)	0,0098521	0,0194666
excise duties and consumption taxes (ec)	-0,0280039	0,0481747
ot - other taxes on production (ot)	-0,0905845	0,0798292
ht - taxes on individual or household income including holding gains (ht)	0,0139942	0,0262221
it - taxes on the income or profits of corporations including holding gains (it)	-0,0284785	0,0300476
aid - other current taxes (aid) ***	-0,3743436	0,2018057
esc – employers' actual social contributions (esc)	-0,0457668	0,028633
Crisis (d1)*	-0,1309193	0,0368912
Member states (d2)	-0,0083939	0,059898
constant	8,453616	0,292323
N	180	
\bar{R}^2	0,9727	

Legend : *1%, ** 5%, *** 10%

Source: (Stata v.12)

For Model 1 we have a total of 180 observations. The coefficient of determination, R^2 shows the percentage of total variation in the dependent variable explained by the independent variables chosen. Thus, approximately 97.27% of the variation of this ratio is explained by exogenous variables included in the model.

areg y3 ct vt tt ii id cs dp dum1 dum2 i.An ,absorb(Country)
R-squared = 0.9727

Analyzing the results for the second model it is obvious that there are serious problems with applying fiscal policy in the countries. Only one fiscal variable was significant in the regression. Other current taxes have a negative, but statistically significant effect on the dependent variable. 1% increase in

other current taxes determines a downward effect for economic growth of 0.37%.

Regarding the dummy variables like for the first model, only the economic crisis had an effect on growth

4. Conclusions

In this article we intend to analyze the impact of total expenditure, total revenue, deficit and mainly the effect of fiscal policy on economic growth in 10 countries in Eastern Europe by using two multiple linear regressions. To better capture this influence we opted to use lagged independent variables.

The results of the first model confirmed a strong connection for a large number of fiscal variables and other variables were found to be insignificant. Of the nine variables used in the first model, 6 had a statistically significant effect on economic growth. Thus, a positive effect on economic growth has had total public expenditure and public deficit. A negative effect has had total public revenues, direct taxes and social contribution. Also there is an insignificant effect of the European Integration on the development of the ten countries of Eastern Europe.

In the second model, the results confirmed a significant effect on economic growth to only 1 explanatory variable. Other current taxes have a downward effect on growth and the other 6 independent variables didn't have any stimulus for the Eastern European countries.

The economic crisis had a negative impact on the growth and well being of the countries.

In conclusion we have shown the role of taxation in the economic development of countries in the region using 2 different statistical models. It was noted that not so many of the fiscal variables have a significant effect on economic growth, many of them having a negative effect.

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