

Foreign direct investments and their impact on the economic development of Bosnia and Herzegovina

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Abstract: From the perspective of macroeconomic indicators, investment is a significant determinant of economic development in general, as well as the development indicator of economic entities in the micro segment. Investments are an essential element of any economic policy, because their implementation provides a platform not only for economic development, but also are prerequisite for the stability of economic and social trends. Foreign direct investment plays an important role in the financing of the global economy, and it represents the most frequent feature in financing the national economies of developing countries and countries in transition. Demand for foreign investment in the global market is large, and thus the governments have been conducting many activities in order to create a more favorable environment to attract investors.

In this paper, special attention was paid to direct investments in financing the economy on a global scale, their importance for the development of the global economy and the impact of foreign direct investment in the economic development of Bosnia and Herzegovina. The major activities, which are necessary to be done to attract investments in the highest possible volume, have been emphasized. With the use of statistical and quantitative analysis, the paper shows that the inflow of foreign capital is one of the basic prerequisite of economic growth acceleration and that the inflow of foreign capital has a positive impact on the economic development of Bosnia and Herzegovina. By monitoring and analyzing the various instruments of foreign capital inflow, with an emphasis on investment in the free zone and a joint venture with foreign investors, it has been clearly pointed out the fact that they have diverse, but proven positive impact on macroeconomic variables in the economy of Bosnia and Herzegovina.

1. Introduction

Foreign direct investments (FDI) represent such a form of investment in which foreign investor keeps the ownership right, provides the control and the management of the firm in which they invested the funds, in order to achieve long-term interests. These investments are the most important instrument of foreign



capital inflow because they represent a direct inflow from abroad, i.e. direct inflow of the capital in the economic system of the host country.

Foreign direct investment, as a form of international capital mobility, represents an important contributor to more efficient activities in the economy. They provide faster exit to the international market and as the aftermath are ensuring improved the living standard of the society. Evaluation of investment efficiency is the basis for making investment decisions from one country to another, which will consequently lead to improvement of the economy. Foreign investments are a key development factor in the modern economy, and jointly with the trade, represent the most important leverage of an enterprise, organization of production, supplying goods and services on a global scale.

FDI are supporting the companies in organizing production on a global scale, providing an efficient supply of raw materials, energy, labor as the input, and are facilitating the placement of products and services as the output in the most important markets in a profitable way. On the basis of such activities, the companies can on optimal way use its advantages in technology, expertise, and economies of scale.

Developing countries having high state debt and unfavorable economic situation show huge interest in gaining as higher foreign investments as possible. It has been especially important after bank loans and various financial aid ceased to arrive in some countries. Countries in transition, aiming to integrate into the world economic system, can overcome negative economic tendencies with the help of international capital inflow.

Developed countries, faced with a financial crisis, have been also interested in an increased inflow of foreign capital, since the foreign investments are the most important element of development strategies in general.

With foreign direct investment is not coming just the capital from one country to another, but also the investment package containing new technologies, managerial skills and new markets. In addition, bearing higher risks, FDIs are significantly increasing the opportunities for making profits. Foreign direct investments are autonomous transactions of long-term capital movements, motivated by economic interests, with the profit at the first place.

Observing today's economic systems at the global market, we can notice that the economic systems, in order to accelerate their economic development compete to each other, aiming to attract foreign capital. In fact, the most significant competition is seen in the area of "greenfield" investments. It is important to elaborate, how and why are the countries competing for foreign direct investment, on the one hand, and on the other hand, why the other countries are the main investors of this type of investment?

In order to monitor investments, the following core analytic indicators related to foreign direct investment are examined:

- Flows of foreign direct investment (FDI), which represents new investments during the observed period (usually one year period). They represent the position of the current account. Total flows are divided by instruments used for investment, and are as follows: owners capital (ownership in subsidiaries), and shares in subsidiaries and affiliated companies, re-invested earnings as part of retained earnings of investors that is not distributed; others investment of FDIs, like the borrowing and lending of funds, including various financial instruments and trade credits between investing company and company which has capital inflow.
- Stocks of foreign direct investment represents is the value of investments at the end of monitored period. In Balance sheet, the foreign direct investments are in the assets side of sheet and in the liabilities side if the investment is coming from the host country. Stock of FDIs is divided into: equity capital and reinvested earnings.
- Income of foreign direct investment is income summarized by direct investors during the period. It is divided into three categories: (a) dividends earned in the reporting period and the

profits allocated to direct investor without deduction of income tax; (b) reinvested earnings; (c) interest on loans, i.e. interest earned on loans to subsidiaries, without deduction of income tax.

In addition, an important indicator is intensity of foreign direct investment, measured as a percentage of gross domestic product (the ratio of the average internal and external flows of foreign direct investment and GDP). Higher intensity indicator means more foreign investments in relation to the size of the economy.

One of the goals of this paper is to demonstrate that in developing countries acceleration of the economic development can be achieved with the use of instruments of foreign capital, and with the additional capital inflow from abroad. The purpose of foreign capital should be the achievement of higher investment rates, higher rates of national income, acceleration of economic development in comparison to the development which would be achieved by using only domestic capital.

The second objective of the research is, that different instruments of foreign capital inflow have different impacts on the macro-economic categories in global circumstances. In the paper has been analyzed impact of FDIs on economic development in BH economy. Also, it has been monitored the impact on: employment growth, budget revenues and export volume. Foreign investment can cause negative effects on domestic companies, if foreign investors squeeze domestic producers from the market, and become monopolists. The damage may be made also to the payment balance of the host country due to the high outflow of investors' profits or because of large imports of inputs.

2. Foreign direct investment and effects to economic development

The role and importance of foreign direct investment for the national economy [1] was primarily in improving the key macroeconomic indicators. FDIs are efficient form of usage of private savings in the process of funding economic development and the in reducing the gap between the planned investment and the local savings. Secondly, it is significant contribution of foreign direct investment in overcoming the gap of foreign trade of host country. Thus, the foreign investment is efficiently covering discrepancy between planned revenues and taxes collected, and the expenditures volume in the budget. FDIs are useful because they contribute in transferring managerial and entrepreneurial experiences. Finally, FDI today represent the main channel for the transfer of new technology between countries.

Foreign direct investment can bring many advantages for foreign investors [2] among which, the most important are: savings in transport costs (both, inputs and finished products), lower labor costs, available infrastructure, savings in customs costs and contribution on imported goods, closer position to the customers, the possibility of quick and efficient delivery, and availability of information about preferences and possibility for fast adoption of products in accordance with market requirements.

In particular, it is necessary to analyze the relationship between investment and economic growth. This interdependence can be seen by measurement of macroeconomic aggregates, i.e. in growth rate, movement of investment, foreign exchange level and trends and other. Changes are related to economic developments at the national level, on the basis of which it is possible to assess the success of development policy. When the positive elements have an increase, there are positive structural changes. In periods of crises the negative changes are strengthening (slowing the growth and investment, increasing unemployment rate, increasing in deficits, etc.) [3] investments generate significant positive effects on the economy of the host country. Their impact is recorded in two points: the quantitative growth, measured by the balance and the total inflow measured by gross domestic product, exports and domestic investment: and qualitative through the transfer to the host country the investment, trade, technology and financial flows. To determine the effects of FDI on economic growth of the host country is not an easy task. There are a large number of variables, where the effects are associated with specifics of each country, sectors of the economy and investment. Variables can be viewed from two aspects: first, they are supplementing

domestic factors of production and creating the conditions for new employment, and secondly they stimulate the development of the host country through technology transfer, manpower training, liaising with the local economy, and in enabling better presence of local companies at the world market.

The effects of FDI depend on the stage of economic development of the country, and these stages are divided in four phases [4]. In the first phase of development, the most important role is played by natural resources, and at this stage, no significant effects to the host country economy are visible. If the country has an economic development at the second phase, it will be recorded increasing of domestic investment, investing in public goods, communications and transport is present. The state in this phase, shifts its interest from natural resources to the production of labor-intensive goods, and the effects depend on the infrastructure and macroeconomic policy. The third phase covers the period when the development of innovation, knowledge management, organizational benefits, rationalization of production and investments are supported. All these variables have the effects on strengthening the competitiveness of local companies and appearance on new markets. The fourth stage is the highest stage of economic development and in this stage it has been recorded lot of post-industrial service company. The products are direct services and cross-border connections and effects are becoming more intense in this phase. Effects of foreign direct investment on the economic development of the host country depends on strategy which the country has chosen: import substituting strategy or export developing strategy. Studies have shown that investments are extremely important for economic growth of host country, where we want to examine: Does the inflow of foreign direct investment, increases or decreases the total investment volume in the host country?

If foreign direct investments are entering into the sector in which there is competition from domestic companies, there is a competitive struggle whose consequences might be the delaying in investment and exit of certain domestic companies from the sector. This will lead to reduction of the total investment in the sector and thus in the entire economy. If the FDIs are entering the new sector (primary, secondary, tertiary) then the total investment in the country will be increased.

3. Foreign direct investment and growth in the European Union

Total investments in the EU amounted slightly less than one-fifth (below 20%) of brut domestic product. The investment rate (I / Y) is stable in a long-term. The rate of investment in the more developed EU countries is lower and ranges up to one sixth, while in the new Member States and less developed investment rate, reaches up to one quarter of output [5].

The subjects of our interest are flows of foreign direct investment and their impact on the changes of gross domestic product, as an important macroeconomic indicator.

Table 1. Real GDP in the EU for the period in 2003-2015 (Eurostat 2016)

Year	Real GDP (in Billion EUR))	Growth (% GDP)
2003.	9.664,40	1,5
2004.	9.913,20	2,6
2005.	10.127,30	2,2
2006.	10.467,80	3,4
2007.	10.802,70	3,2
2008.	10.842,80	0,4
2009.	10.354,90	-4,5
2010.	10.564,30	2,0
2011.	10.740,30	1,7
2012.	10.697,70	-0,4

2013.	10.696,74	0,0
2014.	10.872,70	1,4
2015.	11.080,30	1,9

Gross domestic product and growth rate for the European Union is presented for the period from 2003 to 2015 (EU expanded from mid-2013). It is obvious that, last few years of the observed period, there is an instability in growth rates as a result of the impact of the global crisis and the debt crisis in Eurozone. Data on GDP and growth rates are presented in Table 1.

Real gross domestic product by 2008 is growing steadily. Following the economic crises in late 2008 and early 2009 there was a fall in the GDP value from 10,842.8 billion Euros, measured in 2008 to 10,354.9 billion at the end of 2009. Thus, in 2009 the economic activities decline due to the recession of the European economy. In 2010 there was a slight increase in GDP, but the rate was below the level that was realized in the economy by the end of 2008.

Since June 1, 2013. European Union expands to 28 members. In this period is observed stagnation of growth of real gross domestic product. According to Eurostat, real GDP in the period from 2013 to 2015 was growing more slowly (in 2014 there was a significant increase compared to 2013, while growth in 2015 points to the long-term stabilization and recovery from the crisis). If we compare only the GDP data from the 2008 with GDP data for 2015, we could conclude that the period of the recession has been behind us.

The change in gross domestic product for the period 2003-2015 in Table 1, are shown in Figure 1.

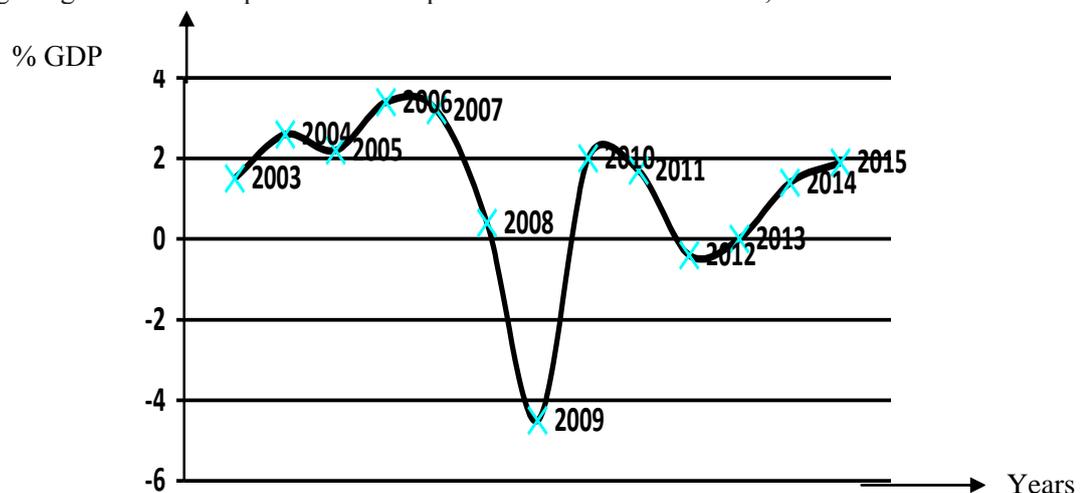


Figure 1. Gross Domestic Product changes (growth in %) (Authors 2016)

The graph shows that from 2003 to 2006, it was recorded a continuous growth and in 2007, before the escalation of the crisis in the US, the growth rate was of over 3%, what is for European circumstances extremely high. In 2008 the growth rate falls sharply to only 0.4%, and it is still positive, although the economy of the European Union, due to the expansion of the American crisis, was already operating in difficult circumstances. As stated, in 2009, it was recorded the decline in GDP, which is an indicator that the economy of the European Union was already in a serious economic crisis.

In 2009 in the European Union had a decrease of outflow, but also to somewhat higher FDI inflow, which, along with other factors, had positive impact on GDP growth in 2010. GDP growth from 2013 to

2015 indicates stabilization in economic developments in the EU, i.e. it was an indicator that the crisis is over.

Table 2 presents the inflows and outflows of foreign direct investment in the period from 2004 to 2015, and data for the first quarter of 2016 for the EU, and the total FDI stock per year of the observed period.

Table 2. FDI flows in millions of euros for EU-27 (Eurostat 2016, European Union, OECD Foreign Direct Investment Statistics, <https://knoema.com/OECD/FDIS2016/oecd-foreign-direct-investment-statistics> [6]).

Year	Foreign Direct Investment (FDI)	Foreign Direct Investment (FDI)	Stock (total value) FDI	
	Inflows	Outflows	Inflows FDI	Outflows FDI
	EUR millions	EUR millions	EUR millions	EUR millions
2004.	244.179	369.134	4.846,365	5.420,856
2005.	591.234	669.041	5.690,696	6.305,140
2006.	726.462	879.818	5.946,830	6.546,792
2007.	1,065.473	1,278.121	7.536,334	8.138,913
2008.	582.517	919.366	6.976,821	8.200,076
2009.	512.626	612.534	7.644,430	9.589,730
2010.	480.892	585.530	7.596,391	9.111,480
2011.	652.062	725.924	7.716,407	9.370,997
2012.	345.096	392.379	8.223,772	9.716,007
2013.	315.559	333,559	8.789,142	10.397,848
2014.	264.794	226.858		
2015.	494.272	508.522		
2016 Q1..	235.085	204.060		

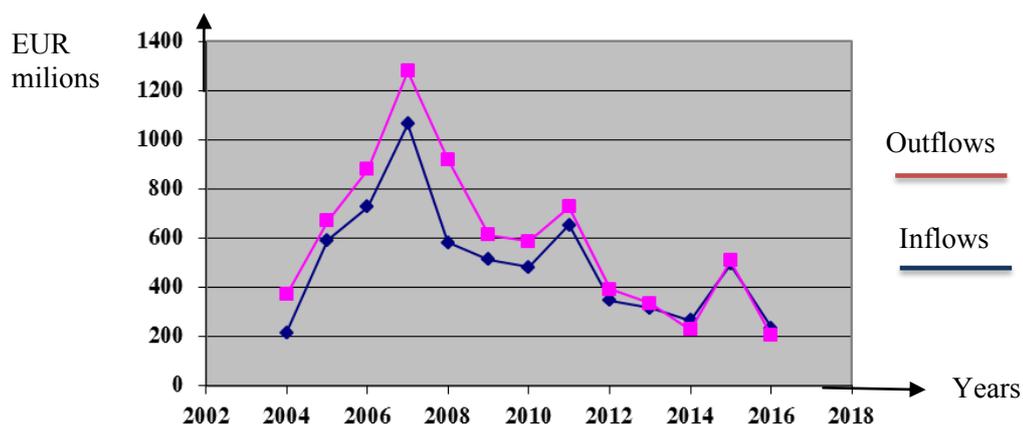


Figure 2. FDI inflow and outflow in EU (Author 2016)

From Table 2 and Figure 2, it can be seen, that inflows and outflows of foreign direct investment in the initial years of the period from 2004 to 2007, recorded steadily increase. If, we take year 2004 as the base year, then the outflow of foreign direct investment in 2005 grew enormously, from 369,134 million to 669,041 million euros, while the inflow increased from 244,179 million to 591,234 euros, i.e. over 100%. Upward trend continued until the end of 2007. During 2008, a decline in flows, in the inflow and outflow, of foreign direct investment was recorded due to the global crisis.

Therefore, the crisis which was present at global financial markets has the reflection on the economy of the Union. Being caused by mismatch of financial and real sectors of the economy, its effects were manifested in the decline in aggregate demand, slowing growth, deflation and rising unemployment. Regardless of the contagion of the crisis from the US financial markets, the European Union still has a close relationship with the US as the largest foreign trade partner, with which realized huge traffic of goods, services and capital, which is on a daily basis, significantly higher than one billion euros. Likewise, the EU continuously making efforts to: increase participation in world trade, achieve the growth of all forms of investment and innovation, and to make upgrade in entrepreneurship skills and to improve corporate social responsibility level.

It is indisputable that the EU countries, same as the most of the world economy, reduced investment activity during the financial crisis, especially outside its borders. Among others, by these measures they try to reduce the negative effects of the global economic crisis. Negative trend and big drop in foreign direct investment continues in 2009, in which the crisis escalated. Many of the world economies were temporarily closed because of concerns for internal economic situation. Similarly, in 2010 it was recorded negative inflows and outflows of foreign direct investment.

Since 2007, for the first time in 2011, the EU 27 noticed the recovery and growth of foreign direct investment. The growth was negligible and did not recover the overall level of investment, bearing in mind that foreign direct investments in 2007 were significantly higher, on the both sides, in inflows and outflows. In 2012, again the decrease of FDI flows was recorded in comparison to the previous year, due to the second wave of the global crisis and the specific financial and fiscal crisis, which includes the individual EU member states, especially Greece.

Flows of foreign direct investment vary each year and it has an increase in periods of growth, and decrease in period of recession. In the European Union, after a drop of 60% in 2008, foreign direct investment is recovering in 2009 to 28%, which is largely the result of growth of own capital and reinvestment of earnings (Eurostat, 2015).

There is an issue in displaying the stock of foreign direct investment, due to the lack of official data of FDI stock in 2012 for territory of the European Union. Since there are databases from previous years, the value of the stock in 2012 has been calculated as the average growth rate for all years back to 2004. Unlike foreign direct investment flows, which fluctuate over the year, the total stock of FDI per year is not decreased, but is constantly growing, and that fact shows that EU countries are attractive for foreign investment.

4. Impact of foreign direct investment on the economic development of Bosnia and Herzegovina

The main objective of the host country is to achieve long-term growth based on increased investments and on adoption new technologies with increased competitiveness of the products on the world market. Research has shown that economic growth can be most efficiently through the „greenfield“ investments, on which is mostly oriented the host country while attracting the foreign investment.

Investments for the renewal and increase of domestic capital, for keeping up with new technologies, are necessary prerequisite for making a long-term growth. Foreign direct investments are considered to be the best source of capital, and have an advantage over other sources of capital, such as debt, portfolio investment and foreign aid. The advantages of foreign direct investment, compared to credits are, that they do not represent a significant capital outflows in the future, which can disrupt the current balance and economic growth in the future. Also, the portfolio investments are seen as significantly instable. Foreign direct investment is related to investments in fixed assets and represent a long-term investment. Analysis of financial effects show that foreign investments represent the inflow of foreign resources which are contributing to increase of total investment in the host country. Their share in total domestic investment is

increasing, especially in countries in transition. In addition to the basic (initial) capital inflows, foreign direct investment is presenting also all reinvested profits of branches of foreign companies in a host country.

The effects of the total investment in the country depend on forms of investment. Greenfield [7] investments have a greater effect on the increase in the total investment than the mergers and acquisitions. Mergers and acquisition (M & A) are, in the essence of the change of ownership of existing resources, rather than creating new ones. Mergers and acquisitions have an impact on the increase of the total investment if the investors (foreign investors) are investing in new facilities to its subsidiaries. These forms of investment have an effect on raising the total investment stock, in the event that the result of basic investments by foreign companies, there is also an increase in investment from other foreign companies, or if there is an increase in domestic investment in the following way: First, foreign direct investment can increase the entry of other transnational companies (TNCs) that are in business connections with an initial investor, and who follow him in all other markets. Second, the investment of a company gives to other TNK signals that there is a favorable investment climate in the host country, at the same time showing that the investment risk is reduced. Third, foreign direct investment stimulates domestic companies to invest, if there is complementarity in the production of domestic companies and branches in the country. In such an environment, foreign affiliates and domestic companies do establish a stable connection, and from those conditions the domestic companies create additional motivation to implement new projects and invest additional funds. Fourth, the experience of the host country show that branches of foreign companies have a propensity towards investing more than domestic, and thus increase the investment in the host country.

4.1. Inflow of foreign capital into business and free zone in Bosnia and Herzegovina

Business zones (BZ) represent a space for wide variety of business activities. They operate and are managed by specialized team of professionals or a specific organization, and are formed as a result of organized development concept of the state, region or municipality. To the entities that operate within the business zone, are typically offered certain benefits, such as cheaper rent or annuity, various tax benefits, deferred payment options, assistance with exports of goods and services, faster and easier access to capital and so on.

Business zone can be organized and managed by the local government or regional organization, which is proved to be the most effective approach to managing and developing the business areas. Efficiency of the business area depends on the characteristics and imposed operating policies in the zone. So, business zones are a tool for the development of entrepreneurship and attracting investment, both domestic and foreign.

The free zone is part of the customs territory of a particular country, which is specially separated by fence and marked, in which the economic activities are performed under special conditions. Usually, these conditions are defined in detail by national laws on free zones. The users of these zones do not pay import duties and value added tax - VAT. Customs duties and tariffs are not charged on imports, and import of equipment that will be used for production and operations within a free zone, is exempted from customs and other duties. It is important to point out that investments in the free zone, transfer of profit and transfer of investment are not charged at all. Free Zone, first of all, implies more liberal regime of business. The need for regulatory standardization requirements for the formation, function and defining benefits for work in free zones is stated in the regulation, which was initially defined by the entities' Laws on Free Zones, and finally established by the Law on Free Zones BH (Off. Gazette of BH 37/02 and 137 / 03).

The relevant legislation that touches the issues of operations in free zones, refers to the Law on Customs Policy of BH, the Law on Free Zones in BH and the Law on foreign direct investment in BH.

Using the survey method, it was obtained the information on the operations of the free zones which are shown in Table 3 and refer to the basic elements of operations of free zones in Bosnia and Herzegovina.

Table 3. Foreign Trade Chamber Bosnia and Herzegovina 2016 The basic elements of operations of free zones in Bosnia and Herzegovina, www.komorabi [8]

Elements	YEAR (in 000 BAM)				Index 2006/03	Average Index
	2003	2004	2005	2006*		
1. The value of income	130.000	290.000	370.000	520.000	4,00	2,05
2. The value of exports	96.506	252.572	332.827	487.754	5,05	2,35
3. Share of export in total income of Zone in % (2/1)	74,2	87,0	90,0	93,7	1,26	0,8578
4. Number of employed	2.140	2.310	2.339	3.311	1,55	1,3475
5. The value of imported equipment	1.741	2.464	28.495	4.971	2,85	1,5130
6. Customs duty on equipment	192	271	1.709	298	1,55	0,9563
7. Paid customs duty on equipment	30	30	150	30	1,00	0,80
8. Export from BH (mil. BAM)	2.330	2.994	3.826	5.271	2,26	1,60
9. Share of export from Free Zones in total export of BH (%)	4,14	8,43	11,6	9,25		

*estimation

As it is evident from the presented table, the activity in the free zones in BH recorded high dynamics in the period 2003-2006. i.e. after 2002, when new regulation on free zones (FZ) was adopted, known under name “Bulldozer initiative”, in 2004 was recorded reducing in percentage of exports from free zones, from 75% to 50%. During this period, the value of production has increased 4 times, and the value of exports was increased 5.05 times. Number of employees has increased by 55%, while the share of exports in total exports of FZ in BH increased from 4.14% to 9.25%. At the same time, it is evident that the issue of quantification of duty-free imports of equipment have a relatively low effect of below 2,5 million of BAM.

4.2. An analysis of positive and negative impacts (loss-profits) for each of the analyzed entities (segments)

Impact of two regulatory measures was analyzed:

- a. harmonization of tariffs for industrial products and equipment, to the provisions of the Stabilization and Association Agreement (SAP)
- b. implementation of the provisions of the duty-free import of equipment to operate in the free zones (according to Article 176 of the BH Law on Customs Operations-BH LCO)

Table 4. Assessment and effects of regulations relating to free zones in Bosnia and Herzegovina regulation by stakeholders [9], (Estimation of author dr. A. Domazet 2007)

Stakeholders	Reduction of customs duties in accordance to SAP		Adjustments with Article 176 of SAP	
	Positive effects	Negative effects	Positive effects	Negative effects
1. Business community	Lower costs of R & D of about 0.75 million. BAM		Lower costs of R & D of around 0.825 mi-	

within Free Zone	annually The attractiveness for domestic and foreign investors, and higher export competitiveness		llion. BAM, the attractiveness for domestic and foreign investors, and higher export competitiveness	
2. Business community out the Free Zone	Lower costs of R & D of about 111.75 million. KM annually The attractiveness for domestic and foreign investors The higher export competitiveness			
3. BH Government	Gains in VAT revenues of 85.5 million BAM annually and gains from contributions and labor taxes 21.4 million. BAM	The loss of revenue from customs duties around 112.5 million. BAM	Gains in VAT revenues of 0.5 million and gains from contributions and labor taxes 1.26 million. BAM	The loss of revenue from customs duties around 0,83 million BAM
4. Employee	Gains in wages to 4,250 workers a total of 30.6 million. KM plus 15.3 million. KM of pension and health fund		Gains in wages to 250 workers a total of 1.8 million BAM plus 0.63 million BAM of pension and health funds	
5. Public sector	The inflow of funds for social funds of 2.2 million. BAM, solidarity for pension and health funds and social cohesion		The inflow of funds for social funds 90,000 BAM plus solidarity for pension and health funds	
Total	250,0 million BAM	112,5 million BAM	4,395 million BAM	0,83 million BAM
Net effect		137,5 million BAM		3,565 million BAM

It can be concluded that the business community engaged in free zones have no special effects, from implementation of Article 176 of the BH LCO, in the sense of benefit in the monetary aggregates (about 830,000 BAM) due to the low level of investment in equipment. If the level of investment changes, the benefits could be greater. Undoubtedly, the greatest impact would have the business community generally speaking, a measure of the horizontal reduction of customs duties on equipment originating from the EU, with effect from around 111.75 million BAM. The greatest loss is to the government with about 112.5 million BAM, i.e. in reduced revenues from customs duties, but it is mostly compensated through increased value and increased VAT, with the total effects of the 106.9 million BAM. Winners are employed with the effects of the new salary and contributions for pensions and health care of 45.9 million BAM.

5. Investigation of the influence of foreign direct investment on economic development Bosnia and Herzegovina

In this section will be shown the correlation between FDI inflows and GDP trends, as main determinants of economic growth. There is no doubt that foreign direct investments have a positive impact on the growth of gross domestic product, which is main hypothesis of this paper. In order to better examine the intensity and quality of the effects of FDI inflow to movements in gross domestic product, and other features of this relationship, it will be used two methods, regression and correlation analysis.

5.1. Regression method- theoretical approach

Regression methods are an integral part of any analysis of the data, which is concerned with describing the links between dependent and independent variables.

The objective of the analysis that uses this method is to find the model that is best suited to data, and at the most economical, but still acceptable way describes the relationship between a dependent variable and a set of independent variables that influence the first variable. In a great number of studies and experiments has been observed a connection between two or more variables. In such a case it is expected from the researchers to determine whether there is connection, and if yes, what are direct functional dependences between these sizes. The term "regression" and methods for finding connections between two variables is in use more than 100 years. The first usage was by Francis Galton, the famous British biologist, in 1908, when he studied inheritance. One of its conclusions was that the children of parents that are higher than the average are not as high as their parents. Thus, the "regression toward mediocrity" given this statistical method name. The term regression and its evolution mainly describes the statistical relationship between the variables. Special, free regression is a regression method that examines the connection between a dependent variable, Y, and one independent variable, X. The simple linear regression model is usually given in the form:

$$Y = \alpha + \beta X + \varepsilon, \quad (1)$$

where Y is the dependent variable, α is the intercept on the y-axis, tilt β is a real simple linear regression, X is the independent variable, and ε is a random annoyances. Depending variable is also called variable of response and independent variable is called explanatory variable, or predictor. The explanatory variable explains the causal variable changes in response. More generally presenting the regression model can be written as

$$Y = EY + \varepsilon, \quad (2)$$

where EY mathematical expectation of variable of response. When the EY is linear combination of the predictor X_1, X_2, \dots, X_k , then the regression is linear. If $k = 1$, the regression is simple linear. If the EY is non-linear function of the predictor X_1, X_2, \dots, X_k , the regression is non-linear.

It is necessary to thoroughly examine the evaluation of the linear connection between the two variables, and $Y_i X_i$, which has the form:

$$Y_i = \alpha + \beta X_i + \varepsilon_i, \quad i = 1, 2, 3, \dots, n \quad (3)$$

where Y_i is highlighted as *i*-observing in the line of observing the dependent variable Y, which may represent GDP, with X_i we marked *i*-observing of the independent variable X, which can be FDI. These data can be collected from the Central Bank of Bosnia and Herzegovina or the Agency for Statistics BH, in which case such data can be collected over time for the state and then this data is called time series. In such case "n" is the number of data, where it may be the number of years if the data is collected over time.

α and β are, as it was said earlier, slice and slope of regression line that describes a simple linear relationship between Y and X. These are the unknown parameters which are to be assessed on the basis of the data. Graphic data (X_i, Y_i) , $i = 1, \dots, n$, can on very illustrative way show the type of connection that empirically exists between these two variables. For example, if Y represents GDP and X represents available FDIs, then it could be expected a positive relationship between these two variables. If α and β were known, we could draw a straight line $\alpha + \beta X_i$. It is clear that to all the data (X_i, Y_i) do not belong to straight line, $\alpha + \beta X_i$. In fact, equation (1) shows the difference between each value for Y_i and the corresponding values of $\alpha + \beta X_i$ that occurs due to disturbances of ϵ_i .

In the analysis of the representativeness of the regression line it is used the coefficient of determination. The coefficient of determination is a relative measure of the regression line adaptation to empirical data. Total deviation of empirical data (variable y) from the average value of the variable y is disassembled to part of deviation interpreted by regression model (the difference between the regression values and average values) and the part of the not interpreted in the model (the difference between the measured values and regression values). The coefficient of determination takes values in the interval 0 and 1.

$$R^2 = \frac{a \sum y + b \sum xy - n\bar{y}^2}{\sum y^2 - n\bar{y}^2}, \text{ for the law } y = a + bx + \epsilon_i \tag{4}$$

With the usage of regression analysis, it has been confirmed a relation that explains the nature of dependence between two variables, but if we want to determine the degree of this dependence it is necessary to use the correlation analysis. The correlation coefficients represents the measure of connection between two variables. Correlation studies the connection and mutual relation between phenomena. There are several correlation coefficients, which are used in different cases. In practice, working with linear models it is commonly used Person's correlation coefficient. Person's correlation coefficient is used in cases where the observed variables are linear and are normally distributed. Values of Person's correlation coefficient ranges from +1 (a perfect positive correlation) to -1 (perfect negative correlation) and is marked with r.

The simplest case of describing the analytical connection between the two variables is if the diagram wastage determine that the relationship is linear. In such cases, it is calculated so-called Pearson's coefficient of simple linear correlation (code: r). Assuming that we have a total of n ordered pairs (x_i, y_i) , the values of the variables X and Y, the coefficient r is calculated by the formula:

$$r = \frac{\sum_{i=1}^n x_i y_i - \frac{1}{n} \sum_{i=1}^n x_i * \sum_{i=1}^n y_i}{\sqrt{\sum_{i=1}^n x_i^2 - \frac{1}{n} (\sum_{i=1}^n x_i)^2} * \sqrt{\sum_{i=1}^n y_i^2 - \frac{1}{n} (\sum_{i=1}^n y_i)^2}} \tag{5}$$

It can be shown that the coefficient r can take on all the values from the segment [-1, 1], and therefore, its minimum value is equal to -1, and the largest is +1. Correlation analysis interprets a special sign of Pearson's coefficient of simple linear correlation, especially its absolute value. The absolute value of the correlation coefficient (code: r) indicates the strength of linear relationships among variables. What is r closer to zero, the connection is weaker, and what is r closer to the number one, the connection is stronger. Person's correlation coefficient is based on a comparison of the actual impact of observed variables to one another in relation to the maximum possible impact of two variables for the samples with a maximum of 30 elements.

To calculate the correlation coefficient is required to have three different sums of squares: the sum of squares of variable X, the sum of the squares of variable Y and the sum of the products of the variables X and Y, that is:

$$r = \frac{\sum_{i=1}^n (x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum_{i=1}^n (x_i - \bar{x})^2 * \sum_{i=1}^n (y_i - \bar{y})^2}} \tag{6}$$

Standardized measure of the strength of the statistical link between the phenomenon presented in two quantitative variables is the correlation coefficient [10]. Since it is an arranged phenomena, the data can be displayed in the coordinate system. A set of these points is called a scatter diagram [11] from which one can see the dependence between variables. The correlation between phenomena can be positive and negative [12]. In case of a positive linear correlation, if one variable is increasing corresponding linear increase in other variables will appear as well. If negative correlation is complete, sign r takes the value of -1.

5.2. *Research using single linear regression model*

In this part of the work it is carried out statistical and quantitative analysis of the impact of foreign capital in the economic development of Bosnia and Herzegovina. This model applies a single linear regression [13] In these models, the dependent variable is GDP, which is the function of foreign direct investment (FDI).

The model is expressed as follows:

$$Y = a + bX, \tag{7}$$

where is:

- Y - dependent variable,
- X - independent variable,
- a and b - the parameters.

Based on the above, the first application of the single linear regression model in this study can be expressed as follows:

$$GDP = f(FDI), \tag{8}$$

- GDP - dependent variable,
- FDI - an independent variable.

Data of the Central Bank of Bosnia and Herzegovina is used in the application of the single linear regression, i.e.: GDP = f (FDI).

Table 5. The data in a single linear regression model (in millions of euros) (Central Bank of BH, July 2016 Author 2016)

YEAR	Xi (FDI)	GROWTH (% FDI)	Yi (GDP)	GROWTH (% GDP)	XY	X ²	Y ²
2009	180	-73,68	12.700	-2,90	2.286.000	32.400	161.290.000
2010	307	70,56	13.000	2,36	3.991.000	94.249	169.000.000
2011	357	16,29	13.400	3,07	4.783.800	127.449	179.560.000
2012	307	-14,00	13.400	0,00	4.113.800	94.249	179.560.000
2013	208	-32,20	13.700	2,24	2.849.600	43.264	187.690.000

2014	399	91,80	14.000	2,19	5.586.000	159.201	196.000.000
2015	244	-38,90	14.600	4,28	3.562.400	59.536	213.160.000
Σ	2.002		94.800		27.172.600	610.348	1.286.260.000

Figure 3 shows a diagram of FDI and GDP growth (in %) per year for the period from 2009 to 2015.

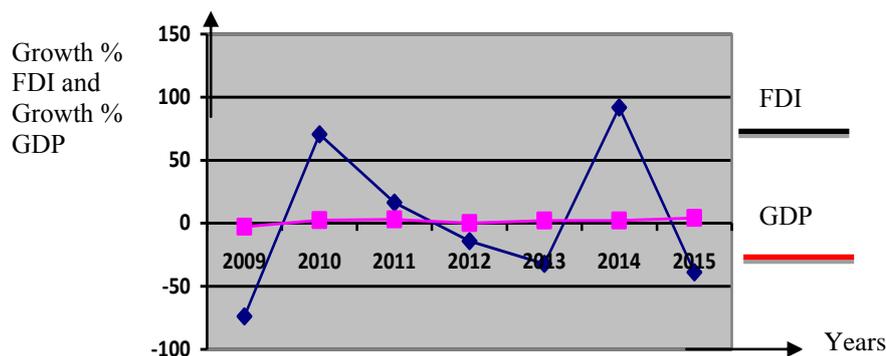


Figure 3. FDI and GDP growth (in %) per year for the period from 2009 to 2015 (Author 2016)

The diagram shows that, in Bosnia and Herzegovina is measured a permanent decline in foreign direct investment from 2010 to the 2013. Small change for the better was in 2014, but after that year, the trend of further decline in foreign capital inflow continued.

Analyzing the regression line for the dependent variable (GDP), which is shown as follows:

$$Y = a + bX,$$

and follows:

$$a = \bar{Y} - b\bar{X} \tag{9}$$

By inserting the data into forms, it follows:

$$\bar{X} = \frac{1}{n} \sum_{i=1}^n X_i = \frac{2002}{7} = 286$$

$$\bar{Y} = \frac{1}{n} \sum_{i=1}^n Y_i = \frac{94800}{7} = 13.543$$

Using the following formula it is calculated b:

$$b = \frac{\sum_{i=1}^n X_i Y_i - \bar{X} \sum_{i=1}^n Y_i}{\sum_{i=1}^n X_i^2 - \bar{X} \sum_{i=1}^n X_i} = \frac{27.172.600 - 286 \times 94.800}{610.348 - 286 \times 2.002} = \frac{59.800}{37.776} = 1,583$$

Using formula (9) it is calculated the a:

$$a = \bar{Y} - b\bar{X} = 13.543 - 1,583 * 286 = 13.090$$

Based on the above, linear regression for the dependent variable is:

$$Y = a + bX = 13.090 + 1,583 * X$$

For this research function of GDP is:

$$GDP = a + b * FDI = 13.090 + 1,583 * FDI$$

The coefficient of determination is calculated using the formula (4):

$$R^2 = \frac{a \sum y + b \sum xy - n \bar{y}^2}{\sum y^2 - n \bar{y}^2} = \frac{13.090 \times 94.800 + 1,583 \times 27.172.600 - 7 \times 13.543^2}{1.286.260.000 - 7 \times 13.543^2} = 0,024$$

Since the coefficient of determination is less than 1, we can conclude that the points are scattered around the line (y). Which means that the higher the linear dependency is between X and Y, if the coefficient of determination closer to 1, and vice versa.

The coefficient of correlation is calculated using the formula

$$r = \sqrt{R^2} = \sqrt{0,024} = 0,155$$

The absolute value of the correlation coefficient (r) indicates the strength of linear relationship between the variables. Value of r closer to zero shows that the connection is weaker, and opposite, if closer to one, the connection is stronger. The correlation in this research is positive, indicating that the linear increase in one variable corresponding to a linear increase in other variables.

Since the calculated correlation coefficient is 0.155, we can conclude that there is a slight influence of independent variable (FID) on the dependent variable (GDP). Linear regression shows that the increase in foreign direct investment in the fixed assets of 1 million euros, leads to an increase in GDP in value of 1,583 million euros.

Conclusion

The foreign capital may affect economic development in three ways. First, it enlarge the domestic investment rates. To the extent that a country has a mismatch between savings and investment as a result of balance of payments deficit, the inflow of foreign capital can help boost investments in the country. Second, it increases business efficiency. The increase in productivity is resulting from the increase in efficiency, based on the transfer of experiences, new knowledge and new technologies that are brought in with foreign capital. Third, it stimulates the economic system and the business. The existence of efficient companies in the market can stimulate local competitors to innovate business in order to survive in the market. In this way, it increases the quality and diversity of local producers in a country that is the recipient of capital.

Acceleration of the economic development and the rapid pace of the development in Bosnia and Herzegovina is linked to the rate of accumulation. Accumulation is one of the main factors of development. The main problem of modern economic systems of developing countries is to ensure the mass and the rate of accumulation that are sufficient to finance investments leading to economic development. Second goal is maximizing the efficiency of accumulation. The main issue of our country, which is preventing the development of the economy, is not that the economy is not able to produce, but that the fact that capital ends up in the hands of those social classes who use the capital on unproductive manner. In addition to the investments, that are very important factor that determines the speed of economic growth and development, there are other factors of the development such as: better and more efficient organization, better and more efficient use of production capacity, the higher level and quality of

workforce education, on time application of new technologies and technical progress and so on. The basic criterion for determining the speed of development of the economic system is, apart from the increase in per capita income, also the amount of investments together with other factors which are available means of achieving economic development for society as a whole.

Based on the survey results, the positive impact of foreign capital on economic development is a proven by statistical-quantitative analysis, where it is recorded a positive correlation between FDI and GDP. Calculated the correlation coefficient is 0.155, so we can conclude that there is a slight influence of independent variable (FDI) on the dependent variable (GDP). However, a little correlation coefficient shows that foreign capital has an insignificant impact on the enabling and acceleration of the economic development in Bosnia and Herzegovina, but also that it is not the basic premise of the generation and acceleration of the economic development of Bosnia and Herzegovina. In addition, the economy of BH has no investment capacity, and must properly provide environment for the inflow of capital, which will be directed into those branches that will achieve the greatest benefit for the progress of the society as whole.

Different instruments of foreign capital inflows have different impacts on macroeconomic ratios of Bosnia and Herzegovina in global circumstances. This is a proven by usage of statistical-quantitative analysis, and it has been proven that FDIs have different effects on economic development in different periods. Positive correlation has confirmed the positive impact of FDI on economic development of BH. Survey method has proven that the instruments of capital inflows through the free zones, in the reporting period, showed outstanding results, i.e. the value of production increased 4 times, and the export value was higher 5.05 times, the number of employees has increased by 55%, while the share of exports from the free zones, in total exports of Bosnia and Herzegovina, increased from 4.14% to 9.25%.

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