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AN EMPIRICAL ANALYSIS OF THE DETERMINANTS OF ECONOMIC GROWTH IN THE WESTERN BALKANS

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Abstract

The objective of this paper is to assess the main determinants and the policies that affect economic growth in the Western Balkan over the period 1994 to 2015. It employs techniques such as pooled OLS, fixed and random effects model, and Hausman-Taylor model with instrumental variables (IV). The study shows evidence of conditional convergence, indicating the need for an upward move in the steady state level. The results show that foreign direct investments, gross savings and domestic credit to the private sector have a positive effect on per capita growth. On the other hand, initial level of per capita growth, corruption, unemployment, and general government final consumption, have a negative relationship with per capita growth. The study also shows a puzzling result, that schooling is not a significant factor for growth in Western Balkans. The study also highlights the relevance of attracting more foreign direct investments and reduction in corruption.

Keywords: economic growth; binding constraints; Western Balkan; panel methods

JEL classification: E60; O11

1. INTRODUCTION

Several studies, both theoretical and empirical, have examined economic growth. Whereas the theory of economic growth model helps in analyzing the mechanisms of economic growth, empirical models employ data in order to find out the channels that affect economic growth. The growth theory by Solow and endogenous growth models are usually utilized as general frameworks, however many researchers have, in their studies, modified the original model based intuition on growth and its determinants. Regression models have enabled researchers to examine the channels through which a range of determinants can impact economic growth and by using a set of explanatory variables, researchers can determine the difference in economic growth and its development over the time.

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Western Balkan countries have, in the last two decades, underperformed in term of economic growth in comparison with other more advanced transition countries. Thus, an investigation of determinants of economic growth can shed light on the factors that constrain economic growth in countries in Western Balkans. In order to examine these factors, we attempt to answer the following research questions:

1) which determinants constrained economic growth? *and*

2) which economic policies can be effective in managing these constraints?

To address these research questions, we establish the following research hypotheses:

H1: *Foreign direct investments, gross savings and domestic credit to the private sector have a positive effect on per capita growth in Western Balkans.*

H2: *Initial level of per capita growth, corruption, unemployment, and general government final consumption have a negative effect on per capita growth in Western Balkans.*

H3: *Schooling is not a significant factor for growth in Western Balkans.*

In order to test hypotheses, we employed pooled OLS with robust error and panel data model, which contains more information than time series variation within each country.

The data came from World Bank and IMF (see Annexes). We have data consistency into consideration and therefore used only data set provided by either of the two institutions (World Bank and IMF) for one indicator for all the countries.

To summarize, the results from panel data models show conditional convergence among the seven Western Balkans countries examined. This was evidenced by the negative sign of coefficient of the initial level of per capita growth. Furthermore, foreign direct investments, gross savings and domestic credit to private sector have a positive effect on per capita growth while, initial level of per capita growth, corruption, unemployment, and general government final consumption have a negative effect on per capita growth. The study also shows puzzling result which is schooling is not significant factor for growth in Western Balkans.

The remainder of this paper is organized as a follows: Section 2 reviews the literature; Section 3 discusses the Research methodology and data; Section 4 provides the results, and Section 5 provides the conclusion.

2. REVIEW OF LITERATURE

There is large number of authors who have investigated the relationship between economic growth and the determinants that affect both developed and developing countries. Several authors have, in the related literature, investigated the constraints by using empirical growth models at micro and macro level. Different studies have showed different results which at times are even contradictory. The study by Hausmann *et al.* (2006) applied the decision tree methodology to identify the binding constraints for different countries. The tree methodology as diagnostic analysis is based on running the short-run constraints, by figuring out firstly the conditions that characterize the economy. The economic activity of low-income countries must be constrained by at least one of the following two factors: the high cost of finance or the low private return on investment.

Several researchers are trying to identify the most important constraints to economic growth, as countries in the Western Balkan region continue to deal with several political and economical reforms. Different authors have estimated different explanatory variables. While certain constraints might have higher impact on economic growth for short period of time, they can also take a longer period as the macroeconomic and microeconomic conditions are not

constant. Murgasova *et al.* (2015) in 'Regional economic issues special report-IMF' analyzed the driving forces behind the economy of Western Balkan countries. The authors found that capital accumulation and total productivity factors were the biggest growth drivers in both, the New Member States, and Western Balkans. Tevdovski (2015) applied ideas from the 'growth diagnostics' approach developed by Rodrik *et al.* (2005). It considers the socio-economic context, institutions and legislations that enable the tabling of policies which targeted the constraints. This methodology has been applied to the Republic of Macedonia. The author concluded that the key process in this country was the income and wealth distribution towards the elites. This resulted in a huge poverty caused by high income inequality.

Tsounta (2014) nonetheless found that the uptick in growth in emerging market economies during the 2000-2012 period was affected by the higher total productivity factors. Other studies advanced different explanations for the very low contribution of labor and human capital to GDP growth in Western Balkans. Gabrisch (2015) used the panel regression analysis technique when applying growth diagnostic approach to identify the binding constraints for economic growth in Western Balkan countries. These results indicate that the main binding constraints are the non performing loans in the private sector. Besides these findings, the IMF report (Murgasova *et al.*, 2015) also stated that the non performing loans (NPLs) in Western Balkan countries became quite slow because of domestic factors such as legal, judicial, tax, and regulatory obstacles.

Moore and Vamvakidis (2007) used The Hodrick-Prescott (HP) filter: Cobb-Douglas function of production with two-factors, capital and labor, and simulation of a growth empirical model for Croatia. The coefficients were used to derive Croatia's potential output growth. The authors came to the conclusion that improvements in the business climate were necessary to sustain growth in Croatia by reducing the administrative taxes, corruption and legal uncertainties. The authors also emphasize the importance of green-field foreign direct investment and the fiscal consolidation and privatization. Lewis (1980) believed that the engine for the economic growth is the trade.

To summarize, a number of studies have examined the various factors that affect economic growth in developed and developing countries, however, only a few studies have developed empirical growth models in Western Balkans countries. To better understand the growth process, this research sets up an empirical growth model in order to investigate determinants that constrain economic growth in Western Balkans countries, and how the policies can manage these constraints.

3. RESEARCH METHODOLOGY AND DATA

3.1 Research methodology

In this section, we developed an empirical econometrics model to assess the impact of the determinants on real per capita economic growth in Western Balkans countries over the period 1994 to 2015. For this purpose, we employed pooled OLS, fixed and random effects and Hausman-Taylor instrumental variables (IV) (Baltagi, 2013). Furthermore, we also employed Hausman test in order to choose between fixed effects, random effects, and the Hausman-Taylor model.

Pooled OLS model

The pooled OLS model is often applied in the literature since it is a constrained model in panel data.

$$y_{it} = B_0 + B_1 x_{it} + u_{it} \quad (1)$$

The model's assumption is about the error term. It is assumed that $e \approx N(0,\sigma^2)iid^2$. Hence, the assumption that there is no autocorrelation between error terms of different observations, thus the errors term are homoscedastic. This assumption is crucial for a good OLS estimation, but the appearance of heterogeneity between units of a given sample and over time in panel data model is problematic, thus the coefficients are biased. Regardless of potential biases, pooled OLS estimation will be employed in this paper as a starting point, as in other empirical studies.

Fixed and random effects model

We employed more sophisticated model fixed effects, the random effects model and the Hausman-Taylor model in order to eliminate the problem of heterogeneity in the pooled OLS.

We here start with the specification of the model:

$$y_{it} = x_{it}B + c_i + u_{it}, \text{ for t=1,2....N} \quad (2)$$

where x_{it} is the observable explanatory variable, y_{it} represents the dependent variable, c_i is the individual specific-effect or the unobserved effect, u_{it} is a random error or idiosyncratic errors. The assumption is whether first term of the decomposition c_i in equation (2) is correlated or not with the explanatory variables x_{it}. In the random effects model the term c_i is not correlated with explanatory variables, while in the fixed effects model the term c_i is correlated with the explanatory variables. Furthermore, the unobservable individual-specific time-invariant effects of heterogeneity is taken into the consideration by both models. Unless, both models take the heterogeneity problem into the consideration there would be two major limitations: 1) whether there is correlation between c_i and the explanatory variables (in case of random effects), and 2) if it is assumed that c_i are correlated with explanatory variables, then estimating the time-invariant explanatory variables becomes difficult (Greene, 2008).

Additionally, as some variables are considered to be endogenous in our study, they might lead to biased results, thus neither random or fixed effects estimation might be appropriate, therefore a more sophisticated model such as the Hausman-Taylor instrumental IV estimation needs to be employed. Because some of the variables in this paper are assumed to be endogenous, the fixed and random effects models are presented only for comparison purposes.

Hausman-Taylor model

Hausman and Taylor (1981) developed a new model which combines both fixed effects and random effect models. The Hausman and Taylor model assumes that some of the explanatory variables are correlated with c_i, while some are not. Practically, this model enables us to identify the explanatory variables which are correlated with c_i. This model is also called instrumental variable technique, and it eliminates the correlation between country specific effects and the error term through the information that are included in the model.

The model can be written as:

$$y_{it} = Z_{it}B + Z_i\lambda + c_i + u_{it} \quad (3)$$

where Z_i are the variables that vary across time or are time-invariant covariates, respectively with all individual observed effects that are denoted as Z_i. The Hausman-Taylor model decomposes *X* and *Z* into two sets of observed variables: X= [X_1, X_2] and Z= [Z_1, Z_2].

The model can therefore be written as:

$$y_{it} = X_{1t}B_1 + X_{2i}B_2 + Z_{1i}\lambda_1 + Z_{2i}\lambda_2 + c_i + u_{it} \quad (4)$$

The main feature of this model is based on the assumptions that the correlation between the individual-specific effect c_i, and the sets of time-varying and time-invariant regressors can be identified. Thus, four sets of observed variables are defined. For example, if X_{2i} and Z_{2i} are biased in the random estimator, the Hausman and Taylor suggest that we use information already included in the model to instrument for the problematic variables X_{2i} and Z_{2i}. However, the selection of the variables as an instrument is not clear. According to Hausman and Taylor (1981) the selection of the instrumental variables is based on economic intuition, however, in this paper the choice of the instruments are based on the framework by Barro and Sala-i-Martin (1992).

Choosing between Fixed Effects, Random Effects and Hausman-Taylor model

Choosing between Fixed Effects, Random Effects and Hausman-Taylor is tested by the Hausman (1978) test. This test tests the null hypothesis that the coefficients calculated by the random effects are identical as the coefficients calculated by the fixed effect estimators. If the null hypothesis is rejected, i.e. indicating insignificant $p < 0.05$, the random effect estimator is better than fixed effect. On the contrary, if one obtains $p > 0.05$, then this is an indication that the fixed effect estimator is better than random effect estimator. We apply the same technique to choose between fixed effects and Hausman-Taylor instrumental (IV). The Hausman test tests the null hypothesis that the coefficients calculated by the Hausman-Taylor instrumental (IV) estimator are identical to the coefficients calculated by the fixed effect estimator. If the null hypothesis is rejected due to the insignificant P-value, one may conclude that Hausman-Taylor Instrumental (IV) estimator is more consistent and efficient than the fixed effects estimator. Practically the Hausman test chooses the more efficient model toward the less efficient model.

Estimated model

A Hausman test shows that the Hausman-Taylor model is considered to be more consistent and efficient than the fixed and random effects. Therefore, we employ the Hausman-Taylor instrumental IV in the growth empirical model to assess the impact of the main determinants on real per capita economic growth, in the Western Balkans countries, over the period 1994 to 2015 (see Annexes, Table A1). In this paper, we also show the results from pooled OLS as well as those from fixed and random effects for the comparison purposes. Applying the Hausman-Taylor Instrumental (IV), we found a solution for the endogeneity problem which is very important from the econometrics' point of view.

Furthermore, because some of the variables are considered to be endogenous, they can become problematic as the determinants of growth could be determined by growth itself, which in turn leads to a system of simultaneous equations. Thus, the endogenous independent variables will lead to biased regression coefficients that accompany these variables. To deal with the problem of endogeneity, we use one-equation applying instrumental variables. Based on the understanding of endogeneity problems and Hausman test, the Hausman-Taylor instrumental variables model is considered to be more appropriate model than random and fixed effects models (see Table A1).

The specification of Hausman-Taylor empirical growth model is as follows:

$$y_{i,t} = c + BX_{i,t} + u_{i,t} \quad (5)$$

where y_{it} is the dependent variable which represents average real per capita GDP growth rate for each country *i*, and *t* represent years; c is the constant; X_{it} is the explanatory variable which includes lagged dependent variable, foreign direct investment (as % of GDP), School enrollment, tertiary (% of gross), unemployment (% of total unemployment), corruption index, domestic credit to private sector (% of GDP), gross savings (% of GDP), general government final consumption expenditure (% of GDP) and inflation and u_{it} is the exogenous disturbance.

3.2 Descriptive statistics

This paper used panel data covering 1994 through 2015 from the World Bank indicators and IMF data for countries in Western Balkan - Macedonia FYR, Bosnia and Herzegovina (BH), Montenegro, Serbia, Albania, Croatia and Kosovo. We provide summary statistics for the paper Table no. 1. Tables B1 and B2 contain information on data and on the data source.

Table no. 1 – Summary statistics of exogenous and endogenous variable

Variables	OBS	Mean	Std. Dev.	Min	Max
gdperclag1	87	18.76	4.894385	8.86	29.94
Fdi	88	5.724	5.723831	0	37.26
Set	88	34.725	13.83162	9.09	58.81
Unp	88	56.039	5.575687	43.5	68.5
Corrup	88	3.224	0.477890	2.3	4.4
Dcps	88	35.277	20.44210	3.5	87.02
Gs	88	13.32	8.013238	-10	26.86
Gexpend	88	18.761	4.894385	8.86	29.94
Infl	87	8.36	13.76942	-0.14	88.38

Source: author's calculation

4. EMPIRICAL RESULTS

Table no. 2 shows the results from pooled OLS, fixed effects, random effects, and the Hausman Taylor (equation 4). Furthermore, the empirical growth model supports evidence that the Hausman-Taylor model (equation 5) is a better choice than fixed and random effects model. Since the result from pooled OLS estimator shows that the unobservable individual-specific effect is heterogeneous, the coefficients of this approach are biased. We estimate the results from fixed effects and random effects models that are reported in the Table no. 2. The Hausman test is used to compare the estimators from fixed and random effects (see Annexes, Table A1). The Hausman test statistic is 17, 96. This shows that fixed effects estimator is better than random effects estimator. Thus, the null hypothesis is rejected in favor of the fixed effects estimator. Furthermore, this statistical test shows that random effects estimator is inconsistent and less efficient. It also indicates that there is a correlation between unobservable individual-specific effect and explanatory variables, therefore the fixed effect estimator is more consistent and efficient than the random effect estimator.

Table no. 2 – Panel Regression Results

Variables	Pooled OLS	Fixed Effect	Random Effects	Hausman Taylor - IV
Gdpperclag1		-0.025063**	-0.016576**	-0.0220202**
		(0.1136225)	(0.111088)	(0.1113043)
Fdi	0.1153075*	0.0752679*	0.1176493*	0.939815*
	(0.0955884)	(0.1116386)	(0.1006499)	(0.1068705)
Set	-0.1035364**	-0.0712692**	-0.0998399**	-0.1023601
	(0.0480392)	(0.0828179)	(0.0498124)	(0.0713184)
Unp	-0.3471011*	-0.5381544*	-0.3272626*	-0.3977443*
	(0.1046803)	(0.2182191)	(0.1108732)	(0.1530939)
corrupti	-1.195225*	-0.0585678*	-1.384199*	-0.777635*
	(1.364768)	(1.575517)	(1.386274)	(1.460016)
Dcps	0.064849*	0.1022874*	0.0665976*	0.0799975*
	(0.0402527)	(0.0653326)	(0.0406206)	(0.0506813)
Gs	0.0910924**	0.1881639**	0.0875163**	0.1410784**
	(0.0687901)	(0.094973)	(0.697131)	(0.0836051)
gexpend	-0.3492622*	-0.2549388**	-0.3580018**	-0.3903854**
	(0.1182982)	(0.3121116)	(0.1255879)	(0.2167161)
Infl	-0.0029247*	-0.0156685*	-0.0030046*	-0.0101412*
	(0.0386521)	(0.0449362)	(0.0403908)	(0.043004)
constant	32.95801	34.8489	32.45614	33.55737
	(7.616417)	(11.96293)	(8.142204)	(10.30321)
Observation	**86**	**84**	**84**	**84**
R-squared	**0.2907**			
F	**3.94**	**0.78**		
Chi 2			**28.30**	**19.37**
Model	**Pooled OLS**	**Fe**	**Re**	

Note: (*) statistically significant at 5% level, (**) statistically significant at 10%

Source: author's calculation

Table no. 2 shows the results from the Hausman-Taylor estimator. Because endogeneity problems, which may lead to biased coefficients in the regression, are present in the data, the Hausman-Taylor estimator is estimated. The Hausman test is also calculated for the fixed effects estimator and the Hausman Taylor estimator, in order to identify whether the instrumental variable technique has eliminated correlations between the unobservable individual-specific effect and explanatory variables which is present in the random effects estimator. The Hausman-Taylor method through the use of instrumental variables eliminates correlation between variables that have been used in the model and individual components of the error terms. Finally, we may conclude that the Hausman-Taylor instrumental (IV) is found to be better choice than fixed and random effects (see Table A1).

In applying Hausman-Taylor instrumental (IV) estimator, the variables that are considered to be as exogenous variables and used as their own instruments are foreign direct investment (fdi), school enrollment tertiary (set), unemployment (unp), corruption index (corrup), domestic credit to private sector (dcps), and gross savings (gs). The variables that are considered to be endogenous and are instruments by the deviation of the individuals mean are GDP per capita first lag (gdppeclag1) or initial level per capita, general government final consumption expenditure (gexpend) and inflation (infl). A positive value

of the explanatory variables means a positive impact on economic growth; a negative value of the coefficient means a negative impact on economic growth.

The initial level of per capita growth is the first lag of real per capita growth which is instrumented by the deviations of the individuals mean. The negative coefficient shows conditional convergence which means that the countries (Western Balkans) are approaching a steady state level. Furthermore, the convergence is conditional, which means a higher growth is response to lower starting real per capita GDP.

Foreign direct investment has a positive coefficient (0.939815). This means that the foreign direct investment has positive impact on per capita GDP growth in the countries. The theories of economic growth maintain that FDIs have positive impact on economic growth. However, a review of related literature shows some instances where the FDI flow is crucial to economic growth which is measured by Gross Domestic Product. Some previous studies found no significant relationship. For example, Lyroudi *et al.* (2004) who examined the effect of FDIs on economic growth of transition economies with a focus on Eastern European and Balkan countries for 1995-1998 found no significant effect on the economic growth of transition economies.

Foreign Direct Investment (FDI) is the establishment of a new production line, or buying an already established production line in a country different from its origin with the aim of diffusing its production abroad. Countries, especially the developing ones, see FDIs as fundamental means for achieving economic growth. Despite the controversial findings, the findings of our study are in line with the theories of economic growth that stated that FDI has positive impact on economic growth.

Tertiary school enrolment has negative coefficient -0.102360 which means a negative impact on economic growth, however the estimated coefficient is statistically insignificant. The research shows a puzzling result that schooling which not a significant factor for growth in Western Balkans.

Unemployment, has a negative coefficient -0.3977443. This means unemployment has a negative impact on economic growth as measured by GDP Per capita. Unemployment has crucial impact on developing economies such as Western Balkan Countries. The high rate of unemployment in these countries means that the human recourses are not used in efficient way.

Corruption has negative coefficient -0.777635 which that means it has a negative impact on economic growth. Our findings are in line with studies such as Mauro (1995 and 1997) that support the hypothesis that corruption has really negative impact on economic growth.

Domestic credit to private sector has a positive impact on economic growth with a coefficient 0.0799975. In the finance-growth literature, financial sector services such as credit availability influences economic growth through their impact on capital accumulation and technological innovation (Levine, 1997). Gross savings has positive impact on economic growth with positive coefficient 0.1410784. According to Lewis (1954), savings plays a crucial role in the internal resource mobilization and economic growth of developing countries.

General government final consumption expenditure has a negative coefficient -0.3903854 which means negative impact on real per capita GDP growth. Furthermore, the results of our study show that higher government expenditures have negative impact on economic growth as they turn away capital from private productive activities to government which utilizes them in inefficient way. Thus, government borrowings take away money that may be used in a more productive way by the private sector. This is consistent with Fetai (2015) which showed that inflation is negatively related to economic growth. Our study also finds a negative impact of inflation on economic growth with a coefficient -0.0101412.

5. CONCLUSIONS

This paper examined the main determinants that affect economic growth, and the policies that affect economic growth in the Western Balkan from 1994 to 2015. Because, the initial level real per capita GDP had a negative coefficient, Hausman-Taylor model reveals the conditional convergence among the seven Western Balkans countries. These findings show that Western Balkans countries are converging and tend to reach their steady level. Foreign direct investment, gross savings and domestic credit to private sector have a positive effect on per capita growth. On the other hand, corruption, unemployment, and general government final consumption have negative relationships with per capita growth. Furthermore, the paper shows a puzzling result that schooling is not a significant factor for growth in the Western Balkans. The study also highlights the relevance of attracting more the foreign direct investment and to reduce the corruption.

FDI can boost the economies of these countries. In the period of investigation, we prioritize the FDI and corruption as a most binding and that FDI has positive impact on economic growth while corruption has negative impact on economic growth. Also the high rate of unemployment in these countries means that the human recourses are not used in efficient way. Furthermore, higher government spending can undermine economic growth by reallocation of the resource from private economic productive activities to the government which utilized them less efficiently. The results of study suggest that Balkan countries need more economical and political reforms in terms of quality in order to increase FDI and reduce corruption. These will in turn lead to higher per capita real GDP.

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ANNEXES

Table A1 – Hausman Tests

Test	Chi 2	Prob>Chi2	Result
Fixed Effects vs. Random Effects	17.97	0.00	Rejects H0
Fixed Effects vs. Hausman-Taylor IV	0.00	1.00	Does not reject H0

Source: author's calculation

Table B1 – Western Balkan Countries

No.	Western Balkan Countries
1	Albania
2	Bosnia and Herzegovina (BH)
3	Montenegro
4	Serbia
5	Albania
6	Croatia
7	Kosovo

Table B2 – Variable Descriptive

No.	Variables	Code
1	GDP per capita	gdpperclag1
2	Foreign direct investment (% of GDP)	Ifdi
3	School enrollment, tertiary (% gross)	Iset
4	Unemployment (% of total unemployment	Iunp
5	corruption index	Icorrupti
6	General government final consumption expenditure(% of GDP)	gexpend
7	Inflation	infl

Source: World Bank and IMF

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