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**THE IMPACT OF SECTORIAL FDI ON ECONOMIC GROWTH IN CENTRAL, EASTERN  
AND SOUTHEASTERN EUROPE**

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**Abstract**

This paper investigates the effects of foreign direct investment inflows in the industrial, construction and services sectors on economic growth in a panel of sixteen Central, Eastern and Southeastern European CESEE countries using data of different time spans within the 1998-2013 period. The empirical results show that total FDI contributes positively to the growth in the analyzed countries. With regards to our main focus, the analysis of the decomposition of FDI finds that FDI in the industrial and services sectors has a positive and significant effect on economic growth, whereas FDI in the construction sector does not exert statistically significant growth-promoting effects.

*JEL Classification:* F21, F43, C23, O47

*Keywords:* Foreign direct investment, economic growth, industrial sector, construction sector, services sector

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## 1. Introduction

Foreign direct investment (FDI) is usually highlighted as one of the most important sources of economic growth and financing for developing and transition economies. It is considered that they supplement inadequate domestic resources, finance both ownership change and capital formation and have helped the replacement of the large amounts of obsolete capital accumulated during years of central planning for transition economies. Additionally, FDI, as stable long-term form of financing, are also perceived as a catalyst of growth because they could bring technology, managerial know-how, and skills necessary for restructuring firms and helping local enterprises expand into foreign markets. The role of FDI in transition countries has been emphasized by the new growth theory, suggesting that it may enhance economic growth not only through capital accumulation, but also by promoting technological change and positive human capital spillovers. In countries where capital is relatively scarce but labor is abundant, the creation of employment opportunities – either directly or indirectly - has been one of the most prominent impacts of FDI. The direct effects arise when foreign investors employ domestic labor force, whereas indirect effects stem from job creation in local suppliers' companies connected to foreign investors or jobs created because of intensified local spending by foreign companies' employees. In addition to all the positive effects, FDI may actually have a damaging impact to the host economy through several channels such as the "market stealing" effect of FDI firms on the domestic market, especially at early stages of the development and/or transition, large dependence from foreign investors, repatriation of profits etc. Beside the amount of FDI inflows, what matters for growth is their sectorial decomposition and the type of FDI that could significantly influence the future performances of the economy. The aim of this research is to reassess the relationship between FDI inflows and economic growth in the transition countries (from Central Eastern, Baltic and South Eastern region) through examining whether FDI inflows in different sectors - industry, services and construction - have an effect on a country's growth and, if so, to what extent. For that purpose we use a panel with 16 countries for the time period 1998-2013. Our main findings show that FDI inflows in industry and services have a positive and significant direct effect on economic growth.

The rest of the paper is organized as follows: In the second section, we give a theoretical overview of the FDI inflows' effects on economic growth; in Section 3 we review the relevant literature on this topic; Section 4 focuses on the stylized facts about the economic growth, FDI inflows and their sectoral dissection for the transition economies; Section 5 describes the used

data, the estimation method and elaborates the results and Section 6 gives the conclusion of this research.

## **2. Theoretical background on FDI effects on economic growth**

Theory provides conflicting arguments concerning the growth effects of FDI. From the viewpoint of neoclassical growth theory, FDI inflows increase the stock of capital in host countries, thereby allowing higher rates of growth than would be possible from reliance on domestic savings. In fact, according to the neoclassical growth theory, where FDI is deemed to be a pure factor input, FDI's effects on economic growth in the long term are neutral, although it does affect the national income level. This is because the growth rate will converge in the long run as the marginal product of capital diminishes its returns over time, even if the exogenous increase in capital realized in the form of capital inflow from foreign countries may temporarily expand production. In contrast, according to the endogenous growth theory, where attention with regard to FDI is focused on their function as a delivery vehicle to transfer excellent technology, knowledge, and know-how accumulated in developed economies, FDI will be able to have positive effects on long-term economic growth as long as it brings further improvements in technology systems and/or human capital in the recipient countries through the contribution of foreign participation in management, the establishment of local subsidiaries by multinational enterprises, the outsourcing of contracts between local and foreign firms, and so forth (Grossman and Helpman, 1991; Aghion and Howitt, 1997). Endogenous growth theory postulates that technological advancement stimulates economic growth by creating externalities that compensate for diminishing returns to capital (Romer, 1990; Mankiw, Romer and Weil, 1992). FDI can therefore enhance growth by allowing host countries access to advanced technologies not available domestically. It has also been argued that FDI leads to increased competition in the domestic market which can cause greater efficiency of domestic firms (UNCTAD, 1999). In addition, improved managerial practices may be transmitted to domestic firms that attempt to imitate foreign firms. In cases where FDI involves training of domestic labor, the strengthening of human capital will generate positive externalities that could raise economic growth. Moreover, FDI has the potential to expand access to export markets. For those developing countries with limited industrial bases, increased export earnings, facilitate imports of capital goods that can lead to higher levels of economic growth. The trade regime of the host country has been identified as an important factor influencing the impact that FDI can have on economic growth. It has been found that the effect of FDI on growth is positive in the

case of countries with export promotion policies, but negative in countries pursuing import substitution policies (Balasubramanyam et.al., 1996).

In addition to all the positive effects of FDIs, some of the direct investments' inflows in the recipient countries might be damaging for the domestic economy and its economic growth rates. According to Schoors et al. (2002) at early stages of the development and/or transition to the market economies, FDI may actually have a negative impact. Additional inflows of FDI in firms may push out of the market other firms without FDI. This fact is referred to as a "market stealing" effect, when domestic firms are not so productive compared to the foreign ones. Also, among other factors of negative influence are dependence from foreign investors and repatriation of profits. When the foreign capital leaves the market, domestic firms will not be able to fulfill that gap in a short run.

As mentioned above, FDI has the potential to bring about both positive and some negative macroeconomic effects for the recipient countries, but it is extremely difficult to theoretically predict the respective degree of these countervailing effects, and thus, economists usually leave this issue to empirical research.

### **3. Literature review**

The relationship between FDI and economic growth has motivated a voluminous empirical literature focusing on both developed and developing countries. Some studies find a clear positive link, while others do not. Research that focuses on data from developing countries tends to find a clear positive relationship, while studies that have ignored this distinction, or have focused on data only from developed countries, have found no growth benefit for the recipient country. Johnson (2006) debates and models the potential of FDI inflows to affect host country economic growth. The paper argues that FDI should have a positive effect on economic growth as a result of technology spillovers and physical capital inflows. The empirical part of the paper attempts to verify whether FDI inflows affect economic growth. Performing cross-section and panel data analysis on a dataset of 90 economies, the paper contributes to the mixed results of earlier empirical studies on the macro level by the finding that FDI inflows have a positive effect on host country economic growth for developing, but not for developed economies. This may reflect that in a mature market economy there is no difference between domestic and cross border investment. In the panel data analysis, domestic investments also have a positive effect on economic growth both in developed and developing economies.

Carkovic and Levine (2002) tried to reassess the relationship between FDI and economic growth for 72 countries over the period 1960-1995. They used the Generalized Method of Moments (GMM) panel estimator to determine the impact of FDI inflows on economic growth. Their results indicated that for both developed and developing economies FDI inflows did not exert an independent influence on economic growth. Specifically, the exogenous component of FDI did not exert a reliable positive impact on economic growth, even allowing for the level of education, the level of economic development, the level of financial development and trade openness of the recipient country.

Since our fields of interest are developing/transition economies we further focus our overview on literature concerning linkages between FDI and growth in such countries. Lyroudi et al. (2004) investigate the existence and the nature of the FDI effect on the growth rate of a panel of transition economies, by applying Bayesian analysis. The study analyzed a sample of transition economies<sup>3</sup> in the period of 1995 to 1998. The analysis is performed with two variables: the independent variable is FDI as a percentage share of GDP and the dependent variable is GDP growth rate. The results indicate that FDI does not exhibit any significant relationship with economic growth for the transition countries. The same conclusions were obtained after splitting the sample into two groups (low and high income). The data before 1998 was not included due to low quality, poor institutions and structural change caused by the 1997-1998 financial crisis. Melnyk, et.al. (2014) investigate the impact of foreign direct investing on economic development of post Comecon transition economy countries<sup>4</sup>. They use the neoclassical growth theory model to analyze the FDI effects on economic growth. The analysis is performed with macroeconomic variables for the economies in transition, transition indicators measuring progress towards market economy status and some indicators on human capital. The data are pooled into a panel on 26 economies in transition over a period of 13 years. In order to determine the appropriate method of panel data estimation, the Hausman specification test was executed which implied that it was more appropriate to use the fixed effects rather than random effects model. The results show significant FDI influence on host country's economic growth. Furthermore, results show that infrastructure reforms, trade system reform and trade policy are also positively correlated with economic growth. Sapienza (2009) examines the role of FDI in promoting growth in 25 Central and Southern Eastern Europe (CSEE) using a dynamic panel approach that includes lags of involved variables to mitigate the

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<sup>3</sup> Albania, Azerbaijan, Belarus, Bosnia, Georgia, Kazakhstan, Kyrgyz Republic, Latvia, Lithuania, Moldova, Mongolia, Romania, Russia, Slovenia, Tajikistan, Turkmenistan, and Uzbekistan.

<sup>4</sup> Bulgaria, Czech Republic, Slovakia, Hungary, Poland, Romania, Mongolia, Russia, Armenia, Azerbaijan, Belarus, Estonia, Georgia, Kazakhstan, Kirgizstan, Latvia, Lithuania, Moldavia, Tajikistan, Turkmenistan, Uzbekistan and Ukraine.

problem of serial correlation. It adopts also a 'general-to-specific' approach to deal with the problem of the omitted variable and uses different estimation methods to control for heterogeneity and autocorrelation. The main finding is that FDI has a positive and significant impact on economic growth in accordance with theory.

Beside the amount of FDI inflows, what matters for growth is their sectorial decomposition and the type of FDI that could significantly influence the future performances of the economy. In that respect, Alfaro (2003) argues that FDI can convey great advantages to host countries, but such gains can differ across the primary, manufacturing and services sectors. She conducts an empirical analysis using cross-section data for 47 countries during 1981-1999 which shows that FDI inflows into the primary sector<sup>5</sup> tend to have a negative effect on growth, while on the contrary the FDI inflows in manufacturing sector have positive effect and evidence from the foreign investments in service sector is ambiguous. Wang (2002) studies the impacts of different sector-level foreign direct investment (FDI) inflows on host country's economic growth. Data in 12 Asian economies over the period of 1987-1997 are employed. The empirical results show that FDI in manufacturing sector has a significant and positive effect on economic growth in the host economies. FDI inflows in non-manufacturing sectors do not play a significant role in enhancing economic growth. Furthermore, he found that without the decomposition of total FDI inflows, the FDI effect on host country's economic growth is possibly underestimated in the previous literature<sup>6</sup>.

#### **4. Stylized facts**

The transition economies (Central Eastern, Baltic and South Eastern countries<sup>7</sup>), experienced rapid growth patterns in the early and mid-2000s, contrary to the turbulence and divergence of the 1990s. After the turmoil from the Russian crisis in 1998, the region as a whole rebounded quickly from an average growth rate of 1.8 percent in 1999 to an average growth of 4.8 percent the following year. In the mid-2000s with favorable global conditions and increasing confidence coming from the rapid convergence with Western Europe, the average growth for the region was 5.5 percent, with no country growing at less than 3.0 percent annually, a faster rate than most countries have consistently managed before or since. However, while soundly based at

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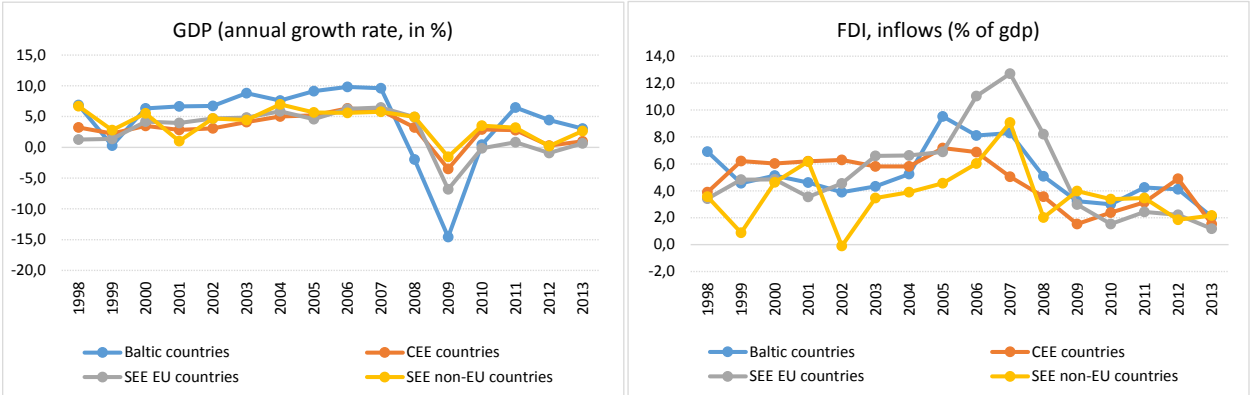
<sup>5</sup> Agriculture, mining, electricity, water supply and construction sectors.

<sup>6</sup> Previous research focusing only on Macedonia was done by Krstevska and Petrovska (2012), who also find that FDI inflows are an important factor for GDP growth and export performances of the Macedonian economy.

<sup>7</sup> Baltic countries: Estonia, Latvia and Lithuania; CEE countries: Czech Republic, Poland, Hungary and Slovakia; SEE EU countries: Slovenia, Bulgaria, Croatia and Romania; SEE non-EU countries: Macedonia, Turkey, Albania, Bosnia and Herzegovina and Serbia.



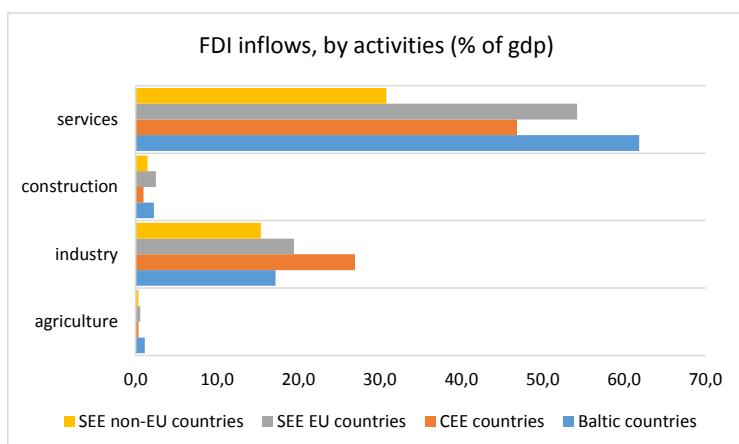
the start, growth in this period became increasingly imbalanced, driven in many countries by large-scale borrowing for consumption and infrastructure and residential construction. The pace of economic reform generally slowed in this period, and the strong growth was based on a rapid increase in domestic demand, with credit booms fueling consumption growth and investment directed towards construction and real estate. The flipside was the build-up of very large external imbalances, as productive capacity struggled to keep up with the demand pace. The ensuing global financial crisis had devastating effect for the transition economies: output declines in 2009 averaged 6.0 percent and ranged up to 15.0 percent, a more severe impact than in any other region of the world. Also, countries with previously accumulated vulnerabilities seem to have been much more affected by the global crisis. Almost all countries in the region saw a return to growth in 2010 and early 2011, with the rebounds tending to be strongest in the countries that had seen the largest output falls in 2009, notably the Baltic countries. The ensuing euro area crisis and slow global recovery, together with rising geopolitical tensions have weighed on growth since and further cloud the outlook looking forward.



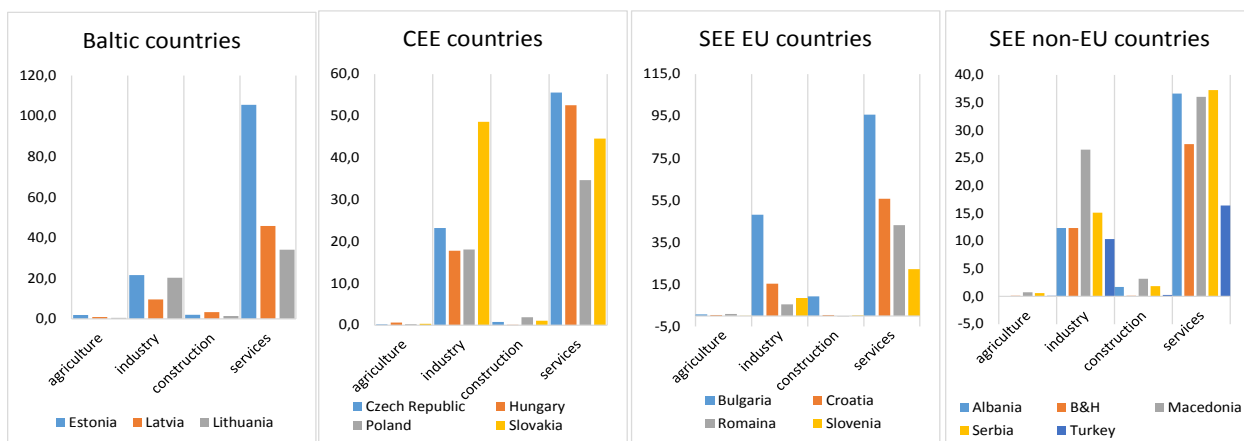
\* Baltic countries: Estonia, Latvia and Lithuania; CEE countries: Czech Republic, Poland, Hungary and Slovakia; SEE EU countries: Slovenia, Bulgaria, Croatia and Romania; SEE non-EU countries: Macedonia, Turkey, Albania, Bosnia and Herzegovina and Serbia. Source: WB and wiw database.

Trade and investment links with Western Europe have been among the most important factors behind the growth in the last two decades. At the very beginning (1990s), investment needs were overwhelming, given underdeveloped infrastructure and rundown industrial capacity. Capital from Western Europe infused the region, playing a key role in its development. Over the transition period, the region moved from relative isolation to become highly financially integrated with the rest of the world, particularly the EU. The bulk of external capital into the region has taken the form of FDI and cross-border bank flows. The dominance of FDI has been partly a result of the large scale privatization that followed the transition, but also of Greenfield investment, particularly in Central Europe. And as countries opened their financial sectors to

privatization, much of the sector became owned by Western parent banks. Over the analyzed period of 15 years (1998-2013) the transition countries registered annual FDI inflows of around 5.0 percent of GDP on average. However, FDI inflows dynamics varied throughout the period, as expected. In the pre-accession and pre-crisis period for most of the economies, FDI inflows averaged around 6.0 percent, with new-EU countries pulling in more of the capital compared to non-EU countries. In 2009 and the overall post-crisis period, FDI influx slowed down considerably i.e. more than halved in the EU countries, mostly in the CEE countries, while the SEE non-EU countries scaled down by around 1 percentage point.



\* Baltic countries: Estonia, Latvia and Lithuania; CEE countries: Czech Republic, Poland, Hungary and Slovakia; SEE EU countries: Slovenia, Bulgaria, Croatia and Romania; SEE non-EU countries: Macedonia, Turkey, Albania, Bosnia and Herzegovina and Serbia. Source: WB and wiiw database.



\*Cumulative FDI inflows, by activities, as % of GDP, for the period 1998-2013. Source: WB and wiiw database.

Foreign capital in the form of direct investment has flowed to all analyzed transition economies primarily to two sectors of the economy, i.e. industry and services. At the end of 2013, the cumulative value of FDI in industry accounted for 28.7% of all investments in the region, and the services totaled 68.0%. Dynamically, FDI distribution throughout the period and among groups of countries varied between the shares of industry and services. In the pre-accession

and pre-crisis period, industry share in FDI inflows within the CEE countries stood at 40.1%, highest among all country groups, whilst for the SEE countries (both EU and non-EU) this percent was around 28.0% and for the Baltic states only 21.4%. These numbers for all EU member countries drastically decreased in the post-crisis period, in the favor of higher services share of FDI inflows. In contrast, SEE non-EU countries registered higher FDI in the industry sector in the latter period, with the shares rising to 41.6%. In the case of the industrial sector, foreign investors invested mainly in manufacturing and, to a lesser extent, in mining and quarrying or electricity, gas, steam and air conditioning supply. The FDI inflow to the services sector was directed mainly to the financial<sup>8</sup> and insurance, real estate, retail trade and the transportation sectors. The significant role of the aforementioned sectors in FDI inflow arises from the fact that privatization of banks, insurance companies and other state enterprises, conducted in the first years of transformation, involved the participation of foreign investors. Considering the distribution of FDI in services, it can be observed that the CEE countries and the Baltic States show a similar share of foreign capital in the financial intermediation sector.

Finally, we would like to note that when analyzing the historical facts and trends through simple averages one must have in mind that the drawn conclusions may not apply to all countries involved. This type of simplified analysis of the data usually does not account for the individual country's specific economic and political characteristics that affect both economic growth and FDI inflows.

## 5. Empirical Analysis

### 5.1 Econometric Methodology

In this section we provide the empirical framework for our analysis. In this regard, we extend the standard growth model by adding three sector-specific variables - foreign direct investment in industry, construction and services, in addition to the standard Cobb-Douglas production function variables representing capital and labor. Thus, our model takes the following form:

$$Y_{it} = f(K_{it}, L_{it}, FDI\_IND_{it}, FDI\_CONS_{it}, FDI\_SERV_{it})$$

where  $Y_{it}$  is real GDP,  $K_{it}$  and  $L_{it}$  are physical and human capital, respectively, henceforth approximated by domestic investment (GCFit) and gross enrolment ratio in secondary education (SEC\_ENR<sub>it</sub>) variables, whereas  $FDI\_IND_{it}$ ,  $FDI\_CONS_{it}$  and  $FDI\_SERV_{it}$  are foreign direct

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<sup>8</sup> The financial sector includes financial service activities such as central banking activities, activities of holding companies, financial leasing and activities of other credit granting institutions.

investment in industry, construction and services sectors.  $i$  and  $t$  are the usual country and time subscripts. However, as it was mentioned before, to guard against omitted variable bias we further expand our model by including the following control variables included in vector  $Z$ : lagged/initial GDP per capita, inflation, government consumption, trade openness, transition index (EBRD) and governance index (World Bank). Thus, our final model has the following basic formulation:

$$\text{GROWTH}_{it} = \alpha_{it} + \beta \text{GCF}_{it} + \gamma \text{SEC\_ENR}_{it} + \lambda \text{FDI\_IND}_{it} + \psi \text{FDI\_CONS}_{it} + \phi \text{FDI\_SERV}_{it} + \theta Z_{it} + \mu_i + \xi_{it}$$

where  $\mu_i$  is a set of unobserved fixed effects and  $\xi_{it}$  is i.i.d standard error.

We first use static panel models that control for unobserved heterogeneity in the sample, and then we apply dynamic panel procedure as in Roodman (2009). Following the modeling approach of Carkovic and Levine (2002), Alfaro (2003) and Wang (2009) we estimate the regressions for a panel of 16 CESEE countries for a time period that incorporates missing values.

## 5.2 Data Description

This section provides a description of the variables used in the model as well as the sources for the panel data. We use the following variables in our extended growth model: per capita real GDP growth rate, foreign direct investment in industry, construction and services, gross capital formation, secondary education enrolment, GDP per capita, inflation, government consumption, trade openness, as well as transitional and institutional variables. GROWTH is the dependent variable and is defined as the annual growth rate of real GDP per capita. FDI\_IND, FDI\_CONS and FDI\_SERV<sup>9</sup> represent the annual inward FDI inflows as a share of GDP in the industrial, construction and services sectors and they are the primary variables of interest through which we test the importance of the sectorial FDI for the host countries in our sample<sup>10</sup>. In line with the theory, we include the variable GCF which is intended to capture the effects of domestic investment on economic growth. Ideally this variable should represent the stock of physical capital, but because such data are usually unavailable, gross capital formation as a share of GDP is used as a proxy instead, similarly as in most of the studies on this topic. However, to ensure that this would be a suitable proxy for domestic investment, from gross capital

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<sup>9</sup> The sectoral disaggregation of the FDI inflows is done according to the Statistical classification of economic activities in the European Community - NACE (revision 1 and 2).

<sup>10</sup> Because the amount of inward FDI inflows in the agriculture sector in the analyzed countries is zero or close to zero in most years, it was decided this sector to be excluded from the analysis.

formation, we subtract the components that are used to finance fixed capital formation such as equity and reinvested earnings, which statistically are also classified as foreign direct investment and which we acquired from the FDI database of the Vienna Institute for International Economic Studies. This should solve the problem of multicollinearity with the FDI variables as well. In order to be properly specified, the model should also include a measure of the stock of human capital as it is one of the basic determinants of growth. Since education is widely accepted as a main component of human capital, we chose the gross enrolment ratio in secondary education of both sexes (SEC\_ENR) to serve as a proxy human capital variable. Another variable that is regularly included in endogenous growth theory is the initial level of GDP per capita, which is used to control for the possible existence of convergence of growth across countries. For that purpose we introduce GDP\_PC which represents GDP per capita in the year before the real GDP growth rates are taken (i.e. the first lag) in the static regressions and initial GDP per capita (in 1998) in the dynamic regressions. Although the main focus of our paper is to investigate how sectorial FDI inflows affect the economic growth, it is imperative that the model should be properly specified by controlling for additional growth determinants. This allows the problem of omitted variable bias to be tackled. Hence, we include the annual change in the consumer price index as a measure of inflation (CPI), general government final consumption expenditure as a share of GDP (GOV\_CONS) and a measure of trade openness calculated as a ratio of exports and imports to GDP (TRADE). We also control for the effect of structural reforms on economic growth by including an aggregate transition index (TRANS) in the model, constructed as an unweighted average of the individual transition indicators published annually by the EBRD. These transition indicators refer to large scale privatization, small scale privatization, governance and enterprise restructuring, price liberalization, trade and foreign exchange system and competition policy. Since the importance of host country institutions for economic growth nowadays is undisputable, we also include a suitable institutional variable named WGI, representing an unweighted average of the Worldwide Governance Indicators published by the World Bank. The index incorporates six broad dimensions of governance such as voice and accountability<sup>11</sup>, political stability and absence of violence, government effectiveness, regulatory quality, rule of law and control of corruption.

We expect that all coefficients of the independent variables, except inflation and GDP per capita, should take positive signs. Hence, we expect that higher FDIs, capital, labor and trade

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<sup>11</sup> Voice and accountability captures perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media.

and faster structural and institutional reforms should have positive effects on GDP growth. On the other hand, in line with the theory, higher inflation should have negative impact on the economic activity. A negative coefficient on GDP per capita is also anticipated, which would indicate convergence, i.e. that the analyzed economies tend to move towards the same level of per capita income over time. The expected sign on the coefficient for government consumption is left an open question as it can be positive or negative. The dataset used in this study includes 16 CESEE countries and covers the period from 1998 to 2013, although there are many missing values especially regarding the independent variables. More specifically, the following countries are included in the panel: Macedonia, Serbia, Slovenia, Bulgaria, Croatia, Albania, Bosnia and Herzegovina, Czech Republic, Poland, Hungary, Slovakia, Romania, Estonia, Latvia, Lithuania and Turkey. Data are acquired from the FDI database of the Vienna Institute for International Economic Studies (wiiw), the World Bank's World Development Indicators database, IMF and EBRD. The chosen time period is conditional on the availability of detailed sectorial data for foreign direct investment. Appendix I provides some additional information as well as descriptive statistics.

### **5.3 Results**

Although the main purpose of this analysis is to examine whether FDI in industry, construction and service exert any effects on a host country's growth, it is useful to initially assess the impact of total FDI inflows on economic growth. Table 1 summarizes the results of fixed effects panel estimation<sup>12</sup>. Since we have detected that the model suffers from heteroskedastic, autocorrelated and cross-sectional correlated error structure, we have corrected for this by performing regressions with Driscoll-Kraay standard errors<sup>13</sup>.

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<sup>12</sup> Random effects model is not pursued since Hausman test shows that fixed effects model is more appropriate.

<sup>13</sup> This was done through the xtsc program in Stata. According to Hoechle (2007, p.17) Driscoll-Kraay standard errors have better small sample properties than other more commonly employed estimators when cross-sectional dependence is present.

Table 1: Growth and total FDI  
 Dependent variable - real GDP per capita growth rate

	(1)	(2)	(3)	(4)	(5)
FDI	0.34** (0.123)	0.42*** (0.095)	0.45*** (0.101)	0.46*** (0.113)	0.48*** (0.069)
GCF		0.76*** (0.148)	0.81*** (0.192)	0.79*** (0.201)	0.81*** (0.187)
SEC_ENR		0.95 (1.052)	1.23 (0.986)	1.27 (0.971)	0.85 (1.230)
GDP PC		-1.04*** (0.324)	-1.73*** (0.290)	-1.90*** (0.293)	-2.12*** (0.511)
CPI			-0.01 (0.046)	0.04 (0.049)	-0.07 (0.070)
GOV. CONS			-0.36 (0.398)	0.25 (0.498)	-1.89** (0.572)
TRADE			0.83*** (0.266)	0.75** (0.277)	0.92** (0.313)
TRANS				2.57* (1.318)	
WGI					0.44*** (0.098)
Observations	186	159	156	150	91
R <sup>2</sup>	0.15	0.31	0.34	0.35	0.48

Driscoll-Kraay standard errors in parenthesis. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.  
 Source: Authors' calculations.

The results show that FDI have a positive and significant effect on growth. As it can be seen from the table, FDI maintain their significant positive effect even after controlling for per capita income and physical and human capital (Column 2), inflation, government consumption and trade openness (Column 3) and transition and institutional variables (Columns 4-5). Moreover, the coefficient on FDI is rather stable and ranges from 0.34 in the case when there are no control variables to 0.46 and 0.48 in the cases when we control for structural and institutional factors.

However, given that aggregate data on FDI inflows encompass foreign investment in industry, construction, services and agriculture, it might be more plausible that FDI-related technology transfers, managerial know-how and market access would tend to be more relevant for some sectors than others. Subsequently we test this hypothesis and assess the impact of foreign investment in different sectors on economic growth, which is our main focus in this paper.

Table 2: Growth and FDI by sector  
 Dependent variable - real GDP per capita growth rate

	(1)	(2)	(3)	(4)	(5)
FDI_IND	0.05 (0.043)	0.03 (0.041)	0.03 (0.048)	0.12** (0.044)	0.08*** (0.018)
FDI_CONSTR	0.04 (0.029)	0.01 (0.043)	0.03 (0.053)	0.04 (0.056)	0.04 (0.053)
FDI_SERV	0.25** (0.104)	0.37*** (0.078)	0.40*** (0.071)	0.41*** (0.077)	0.34** (0.114)
GCF		0.64*** (0.168)	0.67** (0.231)	0.76** (0.269)	0.68** (0.289)
SEC_ENR		1.85 (1.343)	2.48* (1.217)	2.48* (1.265)	2.56* (1.331)
GDP_PC		-0.65** (0.297)	-1.75*** (0.437)	-1.09* (0.621)	-2.02*** (0.342)
CPI			-0.02 (0.061)	-0.05 (0.081)	-0.03 (0.077)
GOV. CONS			-0.02 (0.848)	1.84 (1.247)	-0.37 (1.215)
TRADE			1.36** (0.554)	1.65* (0.856)	1.82** (0.689)
TRANS				-0.09 (0.089)	
WGI					0.31*** (0.062)
Observations	136	115	114	83	65
R <sup>2</sup>	0.16	0.30	0.36	0.43	0.31

Driscoll-Kraay standard errors in parenthesis. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.  
 Source: Authors' calculations.

Our main finding is that FDI inflows in industry and services sectors have a significant positive effect on economic growth, which is robust to the addition of other growth factors. Based on the specifications using the full set of independent variables, a one percentage change in the shares of FDI in industry and services in GDP is associated with an increase of real GDP per capita by 0.08-0.12 and 0.34-0.41 percentages, respectively. With regards to the important role of the services sector for growth, it was mentioned earlier that the FDI inflow to this sector in the analyzed countries was directed mainly to the financial and insurance, real estate, retail trade and the transportation sectors, which are thought to provide both direct and indirect support to economic growth. On the other hand, our finding is that FDIs in the construction sector do not appear to contribute to the host country's economic growth to a significant degree. However, it should be noted that over the sample period the bulk of FDI in the CESEE countries is concentrated specifically in the industry and services sectors, unlike the construction sector which has received only minimal amounts of FDI. In addition, the results suggest that domestic investment is a very significant growth determinant, with a one percentage change causing the growth to increase by 0.64-0.76 percentages. Thus, according to these findings, domestic and foreign investments have a tendency to foster growth in a



complementary manner. As expected, the coefficient on human capital is positive and significant in most of the regressions, implying that educational attainment is an important driver of economic growth. This is in contrast with the previous regressions where aggregate FDI was explanatory variable. In fact, our research has found that a one percentage change in the gross secondary enrolment ratio is associated with growth that is higher by 2.48-2.56 percentages. It is well known in the theory that education should contribute positively to economic growth since it increases both labor productivity and innovative capacity of the labor force and facilitates the diffusion and transmission of knowledge (Lucas, 1988; Romer, 1990 and Mankiw et al., 1992). With regards to the measure of initial conditions, the coefficient on GDP per capita has a significant and negative sign, which lends support to the existence of growth convergence across countries. On the other hand, the variables referring to macroeconomic (in)stability have the expected sign implying that both increased inflation and government consumption have unfavorable impact on GDP, but they are found to be statistically not significant. In addition, it was found that trade openness also has an effect towards promoting economic growth in the analyzed countries. On the other hand, the estimated coefficient on the aggregate transition index is negative and statistically not significant, contrary to the findings from estimations where total FDI was a dependent variable. However, this finding is not uncommon in recent research that reexamines the relationship between structural reforms and economic growth<sup>14</sup>. In contrast, better institutions appear to contribute positively to economic growth, as suggested by theory, with one standard deviation increase in institutional quality leading to a contemporaneous increase in economic growth by 0.3 percentages. This finding is in line with most of the other studies on this topic<sup>15</sup>.

However, it should be noted that although the estimator applied previously takes into account the unobserved heterogeneity across countries, the estimates might still be biased because of the omitted dynamics in the underlying process. This, as it is well known, is a potential source of endogeneity problems. In order to tackle this, subsequently we include the lagged dependent variable among the regressors and apply the difference GMM estimator<sup>16</sup> developed for dynamic panel models to observe whether there will be changes in our conclusions about the impact of sectorial FDI on GDP. In practice, GMM is commonly used technique when there is endogeneity in the model. The main reason for this is because it tends to have the lowest bias and highest

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<sup>14</sup> These studies use various measures of structural reforms and find similar results. See for example Radulescu, R., Barlow, D. (2002) and Lawson, C., Wang, H. (2004).

<sup>15</sup> See for example Hall, R. E., Jones C. I. (1999), Sokoloff, L. K., Engerman L. S. (2000) and Rodrik, D. (2000).

<sup>16</sup> This was done through the xtabond2 program in Stata.

efficiency among alternative estimators (Arellano and Bond, 1991). Moreover, it is specifically designed for estimating models such as ours, which include dynamics, fixed effects and multiple endogenous variables. It tackles endogeneity by first differencing the data, and then using not only the first but also deeper lagged levels of the dependent variable as instruments for its lagged difference. Furthermore, it also uses the current and lagged values of other variables in the model as instruments. However, the use of GMM does not necessarily imply a mechanical and outright solution of the endogeneity problem and some necessary conditions also need to be fulfilled. According to Roodman (2009b), one serious disadvantage of this method is the problem of instrument proliferation, given that GMM estimators tend to generate many potential instruments relative to the number of observations in the sample. The downside of having too numerous instruments is that it makes it difficult for the endogenous component to be fully extracted from the instrumented variables, thus resulting in overfitting bias and invalid results. Consequently, in order to tackle the problem of too many instruments, we contain their number by both collapsing the instruments and limiting the lag depth, as proposed by Roodman (2009b). Another potential problem of GMM estimators is that they were initially designed for typical microeconomic panels with a large cross-section and a short time dimension, whereas their small sample properties might be debatable. However, there are a number of recent studies that find GMM preferable to other techniques even in small samples. Moreover, this is an issue that may be considered endemic in research dealing with macro panels consisted of countries such as the ones of our interest.

The results of the estimation are given in Table 3.

Table 3: Growth and FDI by sector

Dependent variable - real GDP per capita growth rate

	(1)	(2)	(3)	(4)
I.GDP	0.46** (0.167)	0.12 (0.271)	0.23 (0.161)	0.01 (0.218)
FDI_IND	0.13 (0.100)	0.18* (0.112)	0.18** (0.093)	0.17* (0.101)
FDI_CONSTR	-0.06 (0.074)	-0.02 (0.068)	0.02 (0.036)	0.02 (0.059)
FDI_SERV	0.28*** (0.097)	0.47** (0.199)	0.38*** (0.107)	0.41** (0.193)
GCF	0.49* (0.287)	0.69** (0.354)	0.71* (0.419)	0.56* (0.320)
SEC_ENR	2.41* (1.361)	4.01* (2.581)	2.12** (1.010)	3.83** (1.887)
GDP_IC	-1.29** (0.653)	-1.03* (0.572)	-1.37* (0.835)	-1.72** (0.710)
CPI		0.02 (0.049)	-0.02 (0.056)	0.08 (0.097)
GOV. CONS		0.58 (1.337)	1.15 (1.692)	0.07 (1.131)
TRADE		0.02 (0.541)	0.73 (0.661)	-0.55 (0.661)
TRANS			-3.71 (2.564)	
WGI				0.85* (0.460)
Observations	99	98	96	89
Number of instruments	15	22	22	22
Arellano-Bond test for serial correlation	0.847	0.629	0.385	0.852
Hansen test	0.359	0.808	0.557	0.867

Standard errors in parenthesis. \*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1.

Source: Authors' calculations.

The diagnostics tests suggest that the model is well specified given that there is no second order correlation and the instruments are valid according to the Hansen statistic. The coefficient on lagged GDP per capita is positive and significant only in specification (1) of the model, whereas in all other cases it is found insignificant, tentatively supporting the validity of the fixed effects model. Specifically, the results from the dynamic estimation in general confirm the ones obtained with the static model. Industry FDI still has a significant and positive coefficient, indicating that a one percentage increase in FDI in industry leads to a 0.18 percentages increase in economic growth. It is again confirmed that the main positive contribution to economic growth comes from FDI in the services sector. A one percentage increase in services FDI is associated with an increase of growth by 0.28-0.47 percentages, and this is comparable with the findings from the static regression. Furthermore, domestic investment, schooling and institutional quality are all shown to have significant role in generating economic growth in CESEE countries. On the other hand, FDI in construction, inflation, government consumption and transition index again do not enter the growth regressions significantly. In addition, the

estimations are robust to the exclusion of these insignificant variables. From the comparison of Tables 2 and 3 it seems that the key difference between the static and dynamic specification is related with the trade openness variable, which is statistically significant in the former case and not statistically significant in the latter case. Taking into account that this change is mainly reflected on the size of the coefficient on FDI in industry, which is larger in the dynamic specification, one might infer that trade openness is closely associated with FDI in the tradable industrial sector, thus making it difficult to estimate the specific FDI effect on growth when applying static regressions.

## **6. Conclusion**

The aim of this study was to estimate the FDI effect in the industry, construction and services sectors on economic growth, after controlling for other standard growth factors, as well as for possible biases caused by unobserved heterogeneity and endogeneity. The main contribution of the paper is that it attempts to estimate whether there are heterogeneous effects of FDI inflows in different sectors on economic growth in the CESEE countries. The research was conducted by using both static and dynamic panel data models in order to draw more certain conclusions. We have started the analysis by examining the impact of aggregate FDI inflows on growth. In this regard, panel estimations show that total FDI contribute positively to the economic growth in the analyzed countries, which is in line with other research on this topic. Taking into account this finding, we have directed our main focus to the decomposition of FDI inflows into different sectors. Consequently, analyzed on a sectorial level, this paper finds strong evidence that FDI in the industrial and services sectors exert positive influence on economic growth, whereas the FDI effect in the construction sector is found to be statistically insignificant. This finding suggests that while CESEE countries should (continue to) implement FDI-inducing policies, they should particularly target these two sectors of their economies in order to benefit from stronger spillover effects. On the other hand, the study has found that domestic investment and education also play a substantial role in promoting economic growth.

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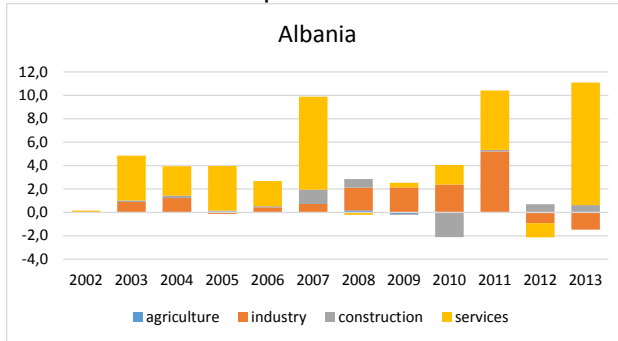
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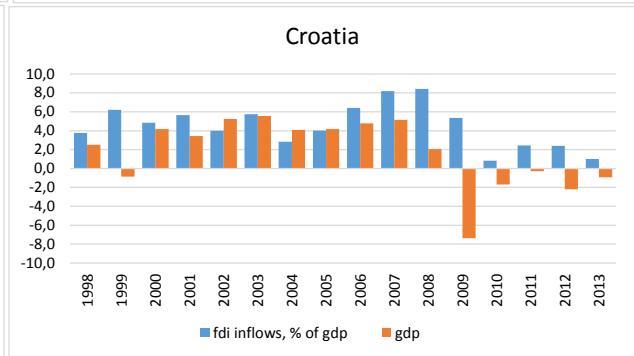
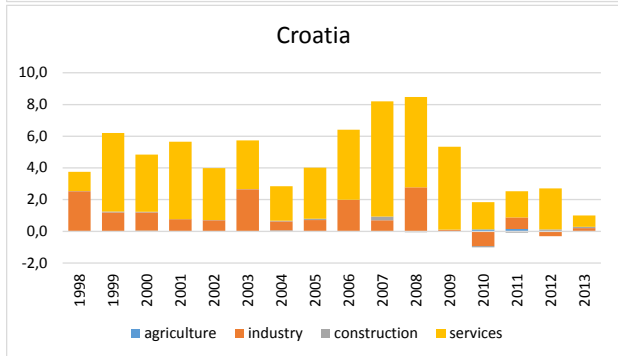
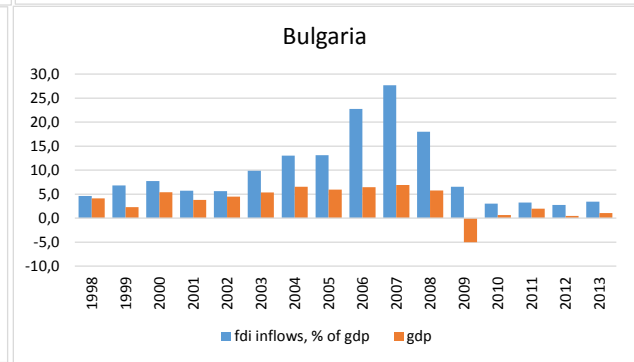
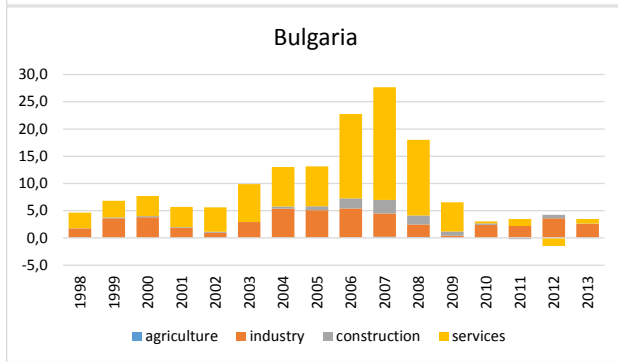
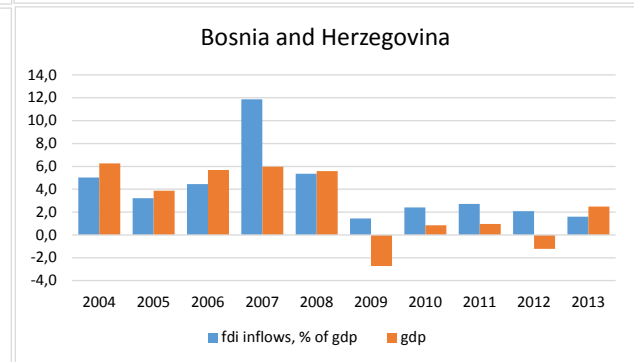
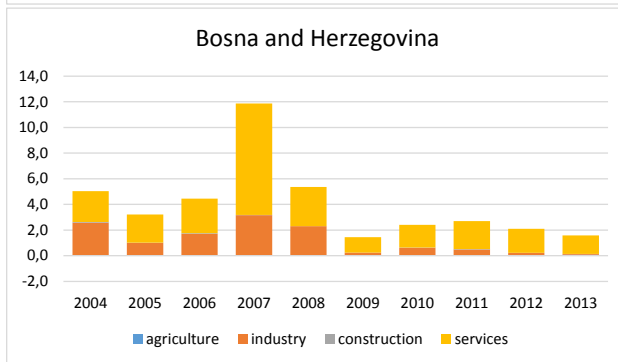
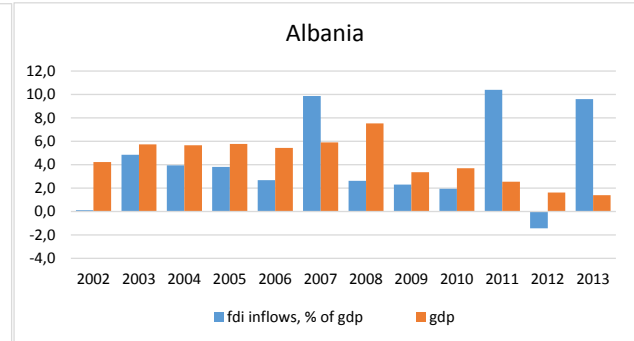
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# Appendix I

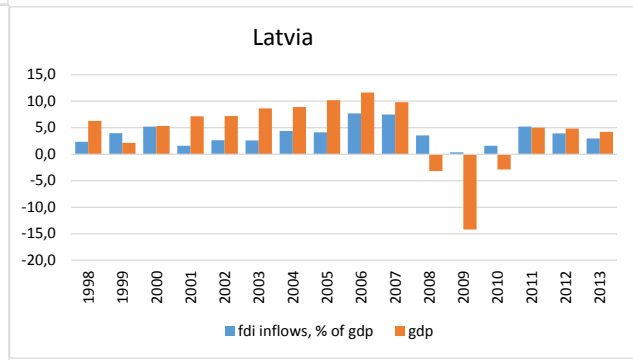
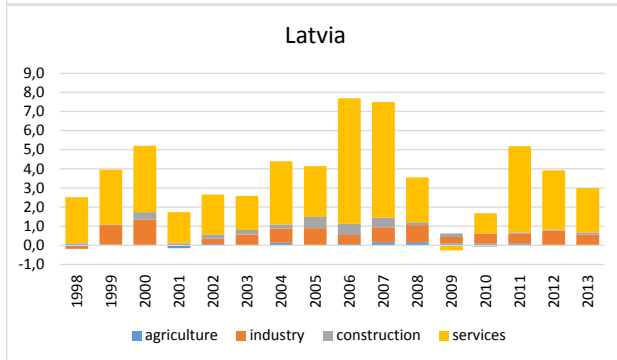
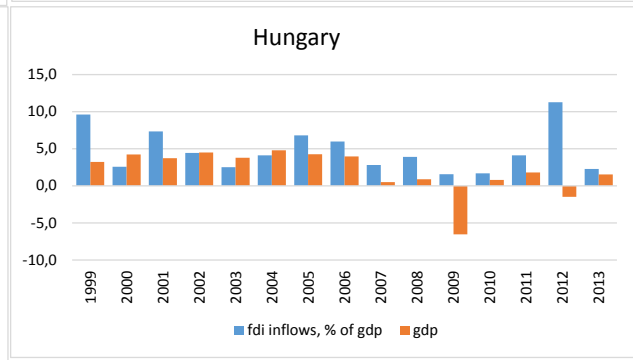
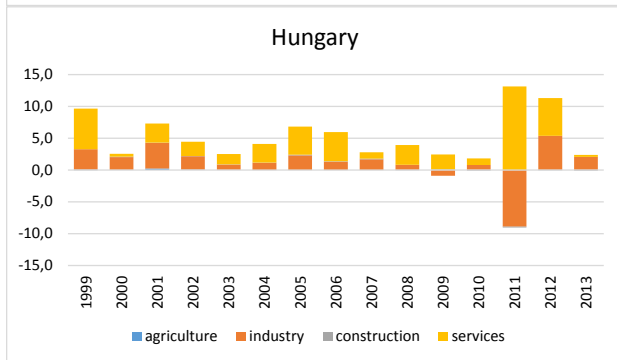
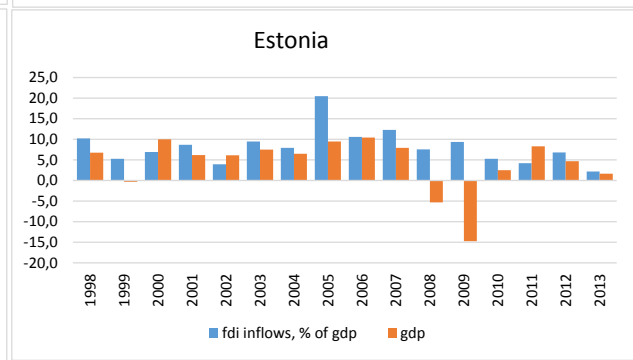
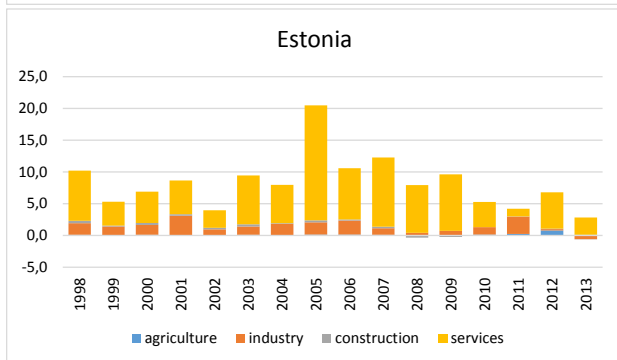
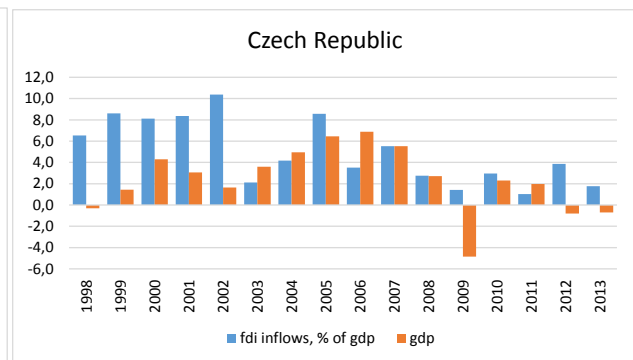
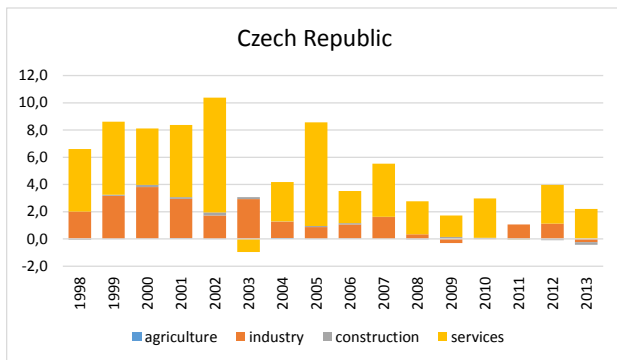
Figure 1  
FDI sectorial decomposition

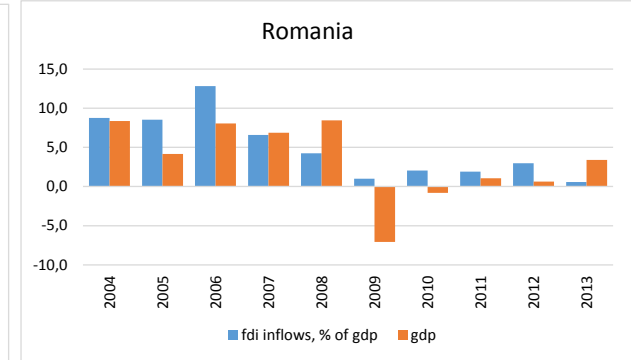
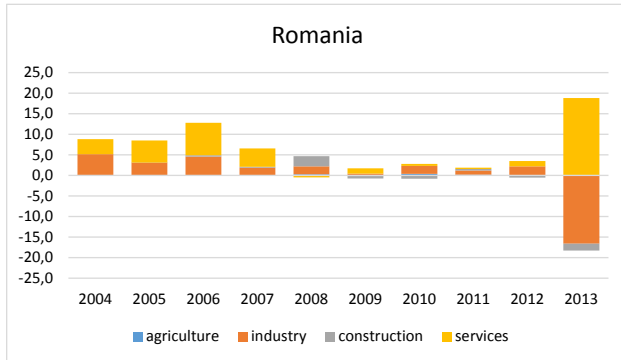
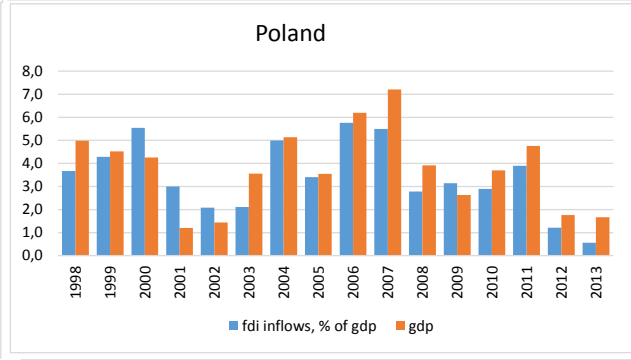
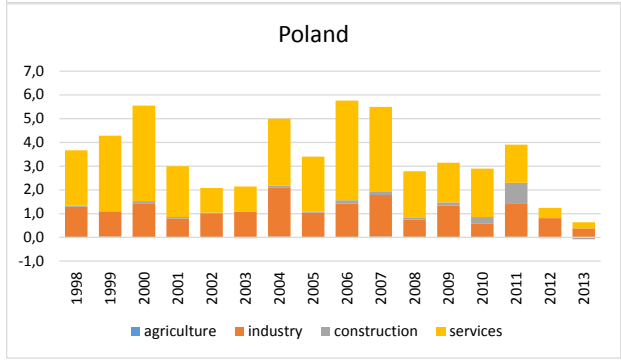
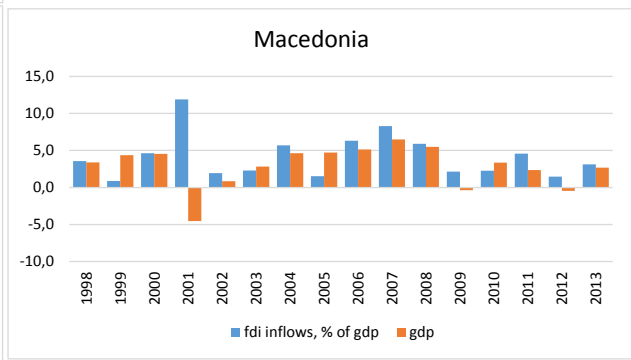
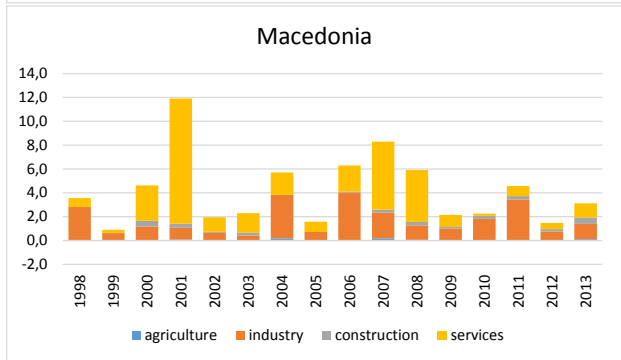
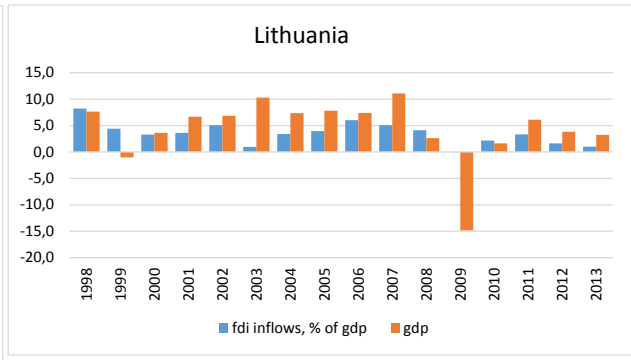
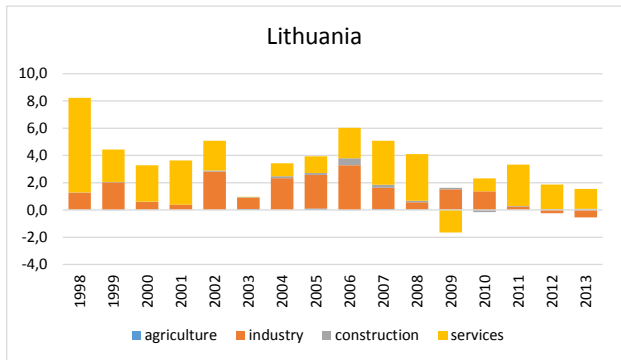


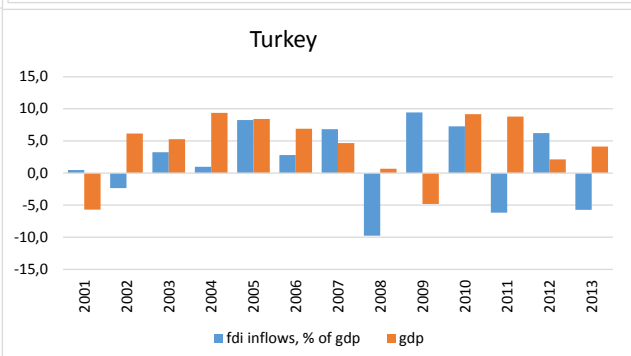
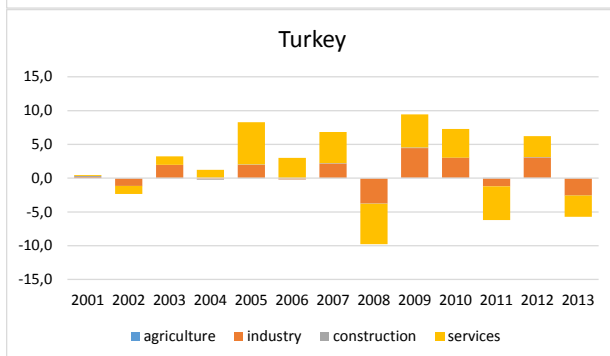
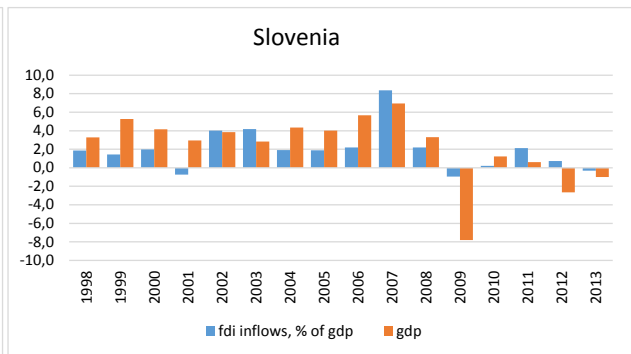
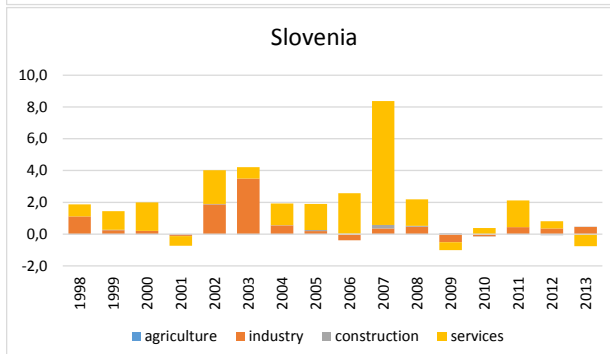
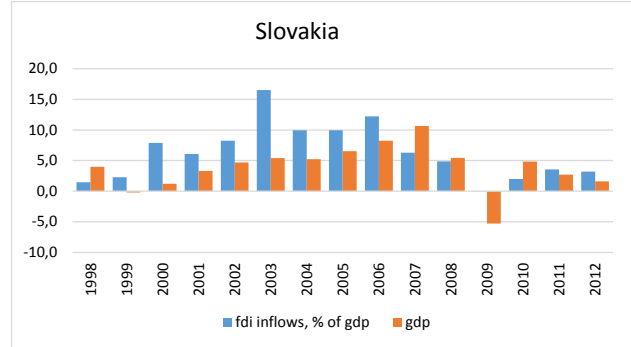
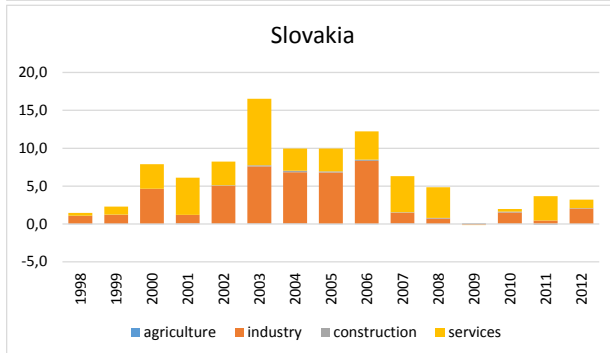
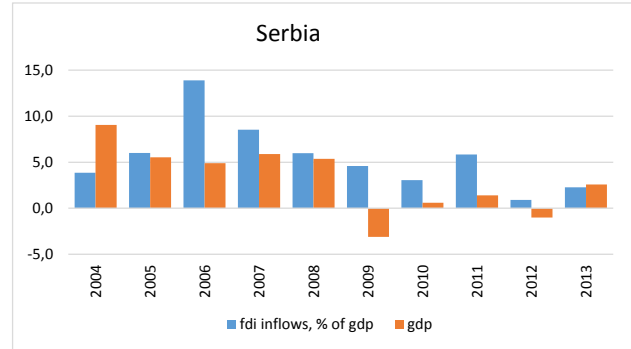
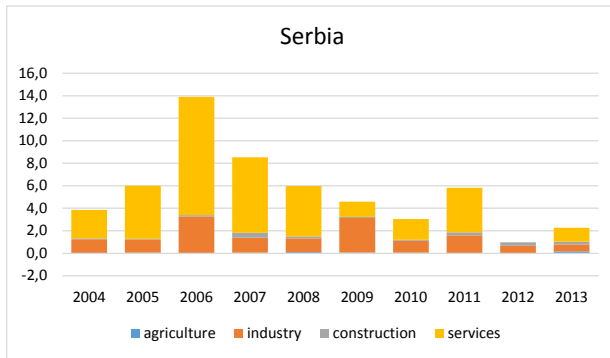
FDI inflows and GDP











Source: Wiiw database and WEO.

Figure 2: FDI in the industry sector and growth (1998-2013) in CESEE

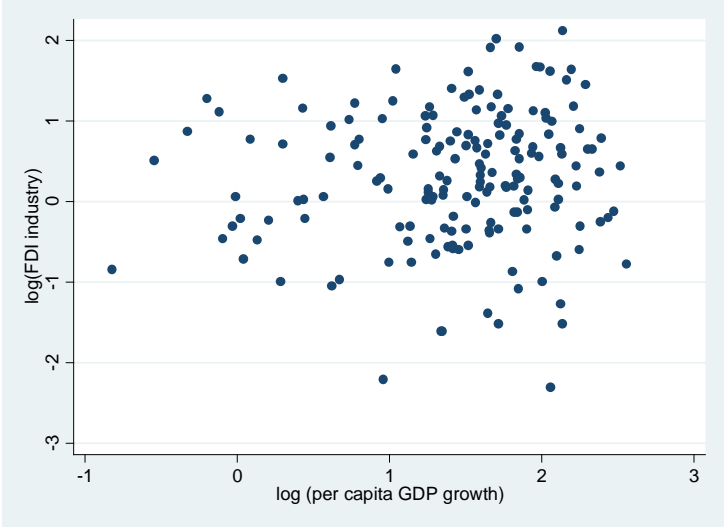


Figure 3: FDI in the construction sector and growth (1998-2013) in CESEE

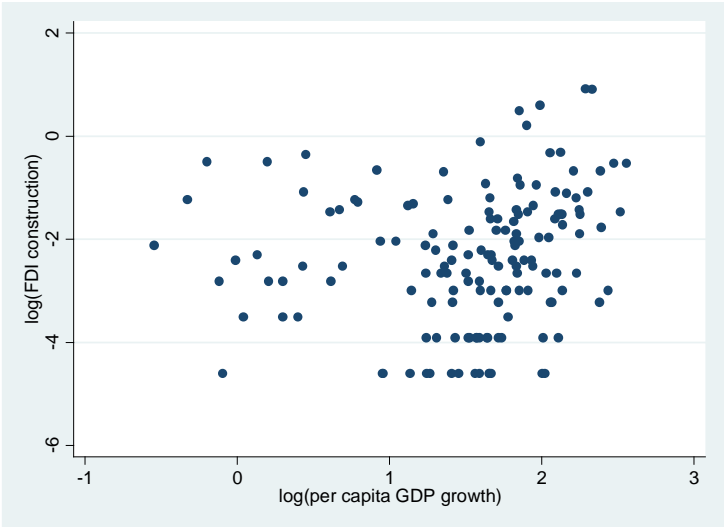


Figure 4: FDI in the services sector and growth (1998-2013) in CESEE

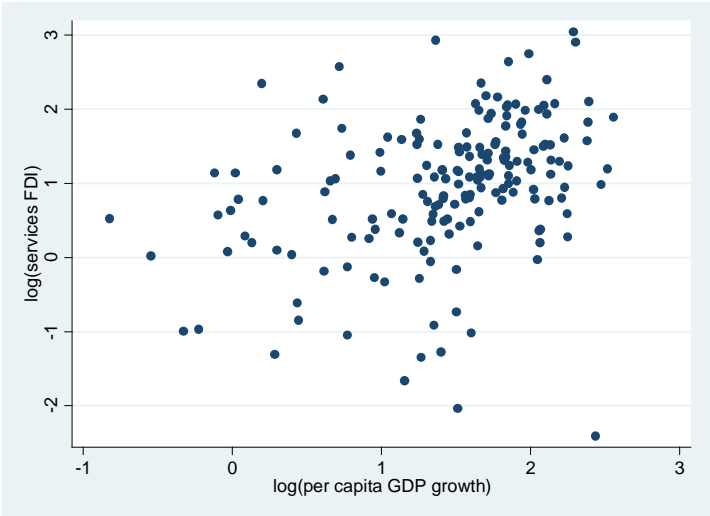


Table 1: Descriptive statistics (CESEE)

Variable	Mean	Std. Dev.	Min	Max
GDP per capita growth	3.68	4.47	-14.56	15.71
FDI industry/GDP	1.35	2.10	-16.53	8.32
FDI construction/GDP	0.12	0.38	-2.11	2.49
FDI services/GDP	3.27	3.42	-6.02	20.90
FDI/GDP	4.74	4.19	-9.78	27.67
Dom. investment/GDP	21.40	5.11	5.82	34.0
Secondary enrolment	93.07	8.95	65.89	110.21
Initial GDP per capita	12101	4554	4212	20589
Inflation	7.33	12.21	-1.22	84.72
Gov. consumption	17.56	4.17	5.69	24.51
Trade openness	98.84	32.73	24.17	181.37
Transition index	3.53	0.44	1.55	4.05
Governance index	0.32	0.52	-1.22	1.12