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Economic development of the Western Balkans and European Union investments

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ABSTRACT

Long-run economic growth represents a precondition for the development of the Western Balkans countries. Continuous investments are required to achieve high rates of economic growth, while investments sources are national savings and foreign investments. The national savings level in the Western Balkans (W.B.) is not sufficient to finance radical changes, so external sources, in particular foreign direct investment (F.D.I.), are necessary for the development, as well as the official development assistance (O.D.A.). In view of the European intentions for the Western Balkans Region and the level of economic relations with the European Union, this paper seeks to explore the European Union (E.U.) investments and W.B. development. Results of the panel analysis and V.A.R. model show a statistically significant relationship between G.D.P. per capita and the length of the road network and E.U. investments. This confirms the significance of these development variables for the inflow of investment from the E.U. Panel analysis, explanatory variables of trade openness and signing of the Stabilisation and Association Agreement with the E.U. did not prove to be significant for E.U. investments inflow. A statistically significant relationship does not exist between the unit labour costs and investments from the E.U. when applying a causality test.

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1. Introduction

The European Union (E.U.) is the largest economic partner to the Western Balkans (W.B.) countries. In the process of accession to the E.U., these countries implement institutional and economic reforms with generous financial support of the Union. However, due to chronic economic problems, the question is why this region does not develop faster with the significant financial and other assistance it has received. In the year of the economic crisis escalation, Bartlett (2008) analysed key economic and social aspects of the Western Balkans Region, taking it as former Yugoslav countries excluding Slovenia, plus Albania. He addresses the need for a more dynamic

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development in the ambient of general reforms and transition in W.B. countries. He analysed structural reforms, privatisation and foreign direct investment (F.D.I.), stating that W.B. countries were not lagging behind Eastern and Central Europe countries before the world crisis. Nevertheless, the problem of high unemployment and insufficient growth rate remains.

Capital and/or investment represent the condition for economic growth and welfare. Investments stimulate economic growth and create new jobs. The Harrod–Domar classical model of economic growth or the Coob–Douglas production function, as well as the newer Solow model and economic model of long-run economic growth all emphasise capital and/or investments to be the factor of economic growth. Investment function shows a positive relationship between the investment and G.D.P. growth (ΔY). The same refers to Tobin's coefficient (q), while investments are in a negative relationship with the real interest rate (Burda & Wyplosz, 2013).

If countries do not have enough stocks of their own capital, they are forced to import it. Countries in transition have to balance their investment deficits with foreign investments.

Characteristics of the region are low productivity and law wages, but they are still higher than the wages in competitive Asian economies. Regardless of the cost of labour, the W.B. Region has high unemployment, which certainly is the biggest economic and social problem (Bartlett, 2013). With high unemployment rates and lower wages, qualifications available on the labour market are not suitable for the demand. Educational reforms represent a prerequisite for attracting F.D.I. and higher economic welfare. Bilas and Franc (2006) have confirmed in their research that an educated work force is of particular importance for foreign investment. In this area of Eastern Europe, due to deteriorated relations in higher education, the knowledge and skills required for the establishment of modern production and the labour market are questionable (Sondergaard, Murthi, Abu-Ghaida, Bodewig, & Rutkowski, 2012). A number of researchers have conducted studies on the mismatch on the labour markets (Arandarenko & Bartlett, 2012), as well as research on the higher education system in the area of the W.B. (Bartlett, 2008). These authors claim that there is no sufficient professional and qualified labour force for the development, reforms and restructurings needed to attract F.D.I. and ensure welfare in the Western Balkans.

Important factors for attracting investments are quality, quantity and the position of transport infrastructure. Research papers have confirmed the relationship between infrastructure and F.D.I. According to Bilas and Franc (2006), transport and telecommunication infrastructure represent essential factors for attracting foreign investments. A report on the E.S.P.O.N. programme (2006) classifies rail and road infrastructure density as one of the key indicators of Western Balkans development. Road infrastructure (except in Croatia) does not meet the European standards; therefore, the transport of goods and provision of services are more expensive. This is a serious barrier for faster inflow of F.D.I.

By signing the Stabilization and Association Agreement (S.A.A.), the Western Balkans countries have become exposed to competition from E.U. (Petreski, 2013). Conclusion of S.A.A. is the basic systemic change and an act of liberalisation of the markets in the Western Balkans countries.

Finally, Jovanović (2009) claims that foreign investors will locate their activities in a country that offers the most favourable cost mix of operation (production and marketing), provided that these factors fit well into the longer-run vision of potential profit. Given that the W.B. countries are more interested in higher F.D.I. inflow than potential foreign investors, structural reforms are imposed as an imperative, as well as legislation framework and more favourable business environment for foreign investors.

2. Overview of previous researches

A standpoint that prevails in the literature says that F.D.I. encourages economic growth, but opposite views can also be found. Globally, there are positive trends of mobility, flows and stocks of F.D.I., although many factors have an impact on them, some authors relate them to developed markets of goods and capital, production method and technology, liberal politics and other factors like: labour force, cultural and historical moments, etc. (Sethi, Guisinger, Phelan, & Berg, 2003). Therefore, F.D.I. are an unavoidable development resource for all countries, in particular for countries in transition. F.D.I. inflows from the European Union are especially important for the Western Balkans, having 2/3 of foreign trade exchange with that trading partner.

Lipsey (2001) applied indicators—size and growth of the market to explain the inflow, outflow, net flows and F.D.I. situation. He used the following variables: nominal G.D.P. and gross fixed investments (percentage of G.D.P.). He concluded that the situation and F.D.I. flows have similar trends over time. However, if markets defer in size, the trends of F.D.I. movement vary as well. Attractiveness of a country for F.D.I. investments depends on numerous conditions and factors.

For Dunning (1993), factors that attract investments lie in natural resources, technology, available capital and labour force. He claims that the success of a country in attracting foreign direct investment (F.D.I.) depends on competitiveness, microeconomic climate and macroeconomic stability. Besides Dunning's theory of development and investments, research on stimulating dynamic development, F.D.I. flows and the impact of governments on competitiveness are emphasised (Buckley, & Castro, 1998). Dunning (2004) defines three prevailing determinants of the location advantages of a recipient country: state policy related to attracting foreign investments, economic determinants and incentives for business development.

Among the papers that suggest that F.D.I. is a factor accelerating growth, competitiveness and investment into development, better economic and production performances both microeconomic and macroeconomic, the following studies excel: Wei and Lui (2006) and Buckley, Clegg, and Wang (2002).

Globerman, Shapiro, and Tang (2006) emphasise the positive impact of accession of countries to the E.U. for incoming investments. Clausing and Dorobantu (2005), as well as Barrell and Holland (2000) confirmed that E.U. membership brings growth of F.D.I.

Kottaridi and Thomakos (2007) evaluate the theory of new economic geography by testing S.D.I. convergence in 35 developing countries over the period 1980–2003.

Campos and Kinoshita (2008), Tintin (2013) and Long, Yang, and Zhang (2015) indicate that neither a market size nor low labour costs are significant F.D.I. determinants compared to the quality of institutions. Likewise, Kersan-Škabić (2013) emphasises the importance of the institutional setting in the countries of Southeast Europe in attracting F.D.I. In his paper, he applies models that include institutional variables, but also macroeconomic variables: G.D.P. per capita, growth rate, inflation and earnings. Results of the panel analysis indicate the importance of G.D.P. per capita and inflation, while the level of corruption, privatisation of large enterprises, foreign trade development and currency system, as well as the overall infrastructure reforms have proved to be significant when it comes to institutional variables.

Jevčák, Setzer, and Suardi (2010) analysed capital flows into 10 new member states of the E.U. before and during the financial crisis. They look at external determinants being interest rates in Euro Area (E.A.), business cycle E.A. and perception of risk in E.A., foreign currency exchange rate and spreads between yield on corporate and state securities. Domestic determinants of capital inflow are: real G.D.P. growth, quarterly referent interest rate, real estate prices rise and home country risk measures, lagged for one quarter. They have measured the effects of shocks of foreign factors on capital inflows in all countries in aggregate and separately by applying the V.A.R. model. All the three determinants are significant in explaining the movement of capital flows. Perception of risk in a host country has proved to be a significant determinant of the inflow of capital in individual members and in aggregate.

Hegerty (2009), by applying the Vector Auto Regressive (V.A.R.) model, explores the impact of the world economic crisis on capital inflows in six European countries in transition via foreign and domestic shocks of macroeconomic variables. The author finds that foreign interest rates had a minimal effect on capital inflows, while the shocks of foreign G.D.P. had various effects – the most significant effect recorded in Bulgaria and Czech Republic, while Estonia, Latvia and Romania experienced stronger effects of domestic shocks. Bevan and Estrin (2004) explored determinants of direct foreign investments in European transition economies by means of panel analysis of bi-lateral F.D.I. flows between Western European and transition countries. They have confirmed that G.D.P. of investor countries and the recipient of capital, as well as accession and integration had positive effects on foreign direct investments. Labour costs in the host country and the distance between the two countries have negative effects.

Çeviş and Çamurdan (2007) have assessed the determinants of foreign direct investments by means of panel analyses applied on an example of 17 countries in transition and developing countries in the period from 1989–2006. The model has seven explanatory variables (F.D.I. levels from the previous period, G.D.P. growth, earnings, trade openness, real interest rates, inflation and domestic investments). They have proved that F.D.I. has a positive relation to interest rates, G.D.P. growth, open economy and F.D.I. from the previous period, while a negative relation to F.D.I. inflow has been identified with other variables.

Jovančević (2007) is dealing with motivation factors of foreign investors. He has emphasised the importance of a transparent and efficient domestic administration, legal system and elimination of customs and non-customs barriers.

Nakov (2004) uses a panel method of analysis for the F.D.I. impact on G.D.P. in some 20 countries in transition, as well as the F.D.I. impact on G.D.P. in Hungary using cointegration analysis. The panel analysis indicates a negative F.D.I. impact on G.D.P. in transition economies. Cointegration analysis in the case of Hungary indicates a counteraction relation between foreign capital and industrial production. In this analysis, elasticity of the G.D.P. to F.D.I. change amounts to around 0.5. Granger test shows the relevance of F.D.I. in explaining economic growth. He concluded that F.D.I. causes growth in terms of Granger test, while the growth in terms of Granger causes no F.D.I.

Al-Iriani and Al-Shamsi (2007) have used Pedroni's cointegration analysis to empirically test for the relationship between F.D.I. and economic growth in the six Gulf countries over the period from 1970–2004. Findings of the research indicate two-way causality between F.D.I. and G.D.P. in the Gulf countries.

Hisarciklilar, Kayam, Kayalica, and Ozkale (2006) explore the relationship between the economic growth, F.D.I. and international trade for selected Mediterranean countries from 1970–2003. The relationship between the above stated variables is explored by means of two-dimensional cointegration analysis and by applying the Granger causality test. For most of these countries, insignificant relations between the variables were determined.

During this decade, there have been a number of interesting studies on the role of foreign direct investment in stimulating economic growth and vice versa (Adams, 2009; Mahmoodi & Mahmoodi, 2016; Mehic, Silajdzic & Babic-Hodovic 2013; Silajdzic & Mehic 2015). Their results are often classified into the following categories: (1) a causal relationship between F.D.I. and G.D.P.; (2) a causal relationship between G.D.P. and F.D.I.; (3) a bidirectional relationship between F.D.I. and G.D.P.; and (4) no causal relationship between F.D.I. and G.D.P.

Croatia was the first country in the region to assume a positive attitude towards foreign financing and direct investments. The Foreign Investment Promotion Act was passed in the year 2000. The key practical and theoretical moments related to stimulating and directing F.D.I. flows and their impact on the growth, export, import, employment, etc. were analysed at that time. Experiences of countries in transition were explored in order for Croatia to increase F.D.I. inflow. However, some research works challenge the achievements of F.D.I.

Lovrinčević, Marić, and Mikulić (2005) noticed the existence of a positive significant relationship between the total foreign capital inflow and the level of domestic investments, as well as a positive relationship with F.D.I., level of specialisation and changes in the export structure in transition countries in favour of products with a higher share of added value. One exception is Croatia, where activities that would lead to a change in the structure of commodity exchange and specialisation are not undertaken.

Hunya and Škudar (2006) analysed F.D.I. effects on employment, economic growth, fiscal revenues and export in Croatia. They concluded that F.D.I. should be an economic growth driver because foreign capital influences the growth of productivity; it has a tendency to export and impacts profitability growth.

Vukšić (2005) analysed the impact of foreign direct investments on export in the manufacturing industry. He reached the conclusion that F.D.I. has a positive and

Table 1. Dependant and explanatory variables for the analysis and data sources.

Variable	Mark in model	Source
(A) Dependant variable		
E.U. investments inflow	Euinv	Central banks in W.B. countries, O.E.C.D.
(B) Explanatory variables		
Length of the road network in W.B.	Lengthroads	World bank
Stabilisation and Accession Agreement with the E.U.	Saasign	European Commission
Foreign trade openness	Tradeopeness	World bank
Unit labour costs	Unitlabourcost	World bank
G.D.P. per capita	Gdppc	World bank

Source: Created by the authors, using data from The Bank of Albania (2015), The Central Bank of B&H (2015), Croatian National Bank (2015), National Bank of Macedonia (2015), Serbian National Bank (2015), Montenegro National Bank (2015), OECD (2016), World Bank (2016), European Commission (2015).

statistically significant impact on export, but the impact is relatively weak. He indicates export potential in the case of attracting F.D.I. in industry.

Bogdan (2009) analysed the F.D.I. impact on the economic growth in the European transition countries over the period 1990–2005. By applying panel analysis, he tested the hypothesis that higher F.D.I. inflow stimulates economic growth in transition countries. He has confirmed that F.D.I. inflow is stimulated by macroeconomic stability and the market size.

Analysing the situation in Bosnia & Herzegovina, Domazet (2016) found that F.D.I. contributed to the restructuring of some public companies, improving the investment climate and partly the employment rate. However, he suggests that these indicators are below the possibilities and potential of F.D.I. The survey shows only a part of the research on the importance of foreign direct investments.

3. Data sources and explanation of variables

The most widely used data base in this paper is the World Development Indicators, within the World Bank. The following have been retrieved from this source: foreign trade openness, G.D.P. per capita, the length of the road network in the Western Balkans and unit labour cost. Data on investments from the E.U. are summed values of F.D.I. from the E.U. and Official Development Assistance. Data related to the year of signing S.A.A. with W.B. countries, the basis for Dummy Predictor Variable, have been retrieved from the European Commission Internet page (Table 1).

(A) *European Union investments inflow*. This variable represents the summed values of F.D.I. (originating from the European Union member states) and Official Development Assistance (coming from the European Union member states and institutions).

(B) *Length of the road network in W.B. countries*. Roads in the period from 2005–2014 represent the sum of road lengths in all W.B. countries.

Stabilisation and Accession Agreement with the European Union is the Dummy variable. It denotes that a country has signed S.A.A. with the E.U. For the year in which the Agreement was not yet signed, the country is assigned the value 0, and in the year and for the period after signing the Agreement, the country is assigned the value 1. Prior to signing the S.A.A., and in particular after that, countries of the

Western Balkans harmonise their respective legislations with E.U. legislation. In spite of the progress achieved in countries of the Western Balkans, there are still laws which are not harmonised with E.U. legislation. Hence, there are difficulties when using E.U. funds intended for faster development, or easier implementation of the process of Euro-integration of the Western Balkans countries. Discrepancy between investments and assistance coming from the E.U. and the utility of resources is not to be ignored. In certain fields, legislation of the Western Balkans countries creates obstacles to implementation of E.U. projects. Thus, conditions for business operations and external competition are endangered by inefficient public sector, lack of democracy, growing corruption, etc. The above indicated issues have been sublimed in S.A.A. (dummy variable), given that it is obvious that the Western Balkans countries have intensified harmonisation of laws and practice with the E.U., before and in particular after signing S.A.A. The above stated activities have an indirect impact on economic well-being and the development of the Western Balkans countries.

Foreign trade openness is the variable in the model calculated via foreign trade coefficient, whose analytical expression is:

$$Kft = \frac{(X + M)}{Y} \tag{1}$$

where the sum of import and export $(X + M)$ is the numerator, and G.D.P. (Y) the denominator.

Unit labour costs is an explanatory variable, calculated as average gross earnings and productivity ratio (productivity calculated as G.D.P. quotient and the total number of employees).

Gross domestic product per capita is the explanatory variable in the model, calculated as the gross product divided by the average population, where gross domestic product represents the gross value added plus taxes and minus subsidies. G.D.P. per capita is a universal indicator of a national economy situation, which also sublimes the development and structure of the national economy.

Data on variables have been collected over the period 2005–2014.

It should be emphasised that these are only a few variables that affect economic development and attract investments. Economic development is also affected by F.D.I. and other macro-economic factors: interest rates (foreign and others), exchange rate, inflation, local investments and economic cycles and shocks in general. Administrative, customs and non-tariff barriers, as well as environmental factors, are also notable. The impact of most of them on economic development and investments can be measured by the V.A.R. model.

4. Applied methodology and the research results

4.1. Panel analysis

Two panel models were tested and the optimal model was decided on the basis of relevant tests. Panel regression analysis evaluates the impact of selected development variables (explanatory ones) on E.U. investments inflow. An advantage of panel

analysis compared to multiple regression analyses is that it allows us to define and test complicated econometric models; panel data lower the problem of multicollinearity (Baltagi, 2013). There are different models, independently pooled panels, a fixed effect model and a random effect model. This paper attempts to explain panels with fixed and random effects.

The fixed effect model is a linear model in which the constant member changes with each unit of observation, whereby it is constant over time and is defined as:

$$Y_{it} = \alpha_i + \beta_1 \cdot x_{it1} + \beta_2 \cdot x_{it2} + ... + \beta_k \cdot x_{itk} + \varepsilon_{it} \quad i = 1, ..., N; t = 1, ..., T \tag{2}$$

where N denotes the number of individual observations, T denotes the number of periods, x_{itk}, $k = 1, \ldots, k$ value of k-independent variable, i-unit observed in the period t. Parameter α_i is a constant member, different for each unit of observation, and $\beta_1, \beta_2, \ldots, \beta_k$ parameters are to be assessed. Parameter ε_{it} is the error term in the observation of i-unit in the moment t, whereby it is presumed that ε_{it} are independently and identically distributed random variables by unit observations over time, with a mean of 0 and constant variance of $\sigma^2{}_{\varepsilon}$. In addition, it is assumed that all x_{itk} are independent with ε_{it} for all i, t, k. The fixed effect model can be formulated by means of an analytical form of the dummy variable:

$$Y_{it} = \sum_{j=1}^{N} \alpha_J \cdot d_{ij} + \beta_1 \cdot x_{it2} + ... + \beta_k \cdot x_{itk} + \varepsilon_{it} \quad i = 1, ..., N; t = 1, ..., T \tag{3}$$

where $d_{ij} = 1$, provided that $i = j$, and the opposite is $d_{ij} = 0$. Based on this equation it can be concluded that, for evaluation of the fixed effect model, we need to estimate N parameters $\alpha_1, \alpha_2, \ldots, \alpha_n$ with N dummy variables. The method of least squared for evaluation of the fixed effect model is called the Least Square Dummy Variables (L.S.D.V.). Attributes of assessors vary given the size of the sample, i.e., given the number of periods and the number of unit observations in the sample. The main disadvantages of this method are the loss of the level of freedom due to evaluation of a constant member for each unit observation, the phenomenon of multicollinarity between independent variables due to a great number of dummy variables, the inability to assess a great number of observation units and the inability of use in the case of variables not depending on time.

The random effect model presumes a simple linear model where the assumption applies that observation units are randomly selected, so the differences between the units are random. Accordingly, the random effect model can be expressed as follows:

$$Y_{it} = \mu + \beta_1 \cdot x_{it1} + \beta_2 \cdot x_{it2} + ... + \beta_{k1} \cdot x_{itk} + \alpha_i + \varepsilon_{it} \quad i = 1, ..., N; t = 1, ..., T \tag{4}$$

where μ denotes a common constant member, and α_i a random effect for each observation unit. Thereby, it is assumed that in this model α_i are independently and identically distributed random variables by observation units with a mean of 0 and

Table 2. Correlation matrix between pairs of explanatory variables, Euinv-dependant variable.

	Euinv	Lengthroads	Saasign	Tradeopeness	Unitlabourcost	Gdppc
Euinv	1.000					
Lengthroads	0.639	1.000				
Saasign	0.002	−0.078	1.000			
Tradeopeness	0.261	0.350	−0.132	1.000		
Unitlabourcost	0.084	−0.374	0.256	−0.341	1.000	
Gdppc	0.561	0.220	0.332	−0.001	0.364	1.000

Source: Author's calculation in Eviews programme.

variance of σ^2_{ε}, while β_1, β_2, …, β_k are parameters that should be assessed. The next assumption is reflected in that ε_{it} are independently and identically distributed random observation units in time, with a mean of 0 and variance of σ_{ε}.

In this analysis, the number of observation units equals the number of Western Balkans countries analysed ($i = 6$), over the period 2005–2014 ($t = 10$).

4.1.1. Panel analysis results

Prior to the formation of the econometric model, the relationship between the observed explanatory variables was tested to detect possible problems of multicollinearity. This problem can disturb the estimation of parameter values, their significance and the direction of impact on the dependent variable. According to the current knowledge, no appropriate test to detect multicollinearity in a panel models exists. According to Baltagi (2013), in empirical papers using panel models to detect the problem of multicollinearity, correlation coefficients between pairs of potential independent variables are applied (Table 2).

According to the correlation test, pairs of explanatory variables should not cause a multicollinearity problem since the correlation has been featured as extremely weak in all cases. Correlation coefficients are not at the level that could lead to a multicollinearity problem.

The following table presents the panel model results. Explanatory variables of evaluation parameters in the random effect panel, G.D.P. per capita (Gdppc), unit labour cost (Unitlabourcost), length of the road network (Lengthroads), are evaluated as statistically significant in explaining the variance of dependant variable at the significance level of 5%.

A probability of 0.03% (variable Gdppc), 2.4% (variable Unitlabourcost), as well as a probability below 0.1% for the variable Lengthroads are within the limit value of 5%. Evaluation of parameters for the variables signing the stabilisation and accession agreement (Saasign) and trade openness (Tradeopeness) in the model are not evaluated as statistically significant. The last chapter of the evaluated model presents the total quality of the model. The determination coefficient ($R^2 = 0.61$) presumes that 61% of the total variances of investments inflow from the E.U. is explained by predictor variables in the model, which can be assessed as statistically satisfactory in terms of significance. Calculated values of *F*-statistics (with a significance level of 5%) indicate the conclusion that the selected explanatory variables get a substantially acceptable impact on the dependant variable (*F*-test value is 18, and probability below 0.1%, which is statistically significant).

Table 3. Panel analysis results.

	Random effect model		Fixed effect model	
Variables	Prob	*t*-Statistic	Prob	*t*-Statistic
C	0.0013*	−3.410957	0.2184	−1.248295
Gdppc	0.0003*	3.873304	0.1396	−1.503786
Tradeopeness	0.1918	1.323092	0.0294*	2.249340
Unitlabourcost	0.0255*	2.302710	0.5861	0.548375
Lengthroads	0.0000*	6.008551	0.1866	1.341202
Saasign	0.1578	−1.433856	0.8746	−0.158767
R-squared	0.646115		0.704510	
Adjusted *R*-squared	0.610727		0.638845	
F-statistic	18.25780		10.72893	
Prob (*F*-statistic)	0.000000*		0.000000	

Source: Author's calculation in Eviews programme.
* 5% significance.

Results obtained by the fixed effect model indicate that the parameter for the explanatory variable foreign trade openness (Tradeopeness) in the model is the only one evaluated as statistically significant in explaining the variances of the dependant variable at a significance level of 5%. The impact of other variables in this model (Gdppc =13.96%, Unitlabourcost = 58.61%, Lengthroads = 18.66%, Saasign = 87.46%) is not assessed as statistically significant, since the probability of *t*-statistics is far above the limit value of 5%. The determination coefficient ($R^2 = 0.64$) implies that the 64% variances of investments from the E.U. are explained by means of predictor variables in the fixed effect model. Calculated *F*-statistics (with a significance level of 5%), explanatory variables get a significant simultaneous impact on the dependant variable (Table 3).

Comparison of models. The Hausman test is used to compare the evaluated coefficient of the fixed effect model and random effect model (Hausman, 1978). If the null hypothesis is not rejected it is concluded that the assessor of random effect is more efficient. On the other hand, if the null hypothesis is rejected, it is concluded that the assessor of random effect is not consistent, i.e., it is referred to the fixed effect assessor.

Results of Hausman test have shown the value of 8.89, with a calculated test probability of 11.34%, at the level of significance of 5%. The results imply no rejection of the null hypothesis, so the random effect model is accepted as adequate in explaining the variances of dependant variables with predictor variables (Table 4).

4.2. Dynamic analysis of the relationship between the Western Balkans economic development factors and investments from the European Union

In order to include the dynamic effect, hereafter the impact of inherent values of variables from the previous period on the current and the future values is analysed, whereby variables assessed as insignificant in the random effect panel model will be excluded. This paper used Toda and Yamamoto's (1995) procedures to test causality between the variables. This procedure avoids the problems of possible unstationarity or cointegration between the series when testing causality, since estimation of the V.A.R. model is applied to level variables, thus minimising the risk of possible error when determining the series integration order or cointegration.

Table 4. Hausman test results.

Test summary	Chi-Sq. statistic	Chi-Sq. d.f.	Prob.
Cross-section random	8.892841	5	0.1134

Source: Author's calculation in Eviews programme.

A common form of the dynamic Vector Auto Regressive (V.A.R.) model based on N variables with the length of lag k is:

$$Z_t = \mu + A_1 Z_{t-1} + \ldots + A_k Z_{t-k} + \psi D_t + e_t \tag{5}$$

where the n-dimensional vector is potentially endogen order variables $(n \times 1)$, $A_1, \ldots, A_k$ are square matrices of autoregression parameters of order $(n \times n)$, D_t is a vector of non-stochastic exogenous variables with a matrix parameters vector of constant members for each variable, e_t is an innovation vector, i.e., n-dimensional vector white noise process with the expected value null and covariance matrix (Juselius, 2006).
The dynamic analysis procedure covers the following:

- estimation of stationarity variables in the model augmented Dickey–Fuller unit root test – A.D.F. test;
- determination of the optimal number of lags (five informative criteria);
- estimation of autocorrelation for serial errors (L.M. test); and
- estimation of causality variables in the V.A.R. model.

Testing will be carried out on the basis of movement of annual data of the mentioned variables over the period 2005–2014.

4.2.1. Testing stationarity

Prior to estimating the cointegration equation and defining the V.A.R. model, stationarity of variables in the model was tested. First, the stationarity of original data was tested. The null hypothesis is the assertion that time series are not stationary and evaluation is made at the level of significance of 5%. If the null hypothesis on the existence of the unit root is rejected, it is concluded that the variable is stationary. If the hypothesis is not rejected, the second iteration follows and stationarity of variables is tested in the first differentiation. The procedure is repeated in the second differentiation if it is proved that the variables are not stationary in the first one (Levin, Lin, & Chu, 2002). The analysis is conducted within the Eviews programme.

Results of the unit root test indicate that the series Euinv and Lengthroad are non-stationary and their first differences are stationary, i.e., that variables are integrated in the same order, which is marked as $I(1)$. The Gdppc variable is the only variable stationary with the original data, i.e., it does not have unit root in accordance with the Dickey–Fuller test. The unit labour cost variable is also non-stationary and it gains a stationarity property only after the second differentiation. It is obvious that there is a difference in stationarity between the variables in the model, with a significance level of 5% (Table 5).

4.2.2. Determination of the optimal lag length

The aim of determining the optimal lag length is that relation errors take the characteristics of the white noise process. The optimal level of the lag is the one that

Table 5. Augmented Dickey–Fuller test (A.D.F. test).

Variables	A.D.F. test	Probability	*I*(*d*)
Euinv	−0.78430	21.64%	*I*(1)
d (Euinv)	−2.08600	1.85%	*I*(0)
Gdppc	−3.08932	0.1 %	*I*(0)
Unitlabourcost	0.2710	60.7%	*I*(1)
d (Unitlabourcost)	−1.53054	6.29%	*I*(1)
d2 (Unitlabourcost)	−3.09531	0.10%	*I*(0)
Lengthroads	−0.81774	20.6%	*I*(1)
d (Lengthroads)	−2.47464	0.67%	*I*(0)

Source: Author's calculation in Eviews programme

minimises the stated information criteria (Asteriou & Hall, 2015). The optimal lag length is calculated in the Eviews programme by means of five information criteria. Determination of optimal lag length can determine the research results to a great extent. The least value of criteria is taken as optimal. Observed by Sequential modified L.R. test, final predictor error, Akaike information criterion and Hannan–Quinn, the optimal lag length amounts to four. The result has indicated that the value of the cited criteria of four lags is the most suitable one for the V.A.R. model analysis (Table 6).

The results of diagnostic tests have confirmed that the selection of four lags in the V.A.R. model is an appropriate choice. First, the L.M. serial correlation test was used for the specification of the model and the null hypothesis on the non-existence of autocorrelation with lagging of four lags was not rejected. Residuals are multivariate regular. Also, at this lagging level, the null hypotheses for asymmetry and Jarque–Bera test (Bai & NG, 2005) were not rejected (Table 7).

4.2.3. Causality test for variables in the V.A.R. model

The dynamic Granger causality can be captured from the vector error correction model derived from the long-run cointegrating relationship (Granger, 1988). Granger causality proposed by Granger (1969) has probable shortcomings of specification bias and spurious regression. Engle and Granger (1987) have defined X and Y as being cointegrated if the linear combination of X and Y is stationary, but not each variable is stationary. Engle and Granger (1987) stressed that, while these two variables are non-stationary and cointegrated, the standard Granger causal inference will be invalid. Analysis of the Granger causality test for variables in the V.A.R. model starts from the assumption that there is no proximate cause between the lagged values (lags) of variables in the model. An alternative hypothesis is the opposite assumption.

Toda and Yamamoto (1995) and Dolado and Lütkepohl (1996) have been found to be superior to ordinary Granger causality tests, since they do not require pre-testing for cointegrating properties of the system, thus avoiding the potential bias associated with unit roots and cointegration tests, given that it can be applied regardless of whether a series is $I(0)$, $I(1)$ or $I(2)$, non-cointegrated or cointegrated of an arbitrary order (Table 8).

Results indicate that there is no proximate cause which starts from G.D.P. per capita, then the length of road network towards E.U. investments (common lagged values of four lags, each variable separately) at the level of the test significance of 5%. With the tested p-value being lower than $\alpha = 0.05$, there is enough evidence to accept the alternative hypothesis and to claim that this connection exists. Causal proximity does

Table 6. Selection of optimal lag length for the V.A.R. model.

Lag	L.R.	F.P.E.	A.I.C.	S.C.	H.Q.
0	NA	1.91e + 17	51.14061	51.31656	51.20202
1	338.2255	8.53e + 12	41.11900	41.99873[a]	41.42605
2	15.36098	1.22e + 13	41.43896	43.02248	41.99166
3	35.62223	6.91e + 12	40.77906	43.06637	41.57739
4	30.67740[a]	4.04e + 12[a]	40.05335[a]	43.04444	41.09732[a]

Source: Author's calculation in Eviews programme
L.R.: sequential modified LR test statistic (each test at 5% level); F.P.E.: Final prediction error; A.I.C.: Akaike information criterion; S.C.: Schwarz information criterion; H.Q.: Hannan–Quinn information criterion.
[a]Lag order selected by the criterion.

Table 7. Results of diagnostic tests of the V.A.R. model suitability.

Tests	L.M.	*p* L.M.	J.B.	*p* J.B.	Skewness	*p Skewness*	Kurtosis	*p* Kurtosis
V.A.R. (4)	17.94	0.33	5.16	0.076	0.70	0.40	4.46	0.035

Source: Author's calculation in Eviews programme.
Note: data marked with *p* in the columns refer to probability.

Table 8. Causality test for the V.A.R. model.

Null hypothesis	Chi-squared statistics	Probability
Gdppc does not cause *Euinv*	46.64**	0.0000
Euinv does not cause *Gdppc*	3.12	0.5391
Unitlabourcost does not cause *Euinv*	6.86	0.1435
Euinv does not cause *Unitlabourcost*	3.34	0.5021
Lengthroads does not cause *Euinv*	32.27**	0.0000
Euinv does not cause *Lengthroads*	14.37**	0.0062

Source: Author's calculation in Eviews programme.
**5% test significance.

not exist in the case of unit labour costs and E.U. investments. On the other hand, tests have proved that there is no causal connection between investments from the E.U. and other variables in the model, thus excluding the length of the road network variable, which is caused by E.U. investments.

5. Conclusion

Welfare of the Western Balkans countries depends on the long-run and dynamic G.D.P. growth. Continuous and efficient investment is required to achieve high rates of economic growth. Therefore, external sources are used for faster development, whereby foreign investments are particularly significant. Official development assistance that W.B. countries receive from the developed countries should be taken into account. This kind of assistance mostly comes from the European Union.

Given the European orientation of the region and high level of mutual economic relations, the subject matter of this paper covers the European Union investments and the Western Balkans development. The paper attempts to determine investment factors, analyse investments and E.U. official development assistance and to evaluate the intensity of the relation between the key development factors and investment inflows from the Union.

Notable participation of the Union in the total assistance provided to the region indicates the interest of the member states and common institution to help W.B.

achieve a higher level of development. Investments analysis indicates the dominance of the E.U. participation in all countries of the Western Balkans. Besides that, according to the World Bank data, the Western Balkans countries were developing faster in the year 2016 than in 2015. Economic recovery can be explained by structural and other reforms carried out, whereby great credit belongs to the E.U. The labour markets also recorded positive changes, but unemployment remains high, ~ 22% in 2016.

Countries of the region have to intensify their reforms. This would attract both foreign and domestic investments, accelerate economic growth and revenues for households, reduce poverty and stabilise the public debt. Economic welfare would grow, macroeconomic stability would be established and the Western Balkans countries would be better resistant to new shocks and crises.

Analysis of development indicators indicates that most of the Western Balkans countries are not sufficiently developed (G.D.P. per capita amounts to around 1/3 of the E.U. percentage). Although the wages are low, average unit labour costs continuously grow. All countries record low productivity and high unemployment.

When it comes to the transport infrastructure, the Western Balkans region features a fragmented transport system, poor road network and inefficient transport services. Import and export share amounts to above 4/5 G.D.P., but the region is faced with permanent deficits in foreign exchange.

Results of the random effect panel analysis and the V.A.R. model indicate a statistically significant relationship between G.D.P. per capita and the length of the road network and E.U. investments. The analysis reveals significance of this development variable to investment inflows from the E.U. Therefore, higher inflow of investments depends on the growth of economic welfare and better transport infrastructure.

There is no significant relationship in the case of unit labour costs between W.B. and E.U. investments. The research has shown that the amount of wages in itself is not the factor that attracts investments. Panel analysis, explanatory variables of trade openness and signing of S.A.A. have not proved to be significant for the inflow of investments from the E.U. This means that formal signing of S.A.A. is not a sufficient condition for the inflow of investments from the E.U. to the Western Balkans countries. One of the explanations why liberalisation of the market and signing of S.A.A. have not brought higher F.D.I. inflow is in that foreign investors (along with other necessary conditions) favour partially controlled markets with tax relief, subsidies and possibilities to achieve high profits (i.e., the case of China).

Finally, a simultaneous impact of all explanatory variables in the panel model significantly affects the inflow of investments from the E.U.

There is a set of macroeconomic factors, the effect of which on F.D.I., economic growth and welfare can be measured by the V.A.R. model and only a few have been applied. Some new or extended current research need to be conducted, since this topic is a perspective and very 'alive' research challenge.

The results of the econometric analysis are sublimed in recommendations: trade openness of the region should be focused on regional economic cooperation and joint appearance of the Western Balkans countries in other markets. It is the aim of all countries to achieve higher export and faster economic growth. There should be a maximised level of the use of European financial support, in particular in the sphere

of infrastructural projects and the construction of the corridor, and the key travel route should be completed.

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