FOREIGN DIRECT INVESTMENTS AND THEIR IMPACT ON DEVELOPMENT OF ECONOMIC INDICATORS: EVIDENCE FROM SLOVAK REPUBLIC

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Abstract: The issues of foreign direct investment and their impact on the country's economy is still a much-discussed topic. On the example of the Slovak Republic, we will try to analyze the influence of FDI inflow on selected economic indicators. In addition to the FDI inflow, we will consider the unemployment rate, the average nominal wage, and GDP in Slovakia for selected indicators. Using the Pearson correlation coefficient and regression analysis using linear regression, we will analyze the significance of the interrelationships between variables based on data for 15 years (from 2003 to 2017).
Keywords: foreign direct investments, economic growth, average wage, unemployment, Pearson correlation coefficient, Slovak republic.

1 Introduction

There are several opinions and definitions of foreign direct investment (FDI) in the literature. Foreign direct investment refers to the purchase of foreign assets for control purposes. Under control, we understand the management of the company whose assets have been purchased (Dudas, 2010).

Foreign direct investment can also be defined as the longer-term interest of a resident entity in one country by a company located in another country. Longer-term interest is the existence of longer-term relationships and the significant influence of the investor on the management of the company. Direct investment represents both initial investment and all subsequent capital flows within companies. These features distinguish FDI from portfolio investment.

Portfolio investments are investments in a company where the investor does not interfere with the management of the company, but his interest is merely the appreciation of his share. In determining the existence of a direct investment relationship, the 10% share capital or enterprise voting power criterion is used in accordance with international standards (Dudas, 2010).

In addition to the above definitions, FDI is seen as an effective tool needed to boost the economy's performance. FDI inflows into countries have a positive impact on GDP developments, unemployment rates, labor productivity, the contribution of new technologies and production processes, know-how and increased domestic human capital skills.

The Slovak Republic is booming in investment. In the 1990s, developments in FDI area was lagging. In particular, the following political developments beginning 2000s, were quite rapid and thus the investment started to develop the economy of the country rapidly, making Slovakia one of the most developing countries in the euro area over the past ten years.

This paper aims to analyze the impact of FDI on the country's economic indicators. Based on the Pearson correlation coefficient r we first determined the intensity of the relationship, respectively. the strength of statistical dependence between FDI and variables - unemployment rate, average nominal wage and GDP in Slovakia. In the second step, we performed a regression analysis using linear regression, which tested the quality of the relationship between FDI and variables unemployment rate, average nominal wage and GDP in Slovakia. As for the time series of all 4 variables, we used the National Bank and the Statistical Office of Slovak republic data. The test period was 2003 to 2017, indicating that the number of variables for statistical testing was 15 altogether.

2 Literature review

In the past, goods exchange played a major role in the development of business activities, with changes in capital movements later. The international movement of capital has reached a rapid pace, globalization has facilitated this process of growth and expansion. It has brought simplification and acceleration of processes. International capital flows into different economies in different economies, including foreign direct investment (FDI). FDI plays a very important role in international business - it represents international capital movements and external sources of economic and economic growth of the economy (Dudas, 2010). Being also an additional source of funding FDI can be called the up-to-date driver for development (Kaminska, 2016). This is a very complex process, as there are different political, legal, economic, and cultural environments in each country. Historically, we can say that the first mention of FDI goes back to the end of the 1950s. In the 1970s and 1980s, the boom began to grow. Today, they are part of the economy of countries where the FDI indicator is one of the main indicators of the national economy.

FDI is defined as a long-term investment of a foreign direct investor in an enterprise resident in another country's economy, not in a foreign investor's home country. The relationship of foreign direct investment consists of a parent company and foreign affiliates, which together form a multinational corporation (Fabus, 2015). Under the constant share we understand the existence of the long-term nature of the direct investor and the direct investment enterprise, its significant contribution to the management of the business. The criterion that is in line with international standards to determine the existence of a direct investment is a 10% share of the core capital or voting rights in an enterprise.

In the theory of FDI motivation of multinational corporations, Dunning creatively divides FDI into resource motive, efficiency seeking, market seeking and strategic asset seeking four motives (Dunning, 2001), which becomes the basic paradigm for studying OFDI motivation and behavior.

FDI can have a significant impact on regional development. On the one hand, FDI tends to focus on advanced regions and thus increase regional disparities, on the other hand, it can be a significant exogenous impulse for the development of regions. FDI inflows alone do not provide for any equalization of regional disparities, but for developing countries it is one of the basic instruments for achieving economic growth. It is economic growth that is one of the basic conditions for improving equality and convergence of regional disparities (Blanc-Brude, et.al. 2014).

The issue of investment attractiveness determinants is currently a topic often dealt with in many publications of both Slovak and foreign authors. The significance of factors affecting investment attractiveness is dealt with for instance by A. Bevan (2000, 2004), S. Estrin (2000, 2004) and K. Meyer (2004), who divide these factors into two basic groups (political and economic factors) and differentiate between factors affecting host and domestic economies. S. Brakman and H. Garretsen (2008) seek the main reasons leading companies to foreign investments as well as ways how a foreign market can be entered. Other authors (e.g. Dudas 2010; Fabus 2017, 2018; Csabay, 2018) deal with individual factors and their impact on economic development, respectively economic growth, and motivation of investors, economic and political conditions created in a host country. If a foreign investor enters the market, it contributes to the formation of the host country's gross domestic product by generating a profit from which to pay taxes. Theoretical background of investment attractiveness and the theories of creation, respectively motivation of FDI creation and movement were based on leading foreign authors. The best known is J. H. Dunning (1979, 2001) and his eclectic theory based on three

categories of factors shaping the decision-making of investors. Dunning introduced a well-known OLI paradigm and motives which are essential in decision-making on investment, like advantages resulting from ownership and ownership rights, advantages resulting from information on human resources and new information and specific advantages resulting from a locality (Dunning, 1977, 1979, 2001). As far as Slovak authors are concerned, we can mention J. Tancosova (2013, 2014), who analyze determinants and location, and their significance in relation to an access to FDI, and T. Dudas (2010), who deals with the significance of workforce.

Among other things, foreign direct investment also supports the development of national economies, increases employment in the regions and has a positive impact on the trade balance. Foreign investors are entering new markets because of sales diversification. Similarly, due to a skilled and cheap labor force, either because of increased turnover or the opportunities of new markets. In terms of employment, FDI entering the host country has a significant impact on maintaining or increasing domestic employment, growth in labor skills and wage growth.

The wage level is considered by several authors to be one of the most important factors influencing the decision to invest in a large number of economic sectors in transition economies. Dunning (1979) argues that labor costs are a significant variable for foreign direct investment investors in 1970, and remains a significant variable over the 1990s, along with the existence of a skilled and skilled workforce. (Paul, et al., 2014)

Bobenič Hintošová, A., Bruothová, M., Kubíková, Z., & Ručinský R. (2018) have identified the level of gross wages and the share of labour force with achieved at least secondary education, as the most significant determinants with the positive effect on FDI inflows.

3 Methodology

The correlation is a statistical method that compares the dependencies between the two variables X and Y. It represents a value that examines whether it is just a random event, or that the values compared are dependent and to what extent. The correlation value is expressed numerically, ranging from 1, positive correlation, to -1, negative correlation. Thus, a positive correlation result is a direct dependence, while a negative correlation result is a dependency of the indirect. Thus, values ranging from -0.5 to +0.5 are defined as a weak linear dependence. The closer the resulting value of the compared phenomena to 0, the less dependency between the variables compared to each other. Thus, the correlation coefficient measures the magnitude and strength of the dependence between the two interval variables.

Pearson's correlation coefficient expresses the degree of dependence between two variables. The reader is called covariance. The calculation is feasible only for those variables that are specified at certain intervals. If the correlation between two variables changes as 0.1, this correlation is called trivial. If the correlation has reached 0.1-0.3, we know that there is a small correlation between the two variables, which also indicates a small dependence. The correlation value between 0.3 and 0.5 expresses the mean dependence if the correlation exceeds 0.5, then we are talking about a large dependency. The correlation of 0.7-0.9 represents a very high correlation and thus a high dependence of one variable from the other variable. If the correlation is greater than 0.9, we call it perfect dependence. However, when calculating the correlation, we must also consider whether we compare variables of a similar nature, otherwise the correlation is irrelevant (Hindls, 2007). The formula for calculating the Pearson correlation coefficient is as follows:

$$r_{XY} = \frac{s_{XY}}{\sqrt{s_X^2 s_Y^2}},$$

$$s_{XY} = \frac{1}{n-1}\sum_{i=1}^{n}(x_i - \bar{x})(y_i - \bar{y}), \qquad s_X^2 = \frac{1}{n-1}\sum_{i=1}^{n}(x_i - \bar{x})^2, \qquad s_Y^2 = \frac{1}{n-1}\sum_{i=1}^{n}(y_i - \bar{y})^2,$$

$$r_{XY} = \frac{n \cdot \sum_{i=1}^{n} x_i y_i - \sum_{i=1}^{n} x_i \cdot \sum_{i=1}^{n} y_i}{\sqrt{\left(n \cdot \sum_{i=1}^{n} x_i^2 - \left(\sum_{i=1}^{n} x_i\right)^2\right)\cdot\left(n \cdot \sum_{i=1}^{n} y_i^2 - \left(\sum_{i=1}^{n} y_i\right)^2\right)}}.$$

Formula 1 Pearson correlation coefficient

The determination coefficient represents the increased value of the Pearson correlation coefficient. The value of this coefficient indicates in what size the variability of one variable determines the variability of the other variable. It is expressed as a percentage. For example, if r = 4, the coefficient of determination will be r2 = 0.16; 0.16x100 = 16%. This means that 16% of the variability of one and the other variable is determined together.

The Spearman coefficient is used for ordinal or interval variables that do not have a classical distribution. If we use interval variables to calculate, they must first be converted to ordinal variables. The value of the calculation results does not change and is expressed between -1 and 1.
Formula to calculate the Spearman coefficient:

$$R = 1 - \frac{6\sum d_i^2}{n(n^2 - 1)}$$

Formula 2 Spearman coefficient

In this paper we are using basic statistical data from Statistical office of Slovak republic and Slovak National Bank from the period of 2003-2017. With this dataset we analyse FDI and economic indicators using the Pearson correlation coefficient, which examines the dependence between selected economic indicators of Slovak economy.

4 Empirical results and discussion

Using the Pearson correlation coefficient r we first determined the intensity of the relationship respectively. the strength of statistical dependence between FDI and variables - unemployment rate, average nominal wage and GDP in Slovakia. In the second step, we performed a regression analysis using linear regression, which tested the quality of the relationship between FDI and variables unemployment rate, average nominal wage and GDP in Slovakia. As for the time series of all 4 variables, we used the National Bank and the SO SR data. The test period was 2003 to 2017, indicating that the number of variables for statistical testing was 15.

The inflow of FDI generally contributes to the creation of new jobs and thus to the problem of unemployment. Unemployment in Slovakia started to decline in the same period when the first major foreign investments started to emerge in Slovakia.
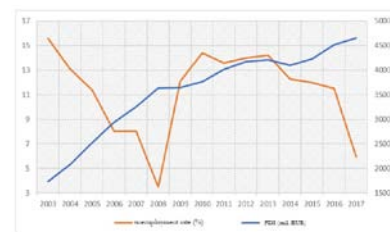

Figure 1 FDI inflow to Slovakia and unemployment rate in Slovakia in 2003 – 2017
Source: Authors' results

The results of the correlation analysis pointed to the fact that between FDI and the unemployment rate there is only a weak negative dependence (correlation coefficient r = - 0.177) with p-value at p = 0,

528 > 0.05 which further indicates that it is statistically non-significant relationship, meaning there was no statistically significant relationship between the FDI inflow and the unemployment rate between 2003 and 2017, with a change in FDI inflows likely to result in a change in the unemployment rate. We can assume that this was mainly due to the fact that other economic factors are also affecting the development of unemployment and FDI is only one of them.

Correlations Marked correlations are significant at p < ,05000 N=15		
	FDI	Unemployment rate
FDI	1,0000	-,1770
	p= ---	p=,528
Unemployment rate	-,1770	1,0000
	p=,528	p= ---

Table 1 Result of correlation analysis between FDI and unemployment rate 2003 - 2017
Source: Authors' results

We examined the quality of variables - FDI and the change in the rate of unemployment in Slovakia through regression analysis and / or regression analysis. using the linear regression method, the time series being 2003 to 2017. Figure 2 shows the result of the regression analysis in which a very slightly decreasing trend line with the equation can be observed: unemployment rate = 13.758 – 0.00007 * FDI (ie unemployment rate of 13.758%, while FDI of EUR 1 million causes only a slight reduction of unemployment by 0.00007). Also, the view of data point distribution (data points are scattered unevenly around the regression line) indicates that the relationship between the variables being examined is very weak. In addition, the determination coefficient $r2 = 0.0313$ (ie 3.13%) reaches a very low value, which means that the test value of this test is very low (this model explains only 3.13% of the relationship between the variables examined).
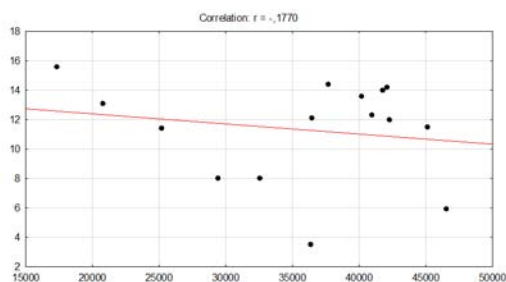

Figure 2 The relationship between FDI inflow and unemployment in Slovakia in 2003-2017
Source: Authors' results

An important positive effect of foreign direct investment is the economic growth expressed by the growth of gross domestic product, where GDP represents the value of goods and services expressed in monetary terms over a period of time in the territory of the state. This indicator is also used as an indicator for measuring the performance of the economy.
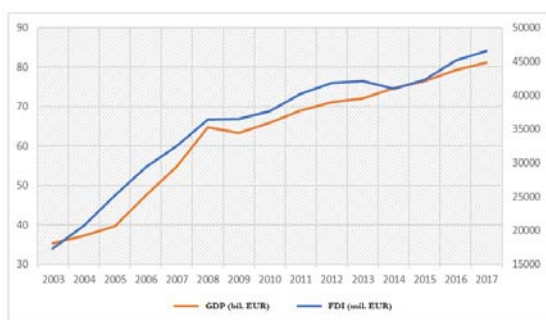

Figure 3 FDI inflow to Slovakia and GDP in 2003 – 2017
Source: Authors' results

In the case of the dependence of GDP and FDI in Slovakia, the correlation coefficient r = 0.9865, which indicates a strong, positive, statistically significant correlation between FDI and GDP variables in Slovakia in the period under review (p = 0.000 < 0.05), t. j. the inflow of investment from abroad has significantly affected the GDP growth in Slovakia.

The results of the regression analysis refer to a significantly increasing trend line with the GDP equation = 0.48269 + 0.00173 * FDI. The regression coefficient a0 = 0.48269 (the so-called level constant) represents the GDP value at zero inflow of FDI, the coefficient a1 (the so-called regression line directive) indicates the change in GDP values corresponding to the unit change of FDI (ie GDP increases by 0,00173 bil. EUR with the inflow of 1 mil EUR = 1.73 mil. EUR).

It is also apparent from Figure 4 that the observation points are evenly distributed around the regression line, suggesting that the regression analysis's predictive power is high. Thus, we can say that the regression analysis confirmed expectations about the positive impact of FDI inflows on GDP growth in the period under review. Also, the determination coefficient $r2 = 0.9732 = 97.32\%$ with a very high value confirms that the test value of this test is very high.
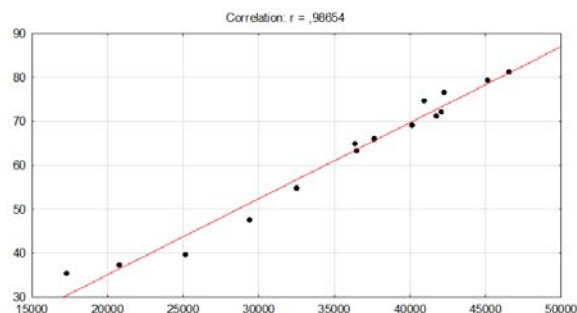

Figure 4 The relationship of FDI inflow and GDP in Slovakia in 2003-2017
Source: Authors' results

In the case of the last investigated dependence, the results of the correlation analysis also confirmed a strong, positive, statistically significant dependence between the examined pair of FDI variables and the average nominal wage in Slovakia (r = 0.9901 →1; p = 0.0000 < 0.05). Thus, the inflow of foreign investment into Slovakia was significantly affected by the increase in the average nominal wage in the period under review.
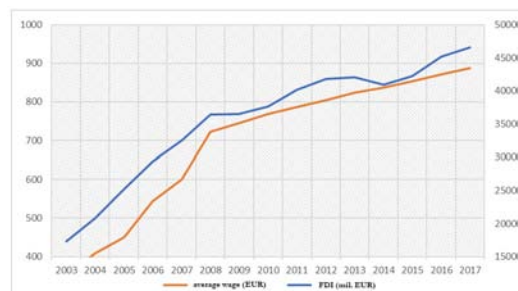

Figure 5 FDI inflow to Slovakia and average wage in Slovakia in 2003 – 2017
Source: Authors' results

The results of the regression analysis, respectively. linear regression with regression line equation: average wage = 0,02009 * FDI - 14,49 speak of growing trend of average nominal wage depending on inflow of foreign investment in Slovakia (coefficient a1 = 0,02009, which represents increase of average nominal wage by 0,02009 EUR for FDI of 1 mil EUR). As further seen from Figure 5, the data points are equally spaced around the regression line and point to the high repetition

capacity of the regression analysis (the determination coefficient $r2 = 0.9803 = 98.03\%$, thus the model used explains up to 98.03% of the relationship between monitored variables).
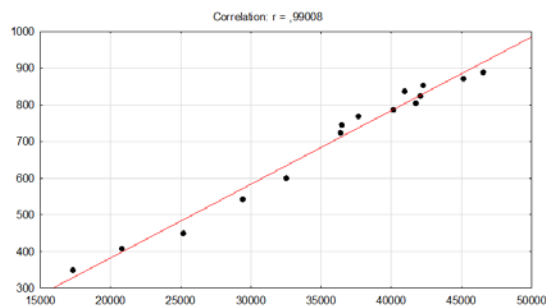

Figure 6 FDI inflow and average wage growth in Slovakia in 2003-2017
Source: Authors' results

5 Conclusion

In the paper we dealt with the relationship between FDI and Slovakia's economic growth represented by selected indicators. We wanted to find out how the inflow of FDI affects unemployment. Governments advocate that FDI is also beneficial in reducing unemployment. We do not agree with this statement, because our research has brought results that, with zero FDI inflows, the unemployment rate reaches 13.758%, while FDI of 1 mil. EUR only a slight reduction in unemployment of 0.00007. Also, the view of data point distribution (data points are scattered unevenly around the regression line) indicates that the relationship between the variables being examined is very weak. There are several studies that deal with empirical research into the relationship between GDP and FDI and confirm the results of our research. In the case of the dependence of GDP and FDI in Slovakia, the Pearson correlation coefficient reached 0.9865, which indicates a strong, positive, statistically significant correlation between FDI and GDP variables in Slovakia in the period under review. This means that the inflow of foreign investment has significantly affected the GDP growth in Slovakia in the period under review. There is a dependence where FDI inflows have a positive and important impact on GDP growth. Another relationship examined was the relationship between average nominal wages and FDI. Here, too, the hypothesis of dependence between the pair of variables examined was confirmed: FDI and the average nominal wage in Slovakia. Thus, the inflow of foreign investment into Slovakia was significantly affecting the increase in the average nominal wage in the period under review. The results of the regression analysis, respectively the linear regression with the regression line equation speaks of the growing average nominal wage trend depending on the inflow of foreign investment into Slovakia.

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Primary Paper Section: A

Secondary Paper Section: AH