INVESTMENT AND ECONOMIC GROWTH: THE EXAMPLE OF BOSNIA AND HERZEGOVINA

1 Jelena Bjelić, Indirect Taxation Authority, Bosnia and Herzegovina
*Corresponding author E-mail: jelena.nemanjabj@gmail.com
ORCID ID: 0000-0001-9412-2006

ARTICLE INFO

ABSTRACT

An investment is a factor of the economic growth and a mandatory constituent in the majority of development models. This study analyzes the impact of the gross investment on the economic growth in Bosnia and Herzegovina (BiH) for the period 2005-2017, and provides the assessment of the interdependence of investment and a newly added value in industry. The relationship between the foreign investment and the economic growth is also included. The dependent variables are the GDP growth rate and the added value in industry (as % of GDP). The independent variables are the total investment rate (as % of GDP) and the foreign investment rate (as % of GDP). The hypothesis is that the gross investment and the foreign investment are positively correlated with the GDP growth rate. The investments contribute to a higher newly added value in industry. The results show that the gross investment is a significant factor of the economic growth because there is a high significance and positive correlation between the observed variables (the total investment and the GDP growth). This shows that the investment growth stimulates the economic growth in Bosnia and Herzegovina. But the dynamic analysis as an investment-GDP ratio shows oscillations. The impact of investments on the share of the newly added value in industry is insignificant and negative. The results of the dynamic analysis are similar. The relationship between the variables of the foreign investment rates and the GDP growth is significant and positive. Although the foreign investments are not sufficient, they still contribute, to a certain extent, to the economic growth of BiH.

1. INTRODUCTION

The investments affect the economic growth and the physical capacity (aggregate supply). Without the continuous investment, it is not possible to ensure the desired growth, so the research focuses on the analysis of the interdependence of investments and the GDP. The indicators are total investments or relative values (the investment rate = I / BDPx100). In the macroeconomic terms, the total (gross) investments are the part of the GDP that is not intended for the personal consumption. The investments are associated with the savings and consumption (C).

The key balance equation shows that the investments are a constituent of the GDP (Y, output), i.e.:

$$Y = C + I + G + (X - Z)$$

Y is GDP, C is consumption of goods and services, I is investments, G is sales to the state, and X – Z is exports and imports.

It is obvious that the size of the GDP depends on the investments. Furthermore, if it is assumed that:

$$Y = C + S + T$$

where: S is savings, T is transfers

Decomposition yields another version of the key balance equation:

$$C + S + T = C + I + G + (X - Z), \text{ or } (S - I) + (T - G) = (X - Z)$$

For S > I, the private sector is a net saver, and for S < I, the private sector is a net debtor, which indicates the interdependence of the investments and savings, as well as the level of the real interest rate.

The analysis of interdependence of the investments and economic growth. The Classical economists understand that the rate of investment affects the economic growth (Vojnić, 1977), i.e. the GDP growth is a function of investment, or: r = f (I), where: r is the rate of the economic growth. This is the basis of the classic Harrod-Domar model of the economic growth, which implies that the economic growth depends on the growth of investment (due to the growth of savings and the efficient use of capital). The model was developed by Roy Harrod (1939) and Evsey Domar (1946). They explained why the economy does not grow as much as the potential growth rate. In a short term, the investment stimulates the aggregate demand and employment. There is a twofold impact of the investments: the

22

growth of aggregate demand in a short run, and the growth of physical capacity in a long run.

The static model has 3 variables: savings, investments and the GDP (Y). The rate of the economic growth (r) is the ratio of the savings rate, i.e. accumulation (s) and the capital coefficient (k), or: r = s / k, where k = I / Y.

The model is still popular today because it simply projects the economic growth. The bottom line is that the GDP growth is tied to two key variables: the savings rate and the capital coefficient. The equilibrium growth rate of the economy (r) is measured by the growth rate of production and it is equal to the ratio of the savings rate and the marginal capital coefficient. Harrod calls this rate the guaranteed growth rate (r), which can grow with simultaneous changes in savings and the marginal capital coefficient.

The negligence of the time dimension of the Harrod-Domar growth model was solved by Samuelson (1988) by introducing the interaction of multipliers and accelerators. The dynamic model has the same variables as the static one, and each variable has a time dimension. The model equates the growth and the development, although the economic growth is purely quantitative. The model is applicable to the less developed countries with the labor surpluses and the capital deficits. Smaller and underdeveloped countries (Tomaš, Radović-Marković, 2018) do not have income for higher savings rates. The result is a low accumulation of the physical capital. In the era of globalization, the foreign direct investment (FDI) and the external borrowing enable some additional investments. Under such conditions, the balance of payments deficit is a signal that disposable income is higher than the GDP, and the total investment is higher than the domestic accumulation (the previous key balance equation).

The general conclusion is that the investments are a condition for the economic growth, i.e. investments are an independent variable in relation to the GDP or growth rate (ΔY) as dependent variables.

New development approaches are evolving into complex models that include new factors: technical progress, productivity, knowledge and innovation, and natural resources. The technical-technological progress is promoted by Robert Solow (1956): According to him, the economic development is a function of the growth of technical progress, knowledge and new technologies. In "A Contribution to the Theory of Economic Growth", he offers a model of the impact of technical progress on a long-term GDP growth. After "Technical Change and the Aggregate Production Function" (1957) and "Investment and Technical Progress" (1960), Solow was awarded the Nobel Prize in 1987 for his contribution

to the theory of economic growth. Solow's model and related theories start from the hypothesis that the economic growth depends on capital (K), labor (L) and technical progress (Tp) expressed in the accumulation of knowledge and technological progress that encourage growth productivity of labor and capital (K, I). Thus, the classical production function gets a new variable (Tp), and the GDP growth is expressed with the equation:

$$Y = f(Tp, K, L), \text{ ili } Y = (K, Tp \cdot L)$$

The technological progress in the Solow model is an exogenous variable, so this factor has not been explained by the model. Later, the discovery of the theory of the endogenous growth attempts to explain how the GDP grows. The endogenous theory of growth is reinforced by great economists, among them the Nobel laureate Paul Romer (1994). The technical progress and knowledge are included as an endogenous variable. The segments and the whole of endogenous theory are explored by Robert Lucas (1988) and other economists. In the new research, Robert Lucas Jr. (2015) observes the positive impact of the human capital on the production function (growth) and the level of aggregate supply. The conclusion is: most classical and new models include investments that are explored as an independent variable, while the amount or increment of GDP is mostly a dependent variable. The technical progress is also an important variable of the economic growth, which can be expressed through various indicators.

The total investments in the developed economies amount to about 1/5 or 20% of the GDP (the investment rate). In the European Union (EU), until the crisis of 2008/2009, the investment rates were around 20% of the GDP (today 18-19%). Bosnia and Herzegovina is a small developing country belonging to the Western Balkan region (for the WB and the IMF, small countries have less than 1.5 million inhabitants). It consists of two entities, the Federation of BiH and the Republic of Srpska (RS). In addition to the non-completed reforms, it is characterized by a complex constitutional and legal structure, and political instability. As one of less developed countries in Europe, it has high unemployment rates and problems in servicing the social sphere. Therefore, BiH is expected to have above-average growth that existed until the crisis of 2008/2009 (close to 6%). After the crisis, the growth was low and uneven. The reasons are the mentioned economic crisis, but also the constitutional-legal and political instability which is reflected in unemployment, corruption, poor social protection and increased emigration.

The condition of the BiH industrial sector is unsatisfactory in the majority of branches, even in those where there is a comparative advantage such as the elec-

tricity generation. The service and agricultural sectors are not in a better position either. That is why BiH needs to finish the process of the economic and social reforms, and in particular, to restructure the economy by focusing on competitiveness and exports. The global economy and the economies of scale are imposing increasingly stringent standards of competitiveness. By implementing the SAA, with the membership in CEFTA, and the comprehensive European integration process, BiH is looking for ways to recover its economy and meet the EU standards on sustainable, smart and inclusive growth.

2. MATERIAL AND METHODS

The topic of research and hypothesis. Before the outbreak of the crisis, Bosnia and Herzegovina recorded high growth rates (around 6% until 2008). The investment rate was higher than the EU average. Since 2015, the growth rates were around 3% and the investment rates around 18%. At the end of the observed period, the FDI is not significant (1.7-2.6% of GDP). Table 1 shows the values of the GDP, investments and the added value in industry.

Table 1. GDP growth, investments, FDI and the value added in % (BiH, 2005-2017)

Year	GDP growth	Gross investments (% GDP)	Foreign investments (% GDP)	Industry added value (% GDP)
	GDP GROWTH	GFCF INV	FDI	INDPARTIC
2005	8.76	27.14	5.56	21.35
2006	5.42	22.60	6.57	20.96
2007	5.86	22.74	11.68	21.70
2008	5.43	24.15	5.26	23.15
2009	-3.00	19.84	0.79	22.84
2010	0.87	17.39	2.58	22.39
2011	0.96	18.52	2.53	22.13
2012	-0.82	18.65	2.28	21.54
2013	2.35	17.96	1.72	22.23
2014	1.15	19.48	2.94	22.06
2015	3.08	17.83	2.29	22.54
2016	3.14	17.35	1.67	23.17
2017	3.19	18.04	2.56	23.94

Source: Created by the authors, using data from the World Bank (2018), the United Nations Industrial Development Organisation (UNIDO, 2018).

The research on the impact of the investments on the economic growth comes down to determining the interdependence between the total investment, foreign investment, the GDP growth and other indicators. The research topic is the analysis of the impact of the gross investment and the FDI on the economic growth on the example of BiH for the period 2005-2017, as well as the assessment of the impact of investments on a newly added value in industry. Results are compared with theoretical assumptions and relevant research for the economies of similar countries and BiH.

A decrease in the investment rate is accompanied by the growth of the gross savings, so the potential domestic capital for investment is absolutely and relatively growing. At the same time, domestic and foreign investments in BiH should be focused on sustainable, productive and technologically progressive development. The GDP growth can be accelerated by higher investments in industries and services that are oriented towards export and tradable goods and services. The BiH economy must be quickly restructured, and development must be enhanced using classical and neoclassical methods, and focusing on investments and other drivers of growth.

The hypotheses arise from the research topics. The starting hypothesis is: the gross investment is the driver of the economic growth (of higher growth rates). Without an increase in investment, the faster GDP growth in Bosnia and Herzegovina is not possible. In addition, the impact of the FDI on the GDP growth is examined, as well as the qualitative aspect of growth and development through the relationship between investments and newly added values in industry. The assumption is that investments, through the influence of technical and technological progress, lead to a higher added value in industry and have a multiple effect on the GDP growth.

***Defining variables and statistical basis*.** Four variables will be used in the paper: the GDP growth rate and the added value in industry (as % of GDP) as dependent variables, and the total investment rate (as % of GDP) and the foreign investment rate (as % of GDP) as independent variables.

The statistical basis consists of relevant international sources which can be seen in the following table.

http://www.ae.ef.unibl.org/

Table 2. Definition of variables and statistical sources

No	Name of indicators	Denotation in the model	Explanation	Source
1	GDP growth, (annual %)	GDP GROWTH	Annual percentage growth rate of GDP at market prices based on constant local currency.	World Bank national accounts data, and OECD National Accounts data files.
2	Gross fixed capital formation, (% of GDP)	GFCF INV	Gross fixed capital formation	World Bank national accounts data, and OECD National Accounts data files.
3	Industry value added (including construction), (% of GDP)	INDPARTIC	Industry corresponds to ISIC divisions 10-45 and includes manufacturing (ISIC divisions 15-37). Value added is the net output of a sector after adding up all outputs and subtracting intermediate inputs.	Industrial Development Report (2018)
4	Foreign investment inflow, (% of GDP)	FDI	Inflow of foreign investment. It comprises the pecentage of GDP. Theoretically, investments are a factor of macroeconomic balance and an important driver of the economic development.	World Bank, national accounts data.

Source: Created by the authors, using data from the World Bank (2018), the United Nations Industrial Development Organisation (UNIDO, 2018).

The Regression Analysis – static approach. The research is based on determining the interdependence of one variable from another, or of several different variables. The dependent variable whose variations can be explained by changes in other independent (regression) variables is primary. The stochastic relationship model between dependent and independent variables is a regression model. It is expressed by an equation where the dependent variable Y is represented as a linear or nonlinear function of the independent variables $(x_1, x_2, ..., x_k)$. The stochastic relationship $Y_i (x_1, x_2, ..., x_k)$ is characterized by the fact that each vector of independent variables $(x_1, x_2, ..., x_k)$ has a distribution of values of the dependent variable. Introducing a random variable into the model, we have:

$$Y = f(x_1, x_2,....,x_k) + \varepsilon$$

(a dependent variable Y can also be called a response, endogenous or output variable, and independent variables can be called exogenous or input variables)

The formula for the estimated simple linear regression function is:

$$\hat{Y}_i = b_0 + b_1 x_i$$

where: $\hat{Y}_i$ - value depending on the variable (on the best adjusted regression line);

b_0 and b_1 - unknown regression parameters (to be estimated).

Finally, the stochastic character of the linear relationship of the dependent (*Y*) and independent variable (*x*) is introduced into the simple linear regression model, so we have:

$$Y_i = \beta_0 + \beta_1 \cdot x_i + \varepsilon_i \ (i = 1, \ldots, n)$$

where: Y_i - i-th dependent variable; x_i - i-th independent variable; β_0, β_1 - regression parameters; ε_i - stochastic member; *n* - size of the basic set.

The Regression Analysis – dynamic approach. Although many econometric models are formulated by static equations, it is possible for the time series to form models in which the concept of time plays the central role (so-called dynamic models). In dynamic models, the dependent variable depends not only on the current value of the explanatory, but also on its shifted (lag) value. There are generally two types of dynamic models:

(1) the distributed lag models (DLMs), which include shifted (lag) values of independent (or explanatory) variables; and

(2) the autoregressive models (AR) that include the residual values of the dependent variable.

The paper uses the DLM model of the impact of shifted investment values as % of GDP (as an independent variable) on the dependent variable (Gross Domestic Product/Added Value of Industry as % of GDP). The formula for DLM is:

$$Y_t = \alpha + \beta_0 X_t + \beta_1 X_{t-1} + \beta_2 X_{t-2} + \cdots + \beta_p X_{t-p} + \varepsilon_t = \alpha + \sum_{i=0}^{p} \beta_i X_{t-i} + \varepsilon_t$$

where β are the residual value coefficients of the independent variable X.

The Yt reaction after the Xt change is distributed in the model over several time periods. There are p shifted (delayed) values of the independent variable in the model, including the current Xt value, so the full effect requires p + 1 of the period of change Xt to affect Yt. The meanings of the above formulations: the parameter β0 is an influential multiplier that shows what the average change in Yt will be when Xt is changed by one unit. The parameter βi is similar and shows the average change of Yt with increasing Xt-i per unit, that is, the increase in

unit X made in the periods before t. For this reason, β are also called temporary multipliers of order.

3. PREVIOUS RESEARCH

In the economic theory, investments are a factor of the economic growth and development. The investment is a constituent of a number of growth models, including the classic Harrod-Domar and more complex Solow growth model. The investment as a growth factor is positively correlated with the GDP growth rate, i.e. ΔY (Burda & Wyplosz, 2016). When it comes to the Harrod-Domar model, it is still an unavoidable approach in the analysis of investments and growth. Pan Yotopoulos and Jeffrey Nugent (1976) see the so-called fundamentalism of capital, i.e. the physical accumulation of capital as a factor of the growth acceleration and development in the 1950s. King and Levine (1994) deal with the fundamentalism of capital in the context of the economic growth and development. The theoretical basis of the capital fundamentalism is the Harrod-Domar model, which became popular again in the 1990s. The reason for the return of the model is the advancement of the endogenous growth theory because the proponents of this approach criticize the so-called AK models, and complement the neoclassical Solow-Swan growth model and the declining yields of the production factors (Easterly, 2001; Ray, 1998; Barro and Sala-i-Martin, 1995; Aghion and Howitt, 1998). Harcourt (2006) also criticizes the model, analyzing 4 concepts of the growth rate: expected, real, justified and natural. He criticizes Harrod's "non-elegant" definition of the growth rate. In new analyzes, the model is critically examined by Cesaratto (2015). New critiques of the Harrod-Domar model relate to the assumption of the need for greater borrowing by developing countries in order to invest additional capital (investment) and create conditions for the economic growth. However, this approach leads to debt repayment problems and it slows down development in the long run (Todaro and Smith, 2015).

The factors that determine the volume of investment are the interest rate and the growth of the national income (Jakšić, Praščević, 2011). The national income depends on investments, i.e. on the investment demand. The real interest rate drives investments in developed economies, i.e. $I = f(r)$, where: r - real interest rate. The interest rate growth lowers the volume of investment (and the optimal level of capital). Conversely, lower interest rates stimulate investments (Michael Burda, Charles Whiplos, 2016).

Lipsi (2001) applied the market size and the growth indicators to explain the inflow, outflow, and the investment flows using the variables: the nominal GDP

and the gross fixed investment (% of GDP). He concluded that if markets differed in size, the investment trends also differed.

Bartlett (2008) analyzes the Western Balkans, including structural reforms and direct investment. He proves high unemployment and slower GDP growth, i.e. the investment deficit. The investments as a factor of growth and competitiveness are explored by Weng and Lui (2006), similar to Buckley, Clegg and Weng (2005). Lovrinčević, Marić and Mikulić (2005) observed a positive significant relationship between the total inflow of foreign capital and the level of domestic investment, and a positive relationship between the FDI, the level of specialization and changes in the structure of export goods for the countries in transition. The change is made by higher exports of products with a higher share of the added value.

The growth of international trade follows the growth of the international capital movements, so there is a need to research the impact of foreign investments on the growth and development. Most of them are based on the regression model, the panel analysis or some other econometric methods.

By using the panel method, Nakov (2004) analyzes the impact of the FDI on the GDP in about twenty transition countries, and proves the negative impact of the FDI on the GDP trends. An example from eight European and eight Asian developing countries is explored by Mahmoodi & Mahmoodi (2016). They prove the causality of the GDP and FDI. Hunya and Škudar (2006) investigate the impact of the FDI in Croatia on employment, growth, exports and fiscal revenues. According to them, the FDI must be a major driver of the economic growth because it affects productivity, propensity to export and growth in profitability.

Vukšić (2005) investigates the impact of foreign investments on the exports of the processing industry, which has a positive effect on exports, but the impact is relatively weak. He determines the export potentials in the case of attracting the FDI for the industry. Bogdan (2009) investigates the impact of the foreign investment on the GDP growth for the European transition countries. He proves that the FDI is negative and insignificant in relation to the GDP trends. BiH authors, Silajdžić and Mehić (2015) investigate the impact of the foreign direct investment on the growth of seven transition countries in the Southeastern Europe for the period 1998-2007. The key result is a positive and statistically significant impact of the FDI on the GDP growth, with the impact of the FDI being statistically more significant if domestic investments are added to the analysis. In addition to this, Mehić, Silajdžić and Babić-Hodović (2013) conduct a new research and come to similar results. Domazet (2016) proves the impact of the FDI on the restructuring processes of some public companies in BiH, and the contribu-

tion to improving the investment climate, rather than the employment growth. The variables examined ranged below the possibilities expected from the FDI inflows. Jože Mencinger (2003) investigated the relationship between the foreign investment and the economic growth for 8 transition countries from 1994 to 2001. He found a persistent negative relation which he argued was due to the foreign investment. The relation is negative due to the dominance of takeovers in the acquisition of the ownership during the transition. Mencinger estimates that the privatization income was spent on consumption and imports. He also investigates the balance of payments and the foreign investment ratio. He believes that the transition countries are generally small, and the FDI is concentrated in retail and finance, which has an impact on the overall investment efficiency.

Globerman, Shapiro, and Tang (2006) prove that the EU accession has had a positive impact on the investment growth in the EU candidate countries. Clausing & Dorobantu (2005), and Barell & Holland (2000), have found that the EU membership has led to the investment growth.

The previous research indicates differences in the perception of the impact of the FDI on the GDP growth. Obviously, there are authors who refute the hypothesis of the unconditional positive effect of the FDI on the GDP growth and the economic well-being of the recipients of foreign investments.

4. RESULTS

The model where the economic growth serves as the gross investment. The Regression Analysis is used to assess the relationship between the Gross Fixed Capital Formation - GFCFINV and the GDP Growth. The results (*Table 1*) show high significance of the gross investment in explaining the GDP trends (results and probabilities of T and F statistics), as well as the consistency of the data. The coefficient of determination R2 = 0.51 indicates a medium-strong correlation (the square root of the coefficient of determination is R = 0.71).

Table 3. Results of Regression Analysis, GDP growth-dependent variable, GFCFINV-independent

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GFCFINV	0.722733	0.120501	5.997728	0.0001
C	-11.74938	2.772173	-4.238327	0.0014
R-squared	0.510222			
F-statistic	11.45914			
Prob(F-statistic)	0.006087			

Source: The authors' calculation in Eviews program

The result of the regression analysis is the equation: GDPGROWTH = - 11.75 + 0.723 x GFCFINV

Thus, a change in the gross investment by one unit affects the change in the GDP by 0.72 units. This is an econometric confirmation of the hypothesis that in the period 2005-2017 in BiH, investments were the factor of the GDP growth. As there is a high correlation between the observed variables, the conclusion is that the investment is one of the key growth factors. The result convenes with the research on the growth models that include investments: Lovrinčević, Marić and Mikulić (2005), Wie and Lui (2006), Buckley, Clegg and Weng (2005) and Bartlett (2008), as well as Silajdžić and Mehić (2015).

For a dynamic (long-term) analysis of the impact of investments on the GDP, the selection of the optimal number of shifts is tested by using five information criteria: LR - sequential modified LR test statistic, FPE: Final prediction error, AIC - Akaike information criterion, SC - Schwarz information criterion, HQ - Hannan -Quinn information criterion. The number that meets the largest number of criteria is used to select the optimal number of shifts in the dynamic analysis of the time series. The result shows that three criteria determine four optimal shifts: AIC, SC, HQ.

Table 4. Determining the optimal number of shifts in a dynamic autoregressive model VAR Lag Order Selection Criteria

Lag	LR[+]	FPE[++]	AIC[+++]	SC[++++]	HQ[+++++]
0	NA*	1.847894	6.287958	6.331786	6.193378
1	7.796510	1.289991*	5.877428	6.008911	5.593688
2	2.335040	2.203632	6.182557	6.401696	5.709657
3	2.193537	3.844700	5.974678	6.281472	5.312618
4	0.000000	NA	-103.5954*	-103.2010*	-104.4466*

* indicates lag order selected by the criterion;[+] sequential modified LR test statistic (each test at 5% level),

[++] Final prediction error, [+++] Akaike information criterion, [++++] Schwarz information criterion,

[+++++] Hannan-Quinn information criterion.

Source: The authors' calculation in Eviews program

After the test for the selection of the optimal number of shifts, where four shifts were selected as the number of delayed values of variables, in the further procedure the regression analysis of the time series *GDP Growth and GFCFINV with shifted four years* is applied.

Table 5. Results of Regression Analysis with a shift, GDP Growth - dependent variable

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	31.85748	4.300348	7.408119	0.0051
GFCFINV	-1.237728	0.268189	-4.615140	0.0191
GFCFINV(-1)	0.166906	0.177894	0.938238	0.4173
GFCFINV(-2)	-0.239813	0.148284	-1.617252	0.2042
GFCFINV(-3)	0.217986	0.147037	1.482524	0.2348
GFCFINV(-4)	-0.514596	0.107117	-4.804063	0.0172
R-squared	0.979321			
F-statistic	28.41426			
Prob(F-statistic)	0.009910			

Source: The authors' calculation in Eview program

The Regression Equation of time series analysis with a shift of 4 years:

$$\text{GDPGROWTH} = 31.86 - 1.24 \times \text{GFCFINV} + 0.17 \times \text{GFCFINV}(-1) - 0.24 \times \text{GFCFINV}(-2) + 0.22 \times \text{GFCFINV}(-3) - 0.51 \times \text{GFCFINV}(-4)$$

The regression analysis with a shifted time series of four years shows that the gross investment is significant for the GDP trends as a dependent variable ($R^2 = 0.98$). However, the direction of influence on the dependent variable oscillates by years (positive in the first and third shifted year, with the original values of investments; shifted in the second year, and negative in the fourth year). The results of the dynamic analysis imply the conclusion that the relationship between the share of the gross investment in GDP and the GDP growth rate in the long run is unstable (unlike the static analysis which showed a positive and significant relation). The explanation is that the gross investment in the long run is not continuous and multiplicative according to the GDP variable. On the contrary, the direction changes from positive to negative over the years. This is explained by the fact that the investments in Bosnia and Herzegovina are not directed towards sectors where GDP increases and multiplies relatively quickly (e.g. the sectors of industry and services), but more is invested in public facilities, infrastructure or the growth of fixed capital in non-productive activities. The reasons are post-war reconstruction, the construction of the new and the reconstruction of old infrastructure, etc. The consequences can be a low level of the added value in industry and the slow growth of the service sector.

The model where the added value of industry serves as the gross investment. In the BiH economy, in addition to insufficiently high growth rates, there are also some structural problems. The analysis of the impact of the investments on the amount of the newly added value in industry (and indirectly of the impact on the

GDP) assumes that the investments are a major driver of the industry growth and the higher added value. The investments are positively correlated with the growth of the added value in industry. This hypothesis coincides with newer theories of growth, which, in addition to investments (I, K), include technical progress (Tp) as a growth factor. It is assumed that the added value in industry grows as a result of increased technical-technological performances, research and development. The share of the newly added value in industry in the GDP is taken as a dependent variable, and the share of the GDP gross investment is taken as an explanatory variable.

The result of the regression analysis is the formula:

$$INDUSTRIPARTIC = 24.66 - 0.12 \times GFCFINV$$

The regression coefficient is 0.12 while the coefficient of determination R^2 is 0.19. The econometric analysis shows that the relationship between the variables is insignificant and negative.

The dynamic analysis was also performed, as well as testing in order to select the optimal number of shifts with five criteria: LR, FPE, AIC, SC, HQ, and results in an optimal number of shifts of four years (per AIC, SC, HQ).

The result of the regression analysis with a shift of four years is the formula:

$$INDUSTRIPARTIC = 25.37 - 0.30 \times GFCFINV + 0.29 \times GFCFINV(-1) - 0.09 \times GFCFINV(-2) + 0.17 \times GFCFINV(-3) - 0.21 \times GFCFINV(-4)$$

The coefficient of determination $R^2 = 0.34$ is on the borderline of acceptability, and the correlation between the variables is moderate (R = 0.58). The results of the dynamic analysis are similar to the results of the static analysis. The coefficients of investments with the original data have a negative direction, as well as in the shift of the second and the fourth year, but they are statistically insignificant (the first and the third shifted year have a positive sign; the investments with the original data have a negative sign in the second and the fourth year). Thus, neither the basic nor the "shifted" values of the investments are significant in relation to the variable of the share of the newly added value in industry in the GDP.

The model where the GDP is in the function of FDI. Finally, the impact of the FDI's share of the GDP on Bosnia and Herzegovina's GDP growth rate will be examined. The result of the regression analysis is the formula:

$$GDPGROWTH = -11.52 + 0.72 \times FDI$$

34   http://www.ae.ef.unibl.org/

The result is a significant and positive direction of the FDI participation in the GDP, in explaining the GDP growth rate (the results and probabilities of the T and F statistics). The regression coefficient is high and amounts to 0.72. The coefficient of determination is R2 = 0.46 at the borderline of acceptability and indicates a moderately strong correlation (R = 0.68). The results imply that the GDP GROWTH movement is consistent with the changes in the FDI. This is an econometric confirmation of the hypothesis that in BiH, in the period 2005-2017, the inflow of foreign investment statistically positively explains the movement of the GDP. The result coincides with the Hunya and Škudar's (2006) research on the impact of the FDI in Croatia, which should drive the economic growth because it affects the export propensity and profitability, as well as Silajdžić and Mehić (2015) on the impact of the FDI on the growth in transition countries. The econometric analysis confirms the research of Domazet (2016) which found that the FDI in Bosnia and Herzegovina contributed to the growth of the investment climate, moderate growth and employment. However, Domazet states that better effects are expected from the FDI, which shows that the level (inflow) of foreign investments in Bosnia and Herzegovina is still low.

5. DISCUSION

According to classical understandings, investments are a key macroeconomic indicator. They are generated from savings as a part of the unspent GDP. The global economy affects the growth of total investment due to external lending, joint ventures or FDI. The primary goal of investment is the GDP growth through the physical growth of products and services. An important aspect of investment is the investment demand, which leads to the acceleration of the economic growth and the growth of the aggregate supply. The movement of investments depends on the level of the real interest, the value and the growth of the GDP, the state of the business environment and other factors.

However, the relationship between the investment and the economic growth is crucial, because the appropriate investment rates achieve the targeted economic growth rates. The results of various studies are mainly reduced to the existence of a direct and significant correlation between investment and the GDP. It is also the basis of the classical Harrod-Domar model, and other simple and complex models based on the simple fundamental formula $r = f (I)$.

The paper investigates the relationship and the impact of investments on the GDP, and the relationship between the FDI rate and the GDP growth. The relationship between the investment and a newly added value in industry as a

qualitative and structural indicator was investigated, especially in the context of trends and the relationship between the total investment and the GDP. In Bosnia and Herzegovina, the gross investments (excluding shifts) have a positive direction (impact) in relation to the GDP growth. The obtained result is in line with the most classic and new approaches to the economic growth. Other results of the econometric analysis confirmed that there are problems in the BiH economy. First of all, when the impact of the gross investment on the GDP shifts, there are reflections on the results due to the investment in infrastructure and the public sector. The results mainly coincide with the works of Lovrinčević, Marić and Mikulić (2005), Wie and Lui (2006) and Bartlett (2008). Silajdžić and Mehić (2015) found a greater statistical significance with the domestic investments being included in the analysis of the foreign investments.

In the era of globalization, the foreign investment is an important external source of new investments. The total amount of investments in the majority of countries is around 1/5 or 20% of the GDP. In Bosnia and Herzegovina, the investment rate is around 18% of GDP, but the share of foreign investment is insufficient. Although the expectations of developing countries are high, some research refutes the hypothesis that the FDI is the key to the economic growth. Basically, these are quantitative analyses that result in a negative correlation between the FDI and the GDP variables, or show the insignificance of the model. For some researchers, this is enough to challenge the impact of the FDI on the economic growth, such as Jože Mencinger (2003).

Nevertheless, the majority of the research papers in the past two decades prove a positive correlation between the FDI and the GDP. The regression analysis for BiH shows a significant and positive direction of the FDI's share in the GDP in terms of explaining the GDP growth rates. The foreign investment statistically positively explains the GDP trends, but their inflow is insufficient, slightly above 2% of the GDP. The reasons are: economic and political instability, bad investment climate, dysfunctional institutions and corruption. The results coincide with the research of Domazet (2016), which analyzes the FDI in BiH in the context of restructuring the public sector and improving the investment climate, as well as Hunya and Škudar (2006) who believe that the FDI in Croatia must be a major driver of the economic growth (similar to BiH).

Industry is the key sector of developed economies. Milton Friedman (2002) believes that there is no developed society without developed industry, which confirms the economic power of the United States. A newly added value in industry is a qualitative indicator of development; technologically modern and competitively oriented branches have a higher level of a newly added value. Developed

industries create more added value. It depends on the technical and technological characteristics of production and the growth of the labor productivity. Robert Solow uniquely recognizes them as technical progress. In the industry of Bosnia and Herzegovina, the ratio of gross investment and the added value in industry is insignificant and it is changing its direction, which can be explained by social (in)efficiency and structural problems.

6. CONCLUSION

The results of the research have led to the following conclusions:

1. The gross investments in Bosnia and Herzegovina are a significant factor of the economic growth. In the observed period, there is a high significance and a positive correlation between the observed variables (the share of the total investment in GDP and the GDP growth rate), which confirms the hypothesis that without more investment, BiH cannot achieve higher economic growth rates. The results of the regression analysis imply multiple effects of the total investments on the economic growth of BiH.

The dynamic analysis shows that the optimal number of shifts is four years and that there is an oscillation in terms of the investment-GDP growth relation (explained by the need to invest in infrastructure and public investments).

Conclusion in the form of recommendation: if BiH wants to achieve a faster GDP growth, the priority must be given to the investments in industry and the service sector, especially in industries where the investments pay off faster.

2. The impact of the share of the gross investment in the GDP on the share of a newly added value of industry in the GDP of Bosnia and Herzegovina is insignificant and negative. A similar result is obtained with the dynamic analysis showing that the optimal number of shifts is four years. The coefficient of determination is at the borderline of acceptability, where the correlation of variables is moderate (gross investment coefficients in the first and the third shifted year are positive, gross investment coefficients are with the original data, and in the second and the fourth shifts they have a negative sign).

The results of the dynamic and the static analysis are similar (insignificant and negative). They correspond to the poorer economic structure of industry, non-competitiveness and less export orientation (non-tradable versus tradable goods predominate).

The conclusion in the form of recommendation: Bosnia and Herzegovina must choose a strategy focused on exports, competitiveness, smart and sustainable

development, activating potentials from the category of technical progress. We should strive to have the export growth of industrial products with a higher share of the added value.

3. The relationship between the variables: the share of the FDI in the GDP and the GDP growth rate are significant and positive. This is a confirmation of the hypothesis that the FDI, to some extent, contributes to the economic growth in BiH. However, the foreign investment in Bosnia and Herzegovina is not large. Consequently, the effects on the economic growth are modest. *The conclusion in the form of a recommendation*: it is necessary to improve the business environment and wider social climate in order to attract foreign investments. At the same time, foreign investors should insist on "fair relations" in the exploitation of non-renewable resources, as well as on the labor legislation. The preference should be given to the greenfield investments over the brownfield investments (Mencinger, 2003).

REFERENCES

Aghion, P. & Howitt, P. (1998). *Endogenous Growth Theory*. Cambridge, Massachusetts, USA: MIT Press.

Barro, R. & Sala-i-Martin, X. (1995). *Economic Growth*. New York, USA: McGraw-Hill

Burda, M. & Wyplosz, C. (2016). *Makroekonomija*. Beograd, Srbija: Ekonomski fakultet Univerziteta u Beogradu

Barrell, R. & Holland, D. (2000) Foreign Direct Investment and Enterprise Restructuring in Central Europe. *Economics of Transition*, *8*(2), 477 - 504.

Bogdan, Ž. (2009). The impact of FDI on the economic growth in European transition countries. *Series of emerging articles*. Zagreb, Hrvatska: Faculty of Economics, University of Zagreb.

Buckley, P.J., Clegg J. & Weng C. (2005). The impact of inward FDI on the performance of Chinese Manufacturing. *Journal of International Business Studies, 33*(3), 637-655.

Bartlett, W. (2008). *Europe's troubled region: Economic development, institutional reform and social welfare in the Western Balkans*. London, UK: Rutledge

Clausing, K.A., & Dorobantu, C. L. (2005). Re-entering Europe: Does European Union candidacy boost foreign direct investment? *Economics of Transition*, *13*(1), 77–103.

Cesaratto, S. (2015). Neo-Kaleckian and Sraffian controversies on the theory of accumulation. *Review of Political Economy*, *27*, 154–82.

Domazet, A. (2016). Foreign direct investment in Bosnia and Herzegovina: From The Delusions of Neoliberalism to drivers of Economic Growth. Academy of Sciences and Arts of Bosnia and Herzegovina. *Conference proceedings: The Dayton Peace Agreement and the future of BiH*, *7*(1), 126-145.

Easterly, W. (2001). *The Elusive Quest for Growth*. Cambridge, Massachusetts, USA: MIT Press

Friedman, M. (2002). *Capitalism and Freedom*. Chicago, Illinois, USA: The University of Chicago Press.

Globerman, S., Shapiro, D. & Tang, Y. (2006). Foreign direct investment in emerging and transition european countries. *International Finance Review*, *6*(1), 431 - 459.

Harrod, R. F. (1939). An Essay in Dynamic Theory. *Economic Journal, 49*(1), 14-33.

Hunya, G. & Škudar, A. (2006). The Role of Foreign Direct Investments in the Croatian Economy. *The Vienna Institute for International Economic Studies*. Retrieved from: http://www.wiiw.ac.at.

Harcourt, G. C. (2006). The Harrod model of growth and some early reactions to it. In Clark, D. A. (Ed.), *The Elgar Companion to Development Studies* (pp. 219–23). Cheltenham, UK: Edward Elgar Publishing

Industrial Development Report (2018). *Demand for Manufacturing: Driving Inclusive and Sustainable Industrial Development*. Vienna, Austria: United Nations Industrial Development Organization. Retrieved from: https://www.unido.org/sites/default/files/files/2017-11/IDR2018_FULL%20REPORT.pdf

Jakšić, M. & Praščević, A., (2011). *Makroekonomska analiza*. Beograd, Srbija: CID.

King, R. G. & Levine, R. (1994). Capital Fundamentalism, Economic Development, and Economic Growth. *Policy Research Working Paper No. 1285*. World Bank, Policy Research Department

Lipsey, R. E. (2001). Foreign Direct Investors in Three Financial Crises, *NBER Working Paper Series*, *No. 8084*. Retrieved from: http://www.nber.org/papers/w8084.pdf

Lovrinčević, Ž, Marić, Z. & Mikulić, D. (2005). Foreign Capital Inflow – the Effects on National Savings, Domestic Investments and Balance of Payments of Countries in Transition in Central and Eastern Europe. *Economic Review, 56*(3-4), 163-184. Retrieved from: http://hrcak.srce.hr/file/15402

Lucas R.E. (1988). On the mechanics of economic development. *Journal of Monetary Economics*, *22*, 3-42.

Lucas, R.E. Jr. (2015). Human Capital and Growth: Reflections on New Growth Theory. *American Economic Review: Papers & Proceedings, 105*(5), 85-88.

Mahmoodi, M. & Mahmoodi, E. (2016). Foreign direct investment, exports and economic growth: evidence from two panels of developing countries. *Economic Research-Ekonomska Istraživanja*, *29*(1), 938-949.

Mehic, E., Silajdzic, S. & Babic-Hodovic, V. (2013). The impact of FDI on economic growth: Some evidence from Southeast Europe. *Emerging Markets Finance and Trade*, *49,* 5–20.

Mencinger, J. (2003). Does Foreign Direct Investment Always Enhance Economic Growth?. *Kyklos*, *56*, 491-508.

Nakov, A. (2004). Foreign Direct Investment and Growth in Transition: Panel Data and Time Series Evidence, 1991-2001. *Croatian International Relations Review*, *10*, 34-35.

Ray, D. (1998). *Development Economics*. Princeton, New Jersey, USA: Princeton University Press.

Romer, P. (1994). The Origins of Endogenous Growth. *Journal of Economic Perspectives*, *8*(1), 3-22.

Samuelson, P.A. (1988). The Keynes-Hansen-Samuelson multiplier-accelerator model of secular stagnation. *Japan and the World Economy*, *1*(1), 3-19.

Silajdzic, S. & Mehic, E. (2015): Absorptive Capabilities, FDI, and Economic Growth in Transition Economies. *Emerging Markets Finance and Trade*, 1-19.

Solow, R. M. (1956). A contribution to the theory of economic growth. *The quarterly journal of economics*, *70*(1), 65-94.

Solow, R. M. (1957). Technical Change and the Aggregate Production Function. *The Review of Economics and Statistics*, *39*(3), 312-320.

Solow, R. (1960). Investment and technical progress. In K. J. Arrow, S. Karlin & P. Suppes (Eds.), *Mathematical models in the social sciences, 1959: Proceedings of the first Stanford symposium - Stanford mathematical studies in the social sciences* (pp. 89-104). Stanford, California, USA: Stanford University Press.

Todaro, Michael P. & Smith, Stephen C. (2015). *Economic Development*. 12th Edition. London, UK: Pearson Education

Tomaš, R., & Radovic-Markovic, M. (2018). Development of small countries in the business environment of the European Union. *Transylvanian Review of Administrative Sciences*, *14*(53), 84-106.

Yotopoulos, P. A. & Nugent, J. B. (1976). *Economics of Development-Empirical Investigations.* New York, NY, USA: Harper & Row.

Vojnić, D. (1977). *Investicije i društvena reprodukcija*. Zagreb, Hrvatska: Informator.

Vukšić, G. (2005). The impact of Foreign Direct Investments on the Croatian manufacturing industry export. *Financial theory and practice*, *29*(2), 147-175.

Weng. Y. & Lui, X. (2006). Productivity spillovers from R&D, exports and FDI in China's manufacturing sector. *Journal of International Business Studies, 37*(7), 554-577.

World Bank (2018). *World development indicators. Topic: Economy & Growth, Infrastructure, Labour, Trade*. Retrieved from: http://data.worldbank.org/data-catalog/world-development-indicators

ИНВЕСТИЦИЈЕ И ЕКОНОМСКИ РАСТ: ПРИМЈЕР БОСНЕ И ХЕРЦЕГОВИНЕ

1 Мр Јелена Бјелић, Управа за индиректно опорезивање, Босна и Херцеговина

САЖЕТАК

Улагање је фактор економског раста и саставни дио већине развојних модела. Ова студија анализира утицај бруто инвестиција на економски раст у Босни и Херцеговини (БиХ) за период 2005-2017, као и процјену међузависности инвестиција и нове додате вриједности у индустрији. Укључен је

и однос између страних инвестиција и економског раста. Зависне промјен-
љиве су стопа раста БДП-а и додата вредност у индустрији (као % БДП-а).
Независне промјењљиве су укупна стопа улагања (као % БДП-а) и стопа
страних инвестиција (као % БДП-а). Хипотеза гласи да су бруто и страна
улагања позитивно повезани са стопом раста БДП-а. Улагања доприносе
већој додатој вредности у индустрији. Резултати показују да је бруто инве-
стиција значајан фактор економског раста, јер постоји велики значај и пози-
тивна корелација између посматраних промјењљивих (укупне инвестиције
и раста БДП-а). То показује да раст инвестиција стимулише економски раст
у Босни и Херцеговини. Међутим, динамичка анализа као однос између
улагања и БДП показује осцилације. Утицај инвестиција на удио нове дода-
те вредности у индустрији је безначајан и негативан. Резултати динамичке
анализе су слични. Веза између промјењљиве стопе страних инвестиција и
промјењљиве раста БДП-а је значајна и позитивна. Иако стране инвестиције
нису довољне, оне ипак донекле доприносе економском расту БиХ.

Кључне ријечи:

*инвестиције, економски раст, СДИ, Босна и Херцеговина, додата вриjед-
ност.*