

# CORRELATIVE ANALYSIS BETWEEN FDI AND GDP IN THE REPUBLIC OF MACEDONIA

PHD Candidate: Elsana Aqifi elsanaejupi@yahoo.com

STATE UNIVERSITY OF TETOVO

**Abstract:** The entry of FDI in the country brings with it a number of effects on the host countries, starting from the local workforce through increased employment opportunities, higher wages by foreign companies; the effect of the transfer of resources, where foreign firms can contribute by providing capital, technology and management; effects on trade and balance of payments, where the balance of payments benefits from any capital inflow and FDI increases competition in the country forcing domestic companies to bring better quality products and services as well as technology and more efficient administration.

No doubt that for Macedonia these investments are very important as a country in transition, which should follow the footsteps of neighboring countries, which benefited from these investments, offering, above all, a genuine climate of investment through improvements in implementation of structural economic reforms, reforms in the legislative sector, elimination of corruption, organized crime, security of property and sustainable political stability, reaching a compromise for the name with Greece and improving relations with other neighbors. The purpose of this paper is to show the correlative analysis between FDI and GDP in the Republic of Macedonia and some EU countries from 2000 – 2009. The results of this paper show us a significant positive correlation between FDI and GDP in the Republic of Macedonia. The coefficient of determination  $R^2 = 0.317$ , indicating that 31.7% GDP is dependent on the inflow of foreign direct investment in the country and 68.3% by other factors.

**Keywords:** FDI, the country benefits from FDI, GDP, correlation analyses

---

## I. INTRODUCTION

### Foreign direct investment and economic growth

Many studies show a positive correlation of FDI and economic growth. This can be evidenced by the fact that the countries, which have attracted more foreign direct investment associated with higher economic growth. With the development of economic globalization, FDI are increasingly being recognized as an important factor in the economic development of countries. The largest increase occurred in recent years, which has resulted from several factors, especially the more open attitude of governments to investment inflows, privatization and the growing interdependence of the world economy. Attitudes and government policies on FDI, as well as its characteristics have changed significantly over time.

Different studies provide different effects of FDI on economic growth. A recent survey of the literature of FDI, Hanson (2001), argues that evidence for FDI to generate positive effects for the host countries are weak. In a summary of micro data on the effects of FDI in economic growth, Gorg and Greenwood (2002) conclude that the effects are mostly negative. Lipsey (2002) takes a more favorable view of literature review of micro and argues that there are positive effects results.

But a study by Laura Alfaro (2003) at Harvard Business School, about FDI and economic growth if it is an important sector of investing foreign investors or not, has come to the conclusion that the effect of FDI on economic growth depends on the sector in which to invest. This study shows that FDI flow into different sectors of the economy, in the primary sector, manufacturing sector and in the services sector, which exert different effects on economic growth. FDI in the primary sector tend to have a negative effect on economic growth, while FDI in the manufacturing sector have a positive effect. Regarding to FDI in the services sector there is no clear evidence.

But from another study done on FDI to by Selin Sayek (2006) at Bilkent University, the results show that the same level of growth of FDI, regardless of the reason for that growth, generates three times more economic growth in countries financially more developed compared to countries with weaker financial development.

There is no doubt that FDI and economic growth have a positive relationship, but it is important that especially developing countries, it is Republic of Macedonia, to ensure an environment of sustainable economic, political and legislative framework to attract more FDI following steps of other countries who benefited from the advantages of these investments, but analyzing which sectors they will have the greatest effects on economic growth.

## **II. METODOLOGY**

For this research is using the Coefficient of determination and the Correlation coefficient of FDI and GDP in Macedonia and some EU countries, that best express the interdependence between these variables. In economic theory and empirical analysis found that there is interdependence

between FDI and GDP. Interdependence between these variables will count through parabolic regression functions and Coefficient of determination and correlation coefficient.

These coefficients are calculated according to the following formula:

**Coefficient of determination:**

$$R^2 = \frac{\sum(\hat{Y}_i - \bar{Y})^2}{\sum(Y_i - \bar{Y})^2}$$

Coefficient of determination expresses the adequacy of the data with the regression line.  $\hat{Y}_i$  represents the estimated function,  $\bar{Y}$  represents the average value of the variable Y and  $Y_i$  represents the value of the dependent variable in years.

The coefficient of the alliance:

$$R^2_a = 1 - R^2_d$$

**Correlation coefficient:**

$$R = \sqrt{r^2_d}$$

$$R = + \sqrt{r^2_d} \quad \text{where b is positive}$$

$$R = - \sqrt{r^2_d} \quad \text{when b is negative}$$

$$R = \sqrt{r^2_d}$$

**General regressive parabolic function:**

$$Y = a + bx + cx^2$$

Variables calculated in the above function are made from actual data on employment and foreign direct investment in the country and in some countries of the European Union in the period 2000-2009, are presented in the following tables:

**Table 1:** GDP of Republic of Macedonia and some countries of UE for the period 2000-2009

(000 000 000)\$

Years	Finland	France	Greece	Germany	Italy	Slovenia	UK	Macedonia
2000	122.073	1,333.254	127.604	1,905.795	1,100.563	19.990	1,480.527	3.589
2001	124.669	1,341.254	131.144	1,892.595	1,118.318	20.413	1,471.396	3.437
2002	135.563	1,463.457	147.910	2,024.060	1,223.236	23.119	1,614.699	3.763
2003	164.440	1,804.407	194.990	2,446.885	1,510.055	29.095	1,862.770	4.628
2004	189.166	2,060.576	231.022	2,748.821	1,730.095	33.756	2,203.575	5.368
2005	195.966	2,147.773	243.378	2,793.232	1,780.781	35.807	2,282.888	5.814
2006	207.989	2,270.364	264.263	2,921.266	1,865.112	38.990	2,447.682	6.370
2007	246.306	2,598.772	310.363	3,333.934	2,119.247	47.380	2,812.049	8.160
2008	271.751	2,865.227	351.948	3,651.618	2,307.429	54.653	2,679.013	9.836
2009	238.607	2,656.378	330.780	3,338.675	2,118.264	48.600	2,178.856	9.371

Source: International Monetary Found, World Economic Outlook Database, October 2010. WIR.UNCTAD, FDI/TNC database, 2010.

**Table 2:** The entry of FDI in Republic of Macedonia and some UE countries for the period 2000-2009

( 000 000)\$

Years	Finland	France	Greece	Germany	Italy	Slovenia	UK	Macedonia*
2000	8015	42930	1089	198276	13375	137	118764	35673.075
2001	3732	52623	1560	21138	14871	369	52623	63907.725

<b>2002</b>	7920	49035	50	50516	14545	1686	24029	71383.665
<b>2003</b>	3296	42498	661	27265	16415	337	20298	79466.61
<b>2004</b>	4648	24318	1351	-38557	16815	516	78399	99028.53
<b>2005</b>	4750	84951	606	41969	19975	577	177901	108791.655
<b>2006</b>	5481	78154	5364	55171	39239	645	148189	129062.055
<b>2007</b>	12384	96221	2111	75543	40202	1514	186381	156527.955
<b>2008</b>	-1974	62257	4499	24435	17031	1924	91487	182578.125
<b>2009</b>	2551	59628	3355	35606	30538	-67	45676	193194.87

\*Million denar

Source: International Monetary Found, World Economic Outlook Database, October 2010. WIR.UNCTAD, FDI/TNC database, 2010. Enti Shtetëror Statistikor i Republikës së Maqedonisë 2010, Banka Popullore e RM-së 2010.

IJSER

### III. RESULTS

#### **Correlative analyses between FDI and GDP in Macedonia and comparison with some EU countries**

#### **Coefficient of Determination and Correlation coefficient of investment and GDP in Republic of Macedonia and some EU countries**

Coefficient of determination and correlation coefficient are the indicators that best express the interdependence between investment and GDP of the country. Therefore, the interdependence of these variables will be analyzed through these coefficients in some EU countries as well as in Macedonia, making a comparison between them.

Calculated parabolic regression functions of GDP and the entry of foreign direct investments in Macedonia and some European Union countries are as follows:

$$\text{Finland GDP} = 234,919.30 - 22,085 + 0.0017 \text{ FDI FDI}^2$$

$$\text{France GDP} = 1,714.73 - 0.0027 \text{ FDI FDI} + 0.00000013 \text{ FDI FDI}^2$$

$$\text{Germany GDP} = 2,765.60 + 0.0028 \text{ FDI} - \text{FDI} \cdot 0.00000003^2$$

$$\text{Greece GDP} = 131,400.41 + 80.46 \text{ FDI} - \text{FDI} \cdot 0.0090^2$$

$$\text{Italy GDP} = -1,213.80 + 0.2322 \text{ FDI} - \text{FDI} \cdot 0.00000383^2$$

$$\text{Slovenia GDP} = 35,924.96 - 16.66 + 0.0118 \text{ FDI FDI}^2$$

$$\text{United Kingdom GDP} = 1 + 727.90 + 0.0029 \text{ FDI FDI}^2$$

$$\text{Macedonia GDP} = 4 + 472.99 + 4.0135 \text{ FDI FDI}^2$$

Calculated by regressive parabolic functions between GDP and the entry of foreign direct investments in the country, we see that, in the analyzed period from 2000-2009, an inverse relationship observed only in Finland, in proportion (1: 22,085) in France in proportion (1: 0.0027) and in Slovenia in proportion (1: 16.66), which means that the economy of Finland, France and Slovenia, during this period, with the increase of direct foreign investments in the country, GDP decreased. But in all other countries surveyed, including Macedonia, expressed a dependency positive GDP and foreign direct investment in the country, which means that the economies of these countries with increasing foreign direct investment in the country will result increasing of GDP in these countries. Calculated parabolic function for Macedonia shows that a monetary unit growth in the entry of foreign direct investment, GDP grows by 4 monetary units.

Regarding the regression dependence of GDP and foreign direct investment in the country, which is expressed by coefficients of determination and alliance generally analyzed countries and the period of 2000-2009, there is also a dependence on relatively strong correlation between GDP and foreign direct investment in the country. Of all the countries analyzed in this period slightly larger dependence regression between these two variables observed in Italy at a rate of determination  $r^2 = 0.602$ , meaning that during the period analyzed 60% of GDP is dependent from entry of foreign direct investment and 40% by other factors ( $r^2 = 1 - 0.602 = 0.398$ ). Then follows Greece with coefficient of determination  $r^2 = 0.528$  shows that 52.8% of GDP is

dependent on the inflow of foreign direct investment and 47.2% of the other factors, Finland coefficient of determination  $r^2 = 0.518$  shows that 51.8% of GDP is dependent on the inflow of foreign direct investment and 48.2% by other factors; UK  $r^2 = 0.345$ , indicating that 34.55% GDP is dependent on the inflow of foreign direct investment and 65.5% of the other factors and Macedonia  $r^2 = 0.317$ , indicating that 31.7% of GDP is dependent the entry of foreign direct investments in the country and 68.3% by other factors. But a less dependent regression observed in France  $r^2 = 0.269$ , 26.9% GDP is dependent on the inflow of direct foreign investments in the country and 73.1% of the other factors and Slovenia with  $r^2 = 0.226$  dependence of GDP of 22.6% from the entry of foreign direct investments in the country and 77.4% of the other factors and Germany  $r^2 = 0.184$ , GDP is dependent 18.4% of foreign direct investment and 81.6% by other factors uninvolved.

The figure below presents a linear function of the impact of foreign direct investment in GDP in the Republic of Macedonia in the analyzed period 2000 - 2009, which reveals a large dependency of these investments in Macedonia's GDP during this period.

Meanwhile, Pearson coefficients (correlation) show the connection that had these countries between GDP and foreign direct investment in these countries in the analyzed period since 2000-2009. The correlation coefficients of these countries also show a relatively strong connection between GDP and foreign direct investment in the country. The coefficients of correlation between GDP and FDI's in Italy with  $r = 0.776$ , in Greece with  $r = 0.727$ , show a strong relationship between these variables. In the UK  $r = 0.587$ , 0.563 Macedonia and Germany  $r = 0.429$  shows a relatively strong connection between these variables. Meanwhile, in Finland  $r = -0.720$ ,  $r = -0.519$  France and Slovenia with  $r = -0.476$  show a negative correlation between GDP and FDI's.

There is the regressive function, in terms of employment and the impact of FDI in GDP in the Republic of Macedonia, in the analyzed period 2000 - 2009:

$$\text{GDP} = 30\,913.5 + 0.2478 + 1.260 \text{ IDH}^2 \text{ Employment}$$

$$t \text{ stat } (0,312) (1,319) (9,342)$$

This feature shows a correlation between employment, FDI and GDP in Macedonia in the period analyzed. Employment marks a proportional dependence (1: 0.2478), indicating that the increase in employment for 1 unit, GDP will grow by 0.25 currency units, while FDI to record a dependency in proportion (1: 2.9238), which It shows that the growth of FDI's for 1 monetary unit, GDP will grow by 1.3 monetary units. From this function we see that the growth of direct foreign investments in Macedonia have a huge impact on the growth of GDP.

IJSER

### **III. CONCLUSION**

The entry of FDI in the country brings with it a number of effects on the host countries, starting from the local workforce through increased employment opportunities, higher wages by foreign companies; the effect of the transfer of resources, where foreign firms can contribute by providing capital, technology and management; effects on trade and balance of payments, where the balance of payments benefits from any capital inflow and FDI increases competition in the country forcing domestic companies to bring better quality products and services as well as technology and more efficient administration.

Many studies show a positive correlation of FDI and economic growth. This can be evidenced by the fact that the countries, which have attracted more foreign direct investment associated with higher economic growth. With the development of economic globalization, FDI are increasingly



being recognized as an important factor in the economic development of countries. The largest increase occurred in recent years, which has resulted from several factors, especially the more open attitude of governments to investment inflows, privatization and the growing interdependence of the world economy. Attitudes and government policies on FDI, as well as its characteristics have changed significantly over time.

Regarding the regression dependence of GDP and foreign direct investment in the country, which is expressed by coefficients of determination and alliance generally analyzed countries and the period of 2000-2009, there is also a dependence on relatively strong correlation between GDP and foreign direct investment in the country.

Also, from the regression function we see a correlation between employment, FDI and GDP in Macedonia in the period analyzed. Employment marks a dependence proportional (1: 0.2478), indicating that the increase in employment for 1 unit, GDP will grow by 0.25 currency units, while FDI to record a dependency in proportion (1: 2.9238), which It shows that the growth of FDI's for 1 monetary unit, GDP will grow by 1.3 monetary units. From this function we see that the growth of direct foreign investments in Macedonia have a huge impact on the growth of GDP.

No doubt that for Macedonia these investments are very important as a country in transition, which should follow the footsteps of neighboring countries, which benefited from these investments, offering, above all, a genuine climate of investment through improvements in implementation of structural economic reforms, reforms in the legislative sector, elimination of corruption, organized crime, security of property and sustainable political stability, reaching a compromise for the name with Greece and improving relations with other neighbors.

# IJSER

## REFERENCES

1. A.Sapir, Bruegel Memos to the New Commission 2009: Europe's economic priorities 2010-2015, Bruegel, Brussels, 2009
2. Alfaro.L, Foreign direct investment and growth:does the sector matter?, Harvard Business School, 2003
3. Banka Popullore e Republikës së Maqedonisë, Raport për pozitën ndërkombëtare të
4. Bevan, A. A. and Estrin, S, The Determinants of Foreign Direct Investment in Transition Economies, WDI Working Paper No. 342, 2000
5. Bevan, A. A. and Estrin, S, The Determinants of Foreign Direct Investment in Transition Economies, WDI Working Paper No. 342, 2000

6. Colander.C.D, Macroeconomics, The MCGraw-Hill Companies, third edition, USA, 1998
7. Enti shtetëror i Republikës së Maqedonisë, Maqedonia në shifra 2009, Shkup, 2009
8. Enti shtetëror statistikor i Republikës së Maqedonisë, Investimet direkte të huaja në Republikën e Maqedonisë 2003-2007, Shkup, Mars 2009
9. Euro Memorandum Group, Confronting the Crisis: Austerity or Solidarity, EuroMemorandum 2010/2011, Greece, 2011
10. Euro Memorandum Group, Europe in Crisis: A critique of the EU's Failure to Respond, Germany, 2009
11. European Commission, The Western Balkans in transition, Occasional Paper no. 5, 2004 from : <[http://europa.eu.int/comm/economy\\_finance](http://europa.eu.int/comm/economy_finance)>
12. Gabrisch. H and Holscher. J, The Successes and Fail Ures of Economic Transition, The European Experience, Palgrave Macmillan, London, 2006
13. Gorg, H. and D. Greenaway. 2002. "Much Ado About Nothing? Do Domestic Firms Really Benefit from Foreign Direct Investment?" Research Paper 2001/37, Globalisation and Labour Markets Programme, at Leverhulme Centre for Research on Globalisation and Economic Policy, Nottingham.
14. Hanson, G. H. 2001. "Should Countries Promote Foreign Direct Investment?" G-24 Discussion Paper No. 9. New York: United Nations.
15. IMF, Staff Report for the 2009 Article IV Consultation, November 24, 2009
16. Kostadinov. A, FDI performance index of Western Balkan countries, Retrieved June 2008
17. Lipsey, R. E. 2002. "Home and Host Country Effects of FDI." NBER Working Paper 9293.
18. Moosa, I. A, Foreign Direct Investment – Theory, Evidence and Practice, New York: Palgrave, 2002
19. Naqellari.A, Makroekonomia 1, Universiteti Bujqësor i Tiranës, Tiranë 2007

20. Pentecost.E, Macroeconomics, An open economy approach, Macmillan Press LTD, London, 2000
21. Riley.G, Macroeconomics, Eton College, September 2006
22. Sayek.S, Chanda.A, Alfaro.L, How does foreign direct investment promote economic growth? Exploring the effects of financial markets on linkages, Bilkent University, 2006
23. Schiller.R.B, The macroeconomy today, The McGraw-Hill Companies, seventh edition, USA, 1997
24. Scott Hunter, Analysis of Advantages and disadvantages of FDI, March 2007
25. Slavin.L.S, Macroeconomics, The McGraw-Hill Companies, fifth edition, USA, 1999
26. United Nations Conference on trade and development, World investment report: Investing in a low-carbon economy, New York and Geneva, United Nations, 2010
27. Valova.G, Prodanov.S and Sirakov.A, Access to Financing in Southeast Europe: Before and After the Crisis”, USAID, May 2010
28. Wafo.K, Political Risk and FDI, Konstanz, 1998
29. Xhaferaj. E, Investimi i huaj direkt në vendet në zhvillim të Europës Lindore, Rasti i Shqipërisë, Tiranë, 2005

#### Internet websites

1. EU Information Centre - Mission of the EU to the former Yugoslav Republic of Macedonia; <http://www.delmkd.cec.eu.int>
2. European Training Foundation; <http://www.etf.europa.eu/>
3. Eurostat; <http://epp.eurostat.ec.europa.eu>
4. International Monetary Fund; <http://www.imf.org>
5. LABORSTA Internet (E) <http://laborsta.ilo.org/>
6. National bank of the Republic of Macedonia; <http://www.nbrm.gov.mk>
7. State Statistical Office of the Republic of Macedonia; <http://www.stat.gov.mk/>
8. The Vienna Institute for International Economic Studies - <http://www.wiiw.at/>
9. [www.dw-world.de](http://www.dw-world.de)
10. [www.fdi.net](http://www.fdi.net)

IJSER