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Working paper

The economic impacts of the foreign direct investments: panel estimation by sectors on the case of Macedonian economy

Aneta Krstevska* and Magdalena Petrovska**

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Abstract

This paper elaborates the economic impacts of the foreign direct investments (FDI) on the case of Macedonian economy. Most developing countries consider FDI a vital source for their development. Anyway, it is quite difficult to measure the economic effects of FDI over the host country, having in mind their numerous direct and indirect effects. Besides the amount of FDI inflows, the economic benefit will also depend on their structure. Based on a panel regression technique, the FDI impacts on GDP, export and employment on the case of Macedonian economy have been estimated, taking into account for their structural dimension. The main conclusion of the analysis is that the FDI inflows were important factor for GDP growth and export performances of the Macedonian economy. On the other hand, the FDI impact over employment is negative mainly due to the low level of green field investments and non attractiveness of the labor intensive industry for the foreign investors. These findings regarding the type and sector distribution of the FDI inflows are very important for the policy makers and imply a need for a strategic approach in this field.

Key words: foreign direct investments, tradable sector, non tradable sector, economic growth, export, employment.
JEL classification: E22, E24, C23.

*Chief Economist at the National Bank of the Republic of Macedonia
krstevskaa@nbrm.mk
** Analyst at the Research Department of the National Bank of the Republic of Macedonia
petrovskam@nbrm.mk

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1. Introduction

This research paper is focused on the economic impact of the foreign direct investments (FDI) on the domestic economy. The FDI are usually listed between the most important factors on the economic growth of the transition economies, considering their numerous direct and indirect effects over domestic economy. Besides FDI inflows, what matters for growth is their sector structure and the type of the FDI, that could significantly influence the future performances of the economy.

On average, the FDI net inflows in Macedonian economy were relatively lower compared to some other advanced transition economies. It goes in line with relatively lower growth rate in the Macedonian economy, traditionally high trade deficit and high and persistent unemployment rate. Based on a panel regression technique, the FDI impacts on GDP, export and employment on the case on Macedonian economy have been estimated. The final aim of this analysis is to detect weather the structure of the FDI by sectors influenced the macroeconomic performances of the Macedonian economy in the past. In addition, it should give important message about this specific feature when attracting the FDI in the future.

The paper contains first a theoretical overview of the FDI impacts over economic growth and literature overview. The next section is about stylized facts on Macedonian economy, followed by presentation of the analytical approach for the empirical research on the case of Macedonian economy, as well as interpretation of the results. The last section concludes the findings.

2. Theoretical overview of the FDI impacts over economic growth

In the analysis of the FDI in the theory, but also in practice, there is a distinction between their importance as a source of financing within the capital account of the balance of payment and their impacts over investments in the domestic economy.

FDI are alternative *source of financing* of the domestic economy, with a main advantage of being stable and with a small probability of reversible process. Besides the direct financial inflow, quite often the induced impacts over external financing framework are even greater. In general, the FDI inflows reflect the investors' perceptions about macroeconomic developments and potential growth of the economy. Therefore, the induced impacts could be seen as additional borrowings on the international market, additional funds from the mother company or retained earnings of the FDI based company. It is possible that those induced financial flows could even reach the amount of the initial FDI inflow. In this respect, the retained earnings are of crucial importance. They could be repatriated to the foreign investor's country, but in the case that they are retained within the company they are considered as an additional FDI inflow.

The FDI are considered as an alternative financing source in addition to the domestic sources, which sometimes could be at a higher price, considering the fact that the profit rate could be higher than the domestic lending interest rates. The higher cost could also arise from the higher amount of profit transferred to abroad than the retained earnings or even relative to the initial investment. The companies established or owned by the foreign investors could also influence the external trade as well as the indebtedness of the economy. The companies based on the FDI that are export oriented or enabling imports substitution, have positive impacts on the trade balance of the economy. On the opposite, the companies that are import oriented or using borrowings from the parent company or other external sources could have potential negative impacts over domestic economy.

The FDI *impacts over investments* in the domestic economy are significantly higher comparing to those of the other capital flows. Besides evident direct FDI effects over investments, there are so called indirect effects that can be positive (crowding in) or negative (crowding out). Besides the transfer of the new technologies, expertise and good practices with the FDI inflows, the positive crowding in effects of the FDI appear when FDI generate new investments by the other domestic companies, where the relationship input - finished goods or inversely could be set up. Actually, domestic contractors heavily rely on the foreign companies that could ensure markets and modern technology. The crowding out effects could arise on the financial markets or on the goods and services market. These are cases when foreign companies are financing their activities from the limited domestic savings, influencing towards increase in the domestic interest rates and therefore the cost of financing of the domestic companies. In addition, foreign companies are potential competitors of the domestic companies on the goods and services market. Anyway, these negative effects to a large extent depend on the secondary impacts (there is possibility that domestic companies under pressure by the competition will increase productivity or reorient towards industry with comparative advantages).

In general, there are two transmission channels by which the FDI influence the technological development, capital stock and generate economic growth. When a multinational corporation, which usually is leading the research activities in its field of operation, starts up a new production capacity abroad, it means implementation of the new technology in the host country. If this new technology is used for production of capital goods, it will increase the capital stock in the domestic economy, contributing on a long run for enhancing economic growth, which is the direct transmission channel. The indirect transmission channel is related to the transfer of managerial expertise and know-how, which also stimulate technological progress and economic growth. The FDI could also generate secondary impulses over other domestic companies to apply new technologies (technologies dispersion and transfer of knowledge effect).

This short overview of the FDI impacts confirms that the scheme of the implications channels is really large and the eventual cost benefit analysis could be extremely complex.

2.1. Literature review

Most developing countries consider FDI a vital source for development. However, the economic effects of FDI are very difficult to measure accurately given that growth depends on many factors whose effects are difficult to disentangle, and given that FDI itself affects several of these factors. As a consequence, the analysis of the effects of FDI resorts to one of two general approaches. The first is econometric analysis of the relationships between inward FDI and various measures of economic performance, and the second is a qualitative analysis of particular aspects of FDI contribution. The econometric analysis of FDI and development is of long standing, but its conclusions sometimes remain unclear. Some analyses show a positive impact while others remain agnostic. On the other hand, the qualitative analysis of FDI is more appealing and practical. The premise is that FDI offer host countries a mixture of positive and negative effects. The challenge is to disentangle these effects, taking measures to maximize the first ones and minimize the others.

A compilation of recent literature on theory and measurement issues of FDI, structural issues related to the impact on FDI, as well as some analytical and policy issues can be found in Bora (2002). In-depth analysis of selected topics related to FDI can be found in different UNCTAD publications. Also, a list of World Bank's papers and case studies deal with the following general topics: FDI impact on growth, trade flows and employment; skills and technology diffusion via FDI; linkages with domestic companies etc. The paper of Benacek, Gronicki, Holland, Sass (2000) is a methodological paper that points out to the

benefits and pitfalls of surveys and econometric analysis as two main sources of information. The authors consider how each of these two sources can contribute to the field of research, whether they give us complementary or contradictory information, and how this information can best be exploited. They conclude that the findings of econometric studies tend to support survey results.

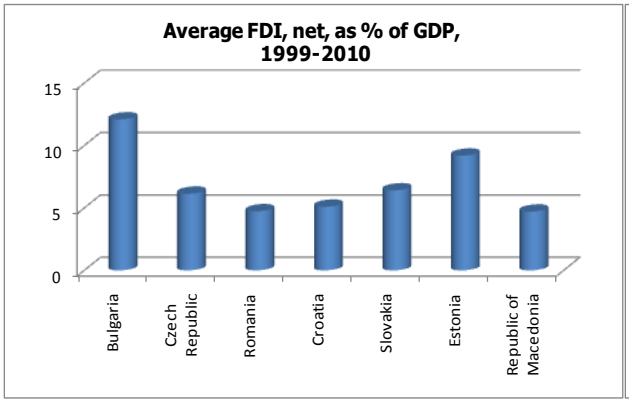
Jevcak, Setzer, Suardi (2010) analyzed the FDI inflows in the 10 new EU member countries (from 2004 EU enlargement), taking into account the specifics of the emerging economies and also pointing out the importance of the structure of the FDI. The capital inflows to this group of countries were driven by country specific factors and also by the global driving forces. One of the conclusions of this paper is that stronger growth and higher interest rates tend to be associated with the larger capital inflows. Anyway, the authors found out that a large part of the foreign capital in the analyzed countries was directed towards non - tradable sector, implying lower contribution to productivity growth and export potential. In addition, a high dependence on large foreign capital inflows could be a source of potential vulnerability of the economy in a case of a change in the environment and risk perception (evident during the last crisis).

This paper should contribute to both of the two general approaches - the econometric analysis of the relationships between inward FDI and GDP and export performances, and the qualitative analysis of various aspects of FDI contribution to the performances of the Macedonian economy, therefore being complementary to the studies on FDI in the transition economies. A specific contribution of this research is the structural dimension of the analysis.

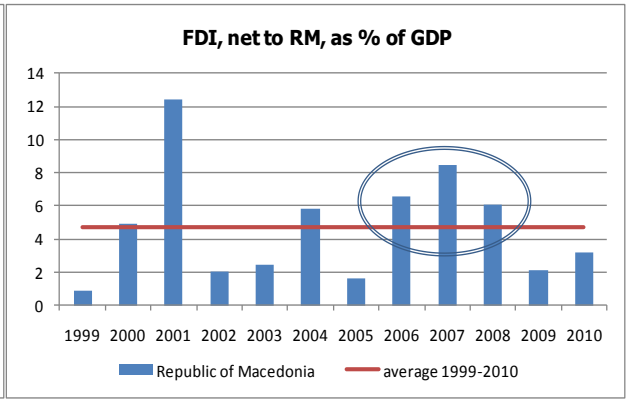
3. Stylized facts about FDI in Macedonian economy

The FDI inflows are considered as ones of the main driving forces of the transition economies. The average FDI net inflows in Macedonian economy in the period 1999 – 2010 were about 4% of GDP which is relatively lower compared to some other transition economies (Czech Republic, Slovakia, Bulgaria, Baltics). These could be explained by various reasons. The potential foreign investors are sensitive on a number of factors when making decision about investment abroad, starting from market size, economic developments and general prospects for growth of the economy, going further to business climate, overall infrastructure, regulative and administrative issues. It must be noted that FDI inflows were quite stronger in the period 2006-2008, that coincide with stronger GDP growth in these years.

Graph 1 Average FDI, by countries



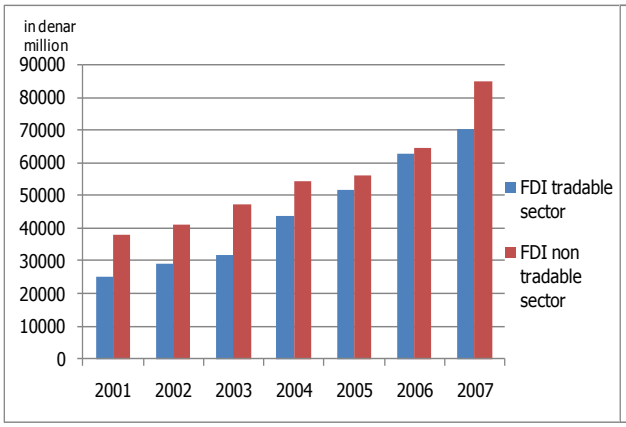
Graph 2 FDI in the Republic of Macedonia



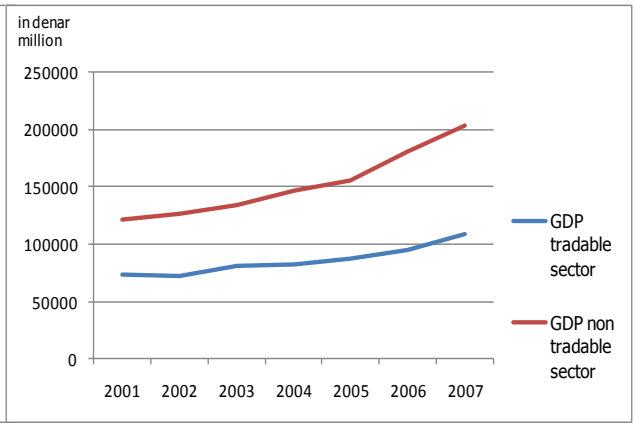
Source: NBRM and Eurostat.

The analysis of the FDI stocks by sectors has shown that FDI inflows in the non tradable sector were higher compared to those in the tradable sector, therefore contributing to higher and faster growing GDP in the non tradable sector. Within the non tradable sector, a largest portion of the FDI inflows was in the telecommunication sector.

Graph 3 FDI, stocks, by sectors



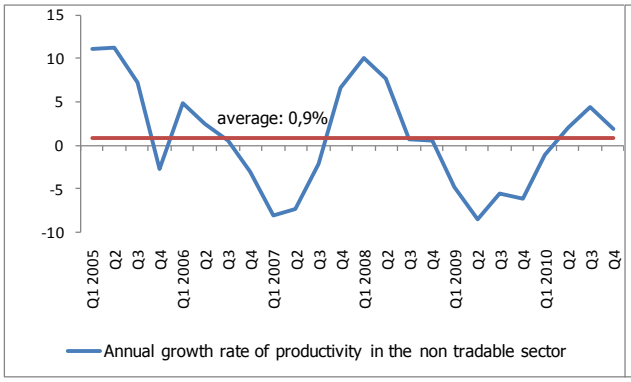
Graph 4 GDP by sectors



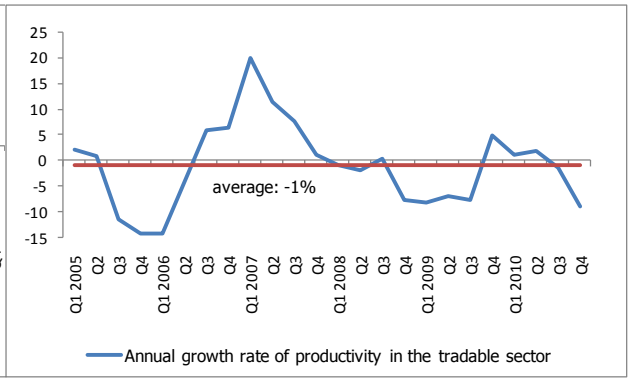
Source: NBRM, SSO and authors' calculation.

Higher absorption of the FDI by the non tradable sector contributed to higher average productivity growth in this sector relative to the tradable sector. Having in mind that there is a higher employment in the non tradable sector, the stronger productivity growth in this sector could be related to the new technology based on the FDI inflows.

Graph 5 Productivity in the non tradable sector



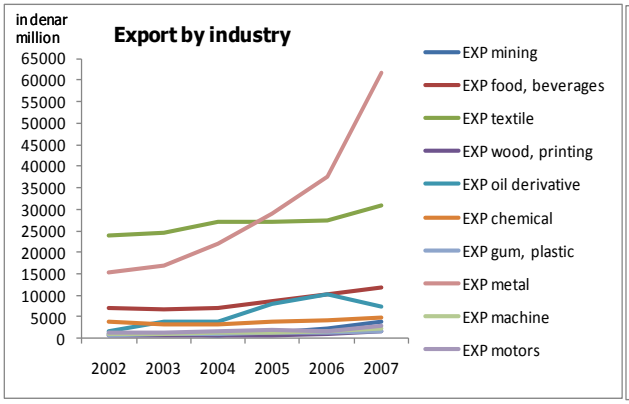
Graph 6 Productivity in the tradable sector



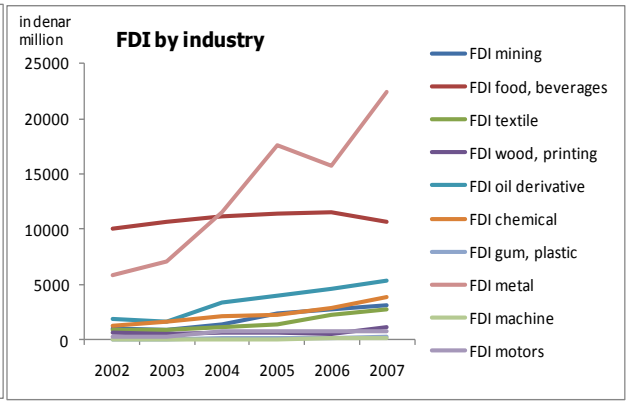
Source: NBRM.

When analyzing the tradable sector, it is important to mention that the export structure in Macedonian economy is dominated by metal and textile products, followed by food, oil derivatives, mining and chemical industry products. The FDI inflows within the tradable sector are mostly concentrated in the metal and food industry, followed by oil derivatives, chemical industry and mining. Among the industrial exporting sectors, only the textile industry is not strongly related to the FDI (although there are some investments of small size). Obviously, the data evidence confirms the importance of the FDI for the export capacity of the economy.

Chart 7 Export by industry



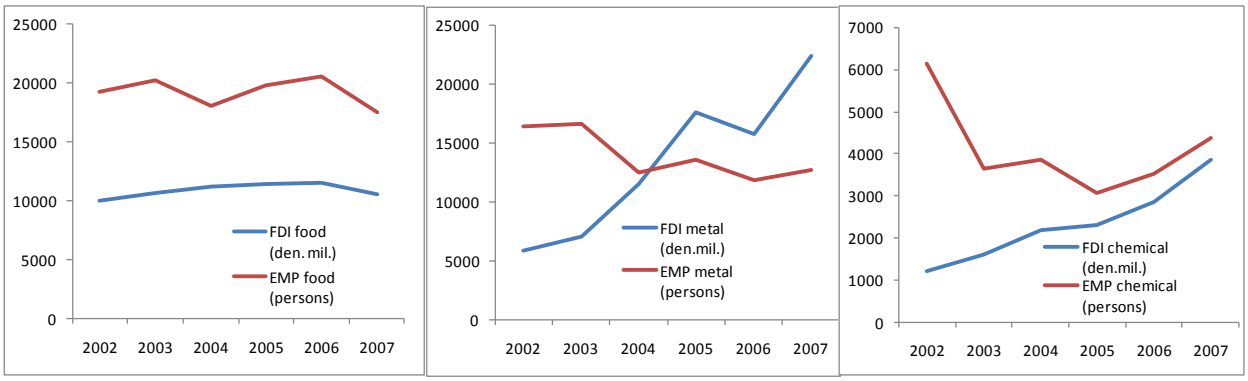
Graph 8 FDI by industry



Source: SSO, NBRM.

The analysis of the employment by industrial sectors (according to Labor Force Survey) has shown that the employment in the sectors where most of the FDI have been concentrated was stagnant or declining, with some exceptions like chemical industry, where positive trend is present. In this regard it is very important to distinguish the role of the privatization based FDI relative to the Greenfield FDI, - the later one supporting the increase of the employment in the economy.

Chart 9 FDI and Employment in selected industries (food, metal and chemical industry)



Source: SSO, NBRM.

Due to the breakage of the time series for the FDI by sectors[1], the analysis could not be extended for the recent times (it remains as a challenge for the future).

4. Empirical analysis

This research is focused on empirical findings on the FDI impacts over GDP, export and employment in the Republic of Macedonia in the period 2001 - 2007, by using panel estimation. The advantage of the panel estimation relative to the alternatives is the time and space dimension. The last one refers to groups within the panel, that in this case are sectors or groups of sectors based on National classification of the

[1] At the time of writing the paper, a consistent time series of FDI by sector were available up to 2007, according to NACE 1. From May 2012 the data for FDI by sectors for the period 2009 - 2011 are available, according to NACE 2. These data are produced by the NBRM.

economic activities - NACE[2]. This dimension enables to take into account different level of heterogeneity between the groups. Within estimations, FDI are considered as exogenous variable, thus the analysis does not incorporate economic or political factors that influence FDI.

The results of this research are based on two types of panel estimation - panel with fixed effects and panel with random effects.

The models with **fixed effects** give opportunity to control for all stable features of the groups, including the non - measurable ones (non measurable heterogeneity). In the general specifications of such models, the non measurable heterogeneity is given with a_i .

$$Y_{it} = \beta_0 + \beta_1 x_{1it} + \beta_2 x_{2it} + ... + \beta_k x_{kit} + a_i + u_{it}$$

The time dimension of the model variables is given with t , while i stands for different groups in the panel. Thus, a_i is without t referring to its fixed effect in through the time. On the other hand, u_{it} as error in the model vary by t and i, both, representing non measurable factors influencing the dependant variable.

The models with **random effects** apply additional assumption in the estimation. Starting from the panel with fixed effects and the specified equation, in the models with random effects the additional assumption is that a_i is uncorrelated with each of the explanatory variables *1*...*k* in each time period *t*, $Cov(x_{kit}, a_i) = 0$. In the models with fixed effects, a_i as individual fixed effect does not mean that it is not random variable, but it means that the correlation between this term and explanatory variables is allowed. In addition, within the models with random effects, a_i is included in the error of the model. Therefore, these models have so called composite error: $v_{it} = a_i + u_{it}$. The general specification of the estimated model with random effects is the following:

$$Y_{it} = \beta_0 + \beta_1 x_{1it} + \beta_2 x_{2it} + ... + \beta_k x_{kit} + v_{it}$$

The composite error is serially correlated through the time. Thus, the random effects method uses this serial correlation of the composite error within the GLS (Generalized Least Square) framework.

[2] NACE is classification of the economic activities in the European Union that is used by the SSO in the Republic of Macedonia, for compiling, processing and dissemination of statistical data. The NACE is also used for classification of the legal entities by sectors they perform, for business registers and other administrative purposes. NACE is composed of four levels: sector, section, group and class.

5. Estimation of the FDI impacts over GDP

5.1. Data and model

The initial point for analysis of the FDI impacts over GDP is the well-known Cobb-Douglass production function enlarged with the FDI and the use of panel estimation.

$$GDP = \beta_0 * K^{\beta_1} * L^{\beta_2} * FDI^{\beta_3} \qquad (1)$$

In addition, we use sector breakdown of the respective variables. Therefore, K is for investments in fixed assets by sector in the current year, L is for the employees by sectors according to the Labor Force Survey and FDI is for FDI stock by sectors. Under panel regression, each variable is transformed in logs.

$$\ln(GDP) = \ln \beta_0 + \beta_1 \ln(K) + \beta_2 \ln(L) + \beta_3 \ln(FDI) \qquad (2)$$

The reason why the FDI variable is a stock variable is to take care about extended effects of the FDI over GDP, having in mind that some positive FDI implications need some time to reflect over real sector of the economy (transfer of skills, expertise)[3]. If FDI flows are used, a potential problem in the analysis could arise in a case that there could be an extraordinary high inflow in one year, while in the following years such high inflows are missing. In a case that FDI flows are used, it means that the effect of the high inflow for all following years will be zero, neglecting the very high presence of foreign capital already being invested in the country. In addition, FDI variable refers to inward FDI (the outward investments in the transitional period almost do not exist).

Regarding the time horizon, the annual data for the period 2001 - 2007 are used, due to the fact that the data for employees by sectors according to the (NACE) are available from 2001, while FDI by sectors were available up to 2007.

Table 1 Sectors of economic activity

(AB)	Agriculture, hunting, forestry; fishing
(CDE)	Mining, manufacturing, electricity, gas and water supply
(F)	Construction
(GHI)	Wholesale and retail trade, hotels and restaurants, transport and communications
(JK)	Financial intermediation, real estate, renting and business activities
(LMNO)	Other service activity

The data for GDP and investments in fixed assets are provided in the same aggregation by sectors as in Table 1, by the State Statistical Office (SSO). The data for the employees are from the labor Force Survey of the SSO and the data for the FDI are from the NBRM. All the data are at current prices and for the analysis they are deflated by the industrial producer price index (PPI, base: 2005).

[3] Marco Neuhaus, *"The Impact of FDI on Economic Growth, An Analysis for the Transition Countries of Central and Eastern Europe"*, Physica-Verlag, A Springer Company, 2006.

The theoretical framework assumes cointegration relationship between GDP, capital stock (domestic and foreign capital) and employment. We also confirm cointegration in the data with Pedroni test (1999, 2004). This test has been used because all inclusive seven test statistics assume independence of the groups in the panel. Therefore, this test enables to capture the individual variability within the groups in the panel.

Within the model, it is necessary to consider the issue of endogeniety and multucollinearity. We assume that FDI influence the economic growth, but also higher GDP would also attract more FDI, meaning that FDI are not entirely exogenous. At the same time, the FDI are complementary part of the domestic investments (FDI in fixed assets are included within investments in fixed assets category of the national accounts statistics), pointing to the fact that these two types of capital investments are not completely independent (multicollinearity problem). However, considering the valid cointegration relationship, the endogeniety and multucollinearity do not play a role, thus the regression coefficients of the explanatory variables are not statistically bias and they can be used as a basis for making conclusions.

Based on the data we can not extract exact information about causal relationship between FDI and economic growth, considering the need for higher number of observations within the groups of the panel. Therefore, the standard Granger test of causality can not be implemented. Anyway, the literature clearly demonstrated that the FDI support the capital accumulation and technological progress and therefore the economic growth. In opposite, the economic growth is only one of numerous variables that influence FDI inflows. Thus, we could assume that the FDI impact over economic growth is larger than the opposite relationship. At the same time, the analysis could not avoid that FDI and GDP both are influenced by other factors (political stability, country risk, expectations), that also stands for the domestic investments too.

5.2.Results of the model

The estimation of the equation is done by using the OLS method (ordinary least squares). A panel of fixed effects in the groups has been specified (the fixed effects in the time dimension are insignificant). There is a positive and statistically significant coefficient of the FDI variable, showing that with 1% growth of the FDI stock, ceteris paribus, there is a 0.23% GDP growth in the current year. The coefficient of the investments in fixed assets (K) is positive and it is 0.14 and the coefficient of the labor force (L) is 0.69 (Table 2).

Table 2 Estimates for the parameters of the equation *(2)*

Dependent variable	$\ln \beta_0$	β_1	β_2	β_3	$Adj.R^2$	$F-test$
$\ln(GDP)$	-3,396	0,139	0,693	0,226	0,975	204,538
$t-stat.$		1,718	5,030	5,921		

Given the model results, we can additionally compute the income shares of the input factors backwards as implied by the estimated regression coefficients, i.e. we can compute the size of the implied income share of foreign capital holders, and that of domestic capital holders.

The size of the implied income shares for domestic and foreign capital in the total capital can be computed using the following formulas as well as using the results reported in Table 2.

$$\alpha = \frac{\hat{\beta}_1}{1+\hat{\beta}_1+\hat{\beta}_3} \quad \text{and} \quad \beta = \frac{\hat{\beta}_3}{1+\hat{\beta}_1+\hat{\beta}_3}$$

Table 3 Income Shares of the Input Factors to Production

foreign **K** (β)	domestic **K** (α)	total **K** ($\alpha+\beta$)	Labour ($1-\alpha-\beta$)
0.17	0.10	0.27	0.73

According to Table 3, the total capital income amounts to 27% of GDP compared to the 73% which goes to labour. These results concerning total capital income and labour income are absolutely in line with the broad empirical growth literature for transition economies. FDI in our case accounts for about two thirds of total capital income. According to Neuhaus (2006), this share for transition countries accounts for about one fourth of total capital income. This finding points out to the fact that FDI in Macedonia although with relatively higher share in the relatively modest total capital stock, in our assessment produce relatively limited investment spillovers beyond the direct increase in capital stock through linkages with local firms (this is usually the case when foreign corporations use imported inputs for their activities which is broadly the case with the biggest foreign investors in the Macedonian manufacturing sector).

6. Estimation of FDI impacts over export

6.1. Data and model

This part of the analysis is aimed to value the FDI effects over export and to answer the question whether FDI stimulate the export. Although the accumulated FDI per capita in Macedonia is lower compared to the other transition economies, the export developments imply that FDI were making important contribution for the export promotion. As a support of this conclusion, there is a detailed analysis on the FDI and export relationship, where also the effects of the other important variables influencing the export are taken into consideration. Within the export analysis, only tradable goods sectors are considered (the services and also agriculture are excluded). It actually means that the analysis is focused on the impacts of FDI stock in the mining and manufacturing industry over the export of these sectors.

The annual data for the period 2002 - 2007 have been used in the analysis. The analyzed period was conditioned by the data availability for export classification by sectors since 2002, which were linked to the FDI data by sectors available up to 2007. The analysis includes 17 industrial branches (3 branches from mining and extraction and 14 branches from manufacturing industry) based on NACE[4]. Furthermore, for the needs of the analysis these 17 branches are classified into 10 groups[5] (table 4).

[4] According to NACE, the manufacturing industry includes subsections from 15 to 37, and mining and extraction include subsections with number 10, 13 and 14.

[5] The branches 17 and 18 composed one group, branches 20-22 are another group, branches 27 and 28 are the third group, branches 34 and 35 are the fourth group, the fifth group are the branches from mining and extraction with numbers 10, 13 and 14. The remaining five branches composed the other five groups in the panel.

The data for the export, industrial production (volume) index, number of employees (based on the Labor Force Survey) and the industrial producer price index are from the State Statistical Office. The productivity index is calculated as ratio between industrial production index and index of the employees for each group in the panel (with 2005 as a base year in both). The data of the export and FDI by groups in the panel were converted in the national currency (MKD) and deflated by the aggregate producer price index (with 2005 as a base year).

Table 4 Panel groups

B	MINING AND QUARRYING	PANEL GROUPS
10	Mining of coal and lignite	
13	Mining of metal ores	
14	Other mining and quarrying	MINING AND QUARRYING
C	**MANUFACTURING**	
15	Manufacture of food products and beverages	MANUFACTURE OF FOOD PRODUCTS AND BEVERAGES
17	Manufacture of textiles	
18	Manufacture of wearing apparel; dressing and dyeing of fur	MANUFACTURE OF TEXTILE AND TEXTILE PRODUCTS
20	Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials	
21	Manufacture of pulp, paper and paper products	
22	Publishing, printing and reproduction of recorded media	MANUFACTURE OF WOOD, PUBLISHING AND PRINTING
23	Manufacture of coke, refined petroleum products and nuclear fuel	MANUFACTURE OF REFINED PETROLEUM PRODUCTS
24	Manufacture of chemicals and chemical products	MANUFACTURE OF CHEMICALS AND CHEMICAL PRODUCTS
25	Manufacture of rubber and plastic products	MANUFACTURE OF RUBBER AND PLASTIC PRODUCTS
27	Manufacture of basic metals	
28	Manufacture of fabricated metal products, except machinery and equipment	MANUFACTURE OF BASIC METALS AND FABRICATED METAL PRODUCTS
29	Manufacture of machinery and equipment n.e.c.	MANUFACTURE OF MACHINERY AND EQUIPMENT N.E.C.
34	Manufacture of motor vehicles, trailers and semi-trailers	
35	Manufacture of other transport equipment	MANUFACTURE OF MOTOR VEHICLES AND OTHER TRANSPORT EQUIPMENT

The following panel regression has been estimated:

$$\ln(EX_{it}) = \beta_0 + \beta_1 \ln(PD\_INDEX_{it}) + \beta_2 \ln(FDI_{i(t-1)}) \qquad (3)$$

The method of random effects under panel estimation has been used. In the equation the export is a dependent variable, while the productivity index and FDI stock are explanatory variables. All variables are in logs. FDI are with a one year lag in the panel regression in line with the assumption of additional period needed to see their effects. The time lag in the FDI also enables to overcome the problem of potential simultaneity in the export and FDI. In addition, by using the FDI stock the potential indirect and extended effects of the FDI are also included.

It is important to mention that in the model the foreign effective demand as potentially important variable is not included. The reason is that the foreign effective demand, calculated as weighted average of the real GDP growth of the main trading partners of the Republic of Macedonia in line with their share in the Macedonian export, has shown as statistically insignificant in the model. Its insignificance could be possibly due to important differences in the export demand by types of industry. However, the impacts of the external demand, as well as other variables that are not included are considered through the random individual effects of the different industrial branches or groups within the panel, enabling for consistency of the estimation.

Productivity as a measure of the export competitiveness of the industries is included in the model, although there is a potential problem, identified in the theory of the international trade, of eventual causal relationship between the export and productivity. In order to account for the eventual simultaneity, 2SLS (Two Stage Least Squares) method of estimation has been used and also instrumental variables for the productivity have been used. As instrumental variable for the productivity, the employment proved as an adequate choice, considering the fact that productivity increase in the period 2002 - 2007 was mainly due to the decline of the employees in the mining and manufacturing industry. On the other hand, productivity increase could arise from the investments in the new technologies and transfer of knowledge coming with the FDI. Therefore, there is economic reason in using the FDI as instrumental variable for the productivity, too. The solution of the final choice of the instruments was done through the following panel regression:

$$\ln(PD\_INDEX_{it}) = \beta_0 + \beta_1 \ln(EMP\_INDEX_{it}(-1)) + \\ + \beta_2 \ln(EMP\_INDEX_{it}(-2)) + \beta_3 \ln(FDI_{it}(-4)) \quad (4)$$

6.2. Results of the models

The equation (4) provides empirical evidence that the FDI positively and significantly influence the productivity (table 5). When only the employment is used as instrumental variable (excluding the FDI from the list of instruments), the productivity in the export equation (3) get negative and insignificant coefficient, confirming that productivity increase induced by cut of the jobs in the mining and manufacturing industry did not promote exports. It means that the impact of the productivity growth over export growth comes out only through the channel of FDI influence over productivity (implementation of new technologies, transfer of know - how, management skills and expertise).

Table 5 Estimates for the parameters of the equation *(4)*

Dependent variable	β_0	β_1	β_2	β_3	$Adj.R^2$	$F-test$
$\ln(PD\_INDEX)$	5.417	-0.825	0.625	0.070	0.407	5.342
$t-stat.$		-2.850	1.677	1.834		

With the model (3) empirically has been quantified the following effect: 1% increase of the FDI stock in the previous year, ceteris paribus, is reflected in export growth of 0.39% in the current period (table 6).

Table 6 Estimates for the parameters of the equation *(3)*

Dependent variable	β_0	β_1	β_2	$Adj.R^2$	$F-test$
$\ln(EX)$	-3.951	1.455	0.386	0.346	6.350
$t-stat.$		1.806	3.807		

7. FDI impacts over employment - model and results

Based on the data explained in the previous section, additional analysis of the FDI impacts over employment level in the mining and manufacturing industry has been done. The employment has been regressed on the FDI stock by industrial branches classified in groups as given in Table 3. The analysis is based on the following model with random individual effects by groups in the panel:

$$\ln(EMP_{it}) = \beta_0 + \beta_1 \ln(FDI_{it}) \qquad (5)$$

The results of the estimation are sum up in the Table 6. The main interest is the total influence (positive and negative) of the FDI over the employment in the mining and manufacturing industry. The empirical results have shown to negative and statistically significant total influence of FDI over employment. Thus, the sector of mining and manufacturing industry where FDI inflow has an upward trend in the period 2002-2007, is lagging behind jobs creation. There are several reasons why FDI accumulation in these industries is not accompanied with employment growth. First, the type of the FDI is very important. In green field investments there is a higher opportunity for job creation than in aquisions or takeovers of the existing domestic companies. Second, FDI in Macedonia are mainly concentrated in the capital intensive industries, that implies limitation on the extent of the job creation. Third, the larger portion of the labor force is employed in the textile industry as a labor intensive industry, where the FDI are small.

Table 7 Estimates for the parameters of the equation *(5)*

Dependent variable	β_0	β_1	$Adj.R^2$	$F-test$
$\ln(EMP)$	8.997	-0.162	0.05	4.135
$t-stat.$		-2.030		

Besides the direct impact, the indirect FDI impact over employment is also important. It could be positive or negative which depends on the balance between the crowding - in effects (creation of new markets for the local companies) and crowding - out effects of the FDI (competition to the local companies). The local links of the foreign investors in Macedonia are quite limited, having in mind that the largest foreign investors mainly provide the inputs for their production process from abroad. This stands primarily for the metal and textile industry, while food industry is more oriented towards use of the local inputs, but the broad picture is that the FDI capacities in Macedonian manufacturing industry are highly dependent from the imported inputs.

Anyway, even if we assume a positive indirect effect, the total effect (direct and indirect) of the FDI over employment is negative mainly due to the low level of green field investments and non attractiveness of the labor intensive industry for the foreign investors. The model (5) empirically confirms that 1% growth of the FDI stock causes decline in the employment by 0.16%.

8. Conclusion

This research is focused on the empirical analysis of the economic impacts of the foreign direct investments on the domestic economy. For this purpose, on the case on Macedonian economy, the FDI impacts on GDP, export and employment have been estimated based on a panel regression technique. The analysis has shown that the sector structure and the type of the FDI significantly influence the economic performances of the economy.

Besides the fact that the average FDI net inflows in Macedonian economy were relatively lower compared to some other transition economies, it is shown that the FDI inflows were important factor for GDP growth and export performances of the Macedonian economy. The impact over export was probably limited having in mind that a large portion of the FDI was allocated in the non tradable sector. It is interesting to mention that the positive impact on export was stronger than the impact on the overall GDP. This could mean that the local links of the foreign investors in Macedonia are quite limited, having in mind that the largest foreign investors mainly provide the inputs for their production process from abroad. Therefore, the indirect positive impacts from the FDI could be stated as limited. Anyway, the empirical analysis has proven the positive contribution of the FDI over productivity, mainly through the implementation of new technologies, transfer of know - how, management skills and expertise. On the other hand, the FDI impact over employment is negative mainly due to the low level of green field investments and non attractiveness of the labor intensive industry for the foreign investors.

This analysis provides important information for the policy makers. FDI entrance in the tradable sector and in export oriented industries should have priority from the viewpoint of the economic performances. In addition, the focus should be on attracting green field investment that could contribute for the reduction

of the unemployment. For the overall impact of the FDI on the economy it is important also to stimulate the links and cooperation of the FDI based companies with the local companies.

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