Does FDI crowd out domestic investment in transition countries?*†

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Abstract

The aim of this paper is to empirically investigate the relationship between FDI and domestic investment in a sample of 10 Central and Eastern European countries over the period 1995-2015. We find FDI to lead to a destructive creation phenomenon, with a short-term crowding out effect on domestic investment, followed by a long-term crowding in. Greenfield FDI develops stronger long run complementarities with domestic investment, while mergers and acquisitions do not show a significant effect on domestic investment. Financial development seems to mitigate crowding out pressures and even foster a crowding in for mergers and acquisitions.

Key words: investment, FDI, crowding-out, economic transition, financial development

JEL codes: E22, F21, F43, O52

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1. Introduction

According to the neoclassical growth theory, economic growth is mostly driven by capital accumulation, up to the optimum level of capital stock per worker (Solow, 1956), although convergence can last for a very long time. In the perspective of investment as a key determinant of economic growth, international capital flows, essentially foreign direct investment (FDI), are expected to complement domestic capital supply, thus facilitating financing for local investment projects. Additionally, FDI serves as a vector for technology transfer, contributing to overall technical progress and productivity spillovers in host countries (de Mello, 1997; Carkovic and Levine, 2005; Liu, 2008; Jude, 2016).

While FDI can directly add to the existing capital stock, it can also influence the structure of the capital stock itself. Typically, local investors may react to FDI entry, leading to either a substitution or a complementary relationship (Agosin and Machado, 2005). FDI crowds in (crowds out) domestic investors, when it leads to more (less) investment from domestic sources. Foreign investors may crowd out local investors due to increased competition, and thus deter previously planned investment projects (Markusen and Venables, 1999). The crowding-out is more likely when foreign rivals are technologically sophisticated or if when domestic firms have limited absorptive capacity. Additionally, FDI may increase the demand addressed to local suppliers and thus have a crowding in effect on domestic investment (Cardoso and Dornbusch, 1989). Finally, the supply of funds associated with FDI can increase local liquidity and loosen financial constraints for domestic firms (Harrison et al. 2004).

This paper investigates the contribution of FDI to capital accumulation in host countries, by focusing on its interaction with domestic investment. The reaction of local investors to foreign firms' entry is of major interest for policy makers. If FDI is found to significantly crowd out domestic investment, its benefits for developing countries could be seriously challenged and policies designed to attract FDI could be put into question. If crowding in is generally seen as beneficial, as it favors investment and overall economic growth, the implications of crowding out are yet ambiguous. While crowding out pushes less efficient domestic firms to exit the market, thus implying a negative short term effect on investment, it may also increase average productivity levels. This issue seems all the more important in Central and Eastern European countries (CEEC), given the obsolete capital stock inherited from the socialist era and the industrial transformation that accompanied the transition period. In fact, as the initial distance to the world technological frontier was significant, there were opinions stating that the

contribution of FDI to capital accumulation in CEE was more growth enhancing than the technology transfer associated with FDI (Hunya, 2000; Eichengreen, 2004).

Our contribution to the literature can be summarized as follows. First, we depart from the traditional empirical framework used in previous studies by adopting a broader approach that includes additional determinants of investment. Second, we investigate the individual effects of greenfield FDI and mergers and acquisitions (M&A), as we expect potentially different implications for the dynamics of local investment. Third, we built on the idea of a two nature interaction between FDI and domestic investment, through the real and the financial market. We thus tackle the role of financial development in favoring a crowding in of domestic investment. This is, to the best of our knowledge, the first paper to provide some indication as to the relative importance of the two interaction channels, in the perspective of different types of FDI. Finally, we focus our analysis on CEEC, with a particular stake in the capital accumulation issue, analyzing the entire period after the fall of communism

Our results indicate that FDI has a two stage impact on domestic investment, tending towards a creative destruction phenomenon. In the short run, FDI crowds out domestic investment, while in the long run, it tends towards a crowding in, explained by the integration of foreign affiliates in the local market and the emergence of trade linkages. We find the interaction between greenfield FDI and domestic investment to mainly occur through a real market competition mechanism, while for M&A the interaction occurs essentially through the financial market. Greenfield FDI confirms the creative destruction pattern, with a stronger long run complementarity. Instead, M&A, tributary to their financial nature, do not prove a consistent contribution to capital accumulation. While real market competition seems to prevail in the relationship between foreign and local investors, financial development can mitigate part of the crowding out pressures. Conditional on strong banking sectors and developed capital markets, M&A can even be conducive of a crowding in effect on domestic investment.

In an attempt to shed some light on the issue of substitution/complementarity between foreign and domestic investment, our paper is organized as follows. Section 2 recalls the mechanisms of such an interaction and surveys the existing literature. Section 3 lays out the empirical methodology and the dataset being used. The main results are then presented in section 4, followed by a discussion on the different entry modes of FDI in section 5. Section 6

investigates the role of financial development in fostering a crowding in effect of FDI on domestic investment. Finally, section 7 highlights the main conclusions.

2. Literature review

From the perspective of FDI as a capital flow, its effects on the host economy can mainly be found in capital accumulation[4]. The literature thus identifies two main interaction channels between FDI and domestic investment: one that takes place on the real market and a second one on the financial market (UNCTAD, 1999; Agosin and Machado, 2005).

The mechanism of real market interaction relies on the idea that FDI entry affects the demand addressed to local firms. As foreign affiliates often have lower marginal costs due to their specific advantage (Aitken and Harrison, 1999), they capture a part of the domestic demand, forcing local firms to reduce output and thus raise their average cost. Increased competition may eventually lead them to abandon investment projects or even reduce existing production capacities. Sufficiently competitive local firms may still respond to FDI entry by increasing and updating their capital stock (De Mello, 1999). To the extent that FDI uses local inputs, investment by domestic suppliers in upstream sectors can be stimulated as well (Cardoso and Dornbusch, 1989). Finally, funds temporally released by cancelling previous investment projects could be directed to other activities where local firms have a comparative advantage. A second interaction mechanism occurs on the financial market, where FDI may improve access to finance for domestic firms. As an international capital flow, FDI increases local liquidity, favors currency appreciation and interest rates decrease (Harrison et al., 2004). If the effect seems more important in developing countries (Harrison et al., 2004), its extent is thought to depend on the degree of financial market development (Razin et al. 1999). Finally, macroeconomic conditions attracting FDI, such as institutional development, economic stability or improved infrastructure should also support local investment (Kose et al, 2006).

While the literature on FDI is extremely abundant, the interaction between FDI and domestic investment has received relatively little attention so far. Theoretical studies are scarce and empirical investigations suffer from several drawbacks and point to conflicting conclusions.

[4] While technology spillovers associated with FDI are equally important, they are not the focus of this paper.

The theoretical model of Markusen and Venables (1999) sets out a two sector economy model, with multinationals (MNE) entering the final goods sector. As a consequence, local firms in this sector are crowded out, while firms in the intermediate goods sector are crowded in through upstream externalities. Barrios et al. (2005) show that the short term crowding out in the downstream sectors can be offset in the long run by boosting demand for the upstream sectors. While taking a different perspective, de Backer and Sleuwaege (2003) model the behavior of local entrepreneurs following the entry of MNE. They argue that a significant part of potential entrepreneurs actually decide to become employees of foreign affiliates rather than developing their own business, thus leading to a labor market crowding out effect. Finally, Agosin and Machado (2005) argue that foreign affiliates in developing countries introduce new products, both for the domestic and the external market, with a positive effect on capital formation through upstream and downstream spillovers, in line with Romer (1993). However, crowding in is only expected if foreign investors target underdeveloped or nascent local industries, with a limited risk of replacing existing producers. In the same vein, Amighini et al. (2017) suggest that FDI contributes to augmenting total investment only if MNE engage in productive activities, and not in trade-related activities.

The empirical question of the effect of FDI on domestic investment was, until recently, only marginally addressed in studies dealing with the growth effect of FDI (Borenzstein et al., 1998; Blonigen and Wang, 2004), as the main benefit of FDI is thought to lie in technology transfer. A small number of empirical studies deal with the specific role of FDI in domestic capital formation. Most of them suffer from several methodological drawbacks, which might explain their conflicting results, as outlined hereafter.

A first shortcoming would be the difficulty of empirically disentangling foreign investment from domestic investment. Since national accounting statistics do not distinguish between foreign and domestic plants, analysis can only be made based on approximations of what is thought to be investment by foreign firms and domestic investment. Contrary to common belief, FDI inflows do not measure investment spending by foreign firms, but they represent a financial flow stemming from the balance of payments. Therefore, obtaining domestic investment by subtracting FDI inflows from gross fixed capital formation, as performed in some of the existing studies (Adams, 2009; Wang, 2010; Morrissey and Udomkerdmongkol, 2012; Chen et al. 2017), is inaccurate as the two concepts are hardly comparable. Further details on this issue are provided in section 3.1.

Second, most empirical studies strictly follow the seminal papers of Agosin and Mayer (2000) and Agosin and Machado (2005), and only consider present and past values of output growth and FDI as determinants of investment (Misun and Tomšík, 2002; Kumar and Pradhan, 2002; Mileva, 2008; Pilbeam and Oboleviciute**,** 2012; Al-Sadig, 2013; Kamaly, 2014). However, this is a rather restrictive specification, leaving out some significant determinants of investment, like the cost of capital or uncertainty, and making the interpretation of short term effects challenging.

Third, the interpretation of the crowding in/crowding out effect is not always straightforward. Several papers conclude in favor of a crowding in effect of FDI on domestic investment based on a positive coefficient on FDI in explaining total gross fixed capital formation (Krkoska, 2001; Calderon et al. 2004; Al-Sadig, 2013; Farla et al. 2016; Amighini et al. 2017). However, this conclusion may be hasty. A positive contribution of FDI to gross fixed capital formation is not a sufficient evidence of crowding in, as domestic disinvestment could be partially offset by higher FDI inflows. Crowding in should correspond to an increase in gross fixed capital formation higher than the increase in FDI.

Finally, most empirical studies rely on aggregated macro level data and do not distinguish between different entry modes for foreign firms. However, the distinction between greenfield investment and M&A has significant implications for the contribution of FDI to the domestic capital stock. Two exceptions are Ashraf and Herzer (2014) and Chen et al. (2017). By using a large sample of 100 developing countries for the period 2003 to 2011, the former show that M&A do not have a significant impact on domestic investment, whereas greenfield FDI incurs a large crowding-out effect. The latter confirm crowding out for greenfield FDI and crowding in for M&A, leading to an overall neutral effect of FDI on domestic investment.

The aforementioned drawbacks, the country specifics, as well as the different methodological choices, single country analysis or panel setting, have led to conflicting empirical results. There is yet not consensus in the literature as to the effect of FDI on domestic investment. Bostworth and Collins (1999) highlight a short-term crowding out effect of FDI on domestic investment in developing countries, while Mody and Mushid (2005) resume the previous study and show that FDI may actually stimulate domestic investment in the long run. Agosin and Machado (2005) run an analysis on a panel of 36 developing countries during 1971-2000, and fail to reach a general conclusion as to the effect of FDI on domestic investment. They

found crowding in effects in Asia, crowding out effects in Latin America and neutral effects in Africa. Wang (2010) and Morrissey and Udomkerdmongkol (2012) use larger samples of around 50 countries and conclude that FDI crowds-out domestic investment. Adversely, Farla et al. (2016) and Kim and Seo (2003) find no evidence of FDI crowding out domestic investment. Finally, Al-Sadig (2013) even conclude in favor of a crowding in effect in a large sample of 91 developing countries over the period 1970–2000. The same conclusion is reached by Ndikumana and Verick (2008) for a sample of 38 African countries for the period 1970–2005.

When focusing on CEEC, the picture is still mixed. Mišun and Tomšík, (2002) found evidence of FDI crowding in domestic investment during the nineties in the Czech Republic and Hungary and crowding out in Poland. Titarenko, (2006) examined the effect of FDI on domestic investment in Lithuania during the period 1995–2004 and concluded in favor of crowding out. Crowding out predominately seems to be a short-term effect following foreign entry, as confirmed by Kosová, (2010) for the Czech Republic during 1994–2001 and Zajc Kejžar (2016) for Slovenia. The subsequent growth of foreign firms' local sales does not seem to induce significant crowding out for firms in CEEC. Adversely, Pilbeam and Oboleviciute (2012) investigated the effect of FDI on domestic investment in several European countries during 1990-2008 and found no crowding out effect in new European Union member states.

Overall, no clear consensus emerges from the literature regarding the effect of FDI on domestic investment. Additionally, the distinction between the different types of FDI seems to matter when investigating potential complementarities between domestic and foreign investment. Finally, none of the existing studies investigate the precise mechanisms of interaction between FDI and domestic investment, be it through the real economy or the financial spectrum. The aim of our paper is therefore to try to address these issues through an improved and detailed empirical analysis focused on CEEC.

3. Methodology and data

3.1 Empirical methodology

The purpose of this section is to empirically estimate the effect of FDI on domestic capital accumulation. More precisely, we seek to find whether FDI crowds in or crowds out domestic investment. To this end, we estimate various specifications of an augmented investment function. We consider investment to be a partial adjustment process, between the existing and the desired capital stock, in the context of liquidity constraints and time adjustment constraints. As the investment rate is a structural component of the economy, we expect it to show a high persistence, corresponding to an autoregressive behavior.

Among the main determinants of investment, we include economic growth and the cost of capital. Thus, the inclusion of the lagged real GDP growth, as a proxy for the accelerator effect, is justified by expectations, adjustment and hysteresis phenomena in economic variables. Additionally, we include the real interest rate as a proxy for the cost of capital. We further consider several control variables including the terms of trade, as a proxy for the relative price of imported capital goods, and economic uncertainty. An increase in the terms of trade indicates relatively cheaper imports, with potentially positive effects on investment. High economic uncertainty is expected to discourage investment, as anticipations of future profits are not well anchored. As a proxy for uncertainty, we consider the difference between the GDP forecast for the current year in the April World economic Outlook and the observed GDP growth at the end of the year. This measure is expected to capture unanticipated macroeconomic shocks[5]. We have tested several other measures of uncertainty, like the volatility of industrial production, the volatility of inflation, with little impact on investment.

As the abundance of liquidity may foster dynamic investment, we have tested several measures of liquidity, like the M2 monetary aggregate, its deviation from its three-year moving average, credit provided to the private sector. They proved insignificant in explaining investment, probably because their informational content is already included in the real interest rate. We have tested several other determinants of investment, which proved to be insignificant (trade, aggregate profitability, the relative price of capital goods, currency depreciation, public subsidies and the level of taxation). Finally, as our time span includes the great financial crisis, characterized by a major fall in investment in all countries, we include a

[5] One may argue that this proxy also captures forecast errors. While this may be the case, we argue that forecast errors occur when there is a considerable amount of uncertainty on the evolution of the macroeconomic aggregates. Second, as long as forecast errors are normally distributed and of zero mean, thus not biased in the positive or negative direction, this should not be problematic. Descriptive statistics in Table 6 in appendix show that this condition is broadly respected.

crisis dummy variable, taking the value 1 for years 2009 and 2010 (compared to advanced countries, the crisis has been slighted delayed in transition and emerging countries).

Therefore, the empirical equation we will estimate is the following:

$$GFCF_{it} = \alpha GFCF_{it-1} + \beta_1 G_{it-1} + \beta_2 I_{it} + \beta_3 FDI_{it} + \beta_4 TT_{it} + \beta_5 U_{it} + \beta_6 Crisis + \upsilon_i + \varepsilon_{it} \qquad (2)$$

Where *GFCF* is gross fixed capital formation as a share of GDP, *I* is the real interest rate, *G* is real GDP growth rate, *TT* is the terms of trade, *U* stands for uncertainty, *Crisis* is a dummy variable for the economic crisis. υ_i are country-specific fixed effects, and ε_{it} is the error term, uncorrelated over time and across countries.

The choice of the dependent variable is not trivial. Here, we consider total investment, or gross fixed capital formation. GFCF represents a national accounts' aggregate, measuring net additions to fixed assets, and comprises both foreign and domestic investment As previously discussed, when using total investment as a dependent variable (instead of the domestic component of investment), a positive coefficient on FDI only shows that total investment increases with FDI. By consequence, it does not provide a sufficient indication as to the investment behavior of domestic firms. If crowding out were to take place, investment should grow less than the increase in FDI. Adversely, in the case of crowding in, the increase in investment should be higher than the increase in FDI. Therefore, when assessing the impact of FDI on domestic investment, our focus is on the β_3 coefficient associated with FDI in equation (2). More than the sign, we are interested in the value of the coefficient : a crowding out effect would correspond to a β_3 coefficient less than 1, while a crowding in effect would correspond to a β_3 larger than 1. Nevertheless, our analysis is not spared by the limit that plagues all studies looking at the relationship between FDI and domestic investment, namely the difficulty if estimating the extent to which FDI inflows actually finance acquisition of fixed assets. Unfortunately, this shortcoming can only be addressed by micro level studies.

An alternative methodology would have been to proxy domestic investment by the residual of total investment when deducting FDI inflows. However, this residual measure is inaccurate as FDI inflows are not a true measure of investment by foreign firms. FDI is a financial flow stemming from the balance of payments. It actually includes any financial transfers from a multinational's headquarters to its subsidiary, be it equity stakes, reinvested earnings and intra-company loans. The bias becomes all the more important as the share of M&A is large, as these flows are not captured in GFCF statistics. This has been the case in the 1990s,

especially in developing countries embarking in massive privatization policies, as CEEC did. Additionally, foreign affiliates can access other financing sources for their investment projects (loans, bonds), not captured in FDI statistics. Therefore, Morrissey and Udomkerdmongkol (2016) have argued that this alternative dependent variable may introduce a bias in favor of crowding out.

Additionally, the theoretical model of Markusen and Venables (1999) suggests a two stage impact of FDI on domestic investment: an initial crowding out, followed by a subsequent crowding in. In order to test this hypothesis, we compute long run elasticities of investment to FDI by using the dynamic nature of equation (2) and the convergence to the steady rate of investment. We assume that in the long run, the investment rate, which is a partial adjustment process, converges to its steady state equilibrium level, meaning that *GFCF(t-1) = GFCF(t)*. Thus, the marginal effect of FDI on GFCF[6], assimilated to the long-run elasticity of investment to FDI, is given by the following expression:

$$\beta_L(FDI) = \frac{\beta_S(FDI)}{1-\alpha} \qquad (3)$$

As expression (3) is a nonlinear combination of parameter estimates from equation (2), its significance can be tested through a non-linear Wald test (a standard Wald test for linearized constraint). We consider the nonlinear transformation in equation (3) and apply the delta method to calculate the variance, the standard error and the Wald test statistic of this transformation. Under the null, the Wald statistics follows a *chi-square* distribution with the number of degrees of freedom equal to the number of constraints, in our case one. The first null hypothesis we are testing is $\beta_L(FDI) = 0$, equivalent to $\frac{\beta_S(FDI)}{1-\alpha} = 0$, meaning that investment does not respond to FDI inflows in the long run. Second, we test $\beta_L(FDI) = 1$,

[6] If $GFCF_t = \alpha GFCF_{t-1} + \beta FDI_t$ is the short run relationship, then the long term equilibrium means that *GFCF* and *FDI* do not significantly differ from their stationary levels: $GFCF_{i,t-1} = GFCF_{it} = GFCF$ and $FDI_{it} = FDI$. Thus we can write $GFCF = \alpha GFCF + \beta FDI$, or $GFCF(1-\alpha) = \beta FDI$. Finally, we have $GFCF = \frac{\beta}{1-\alpha} FDI$. The marginal effect of FDI on GFCF equals $\frac{\partial GFCF}{\partial FDI} = \frac{\beta}{1-\alpha}$. This approach was originally used by Borensztein et al. (1998) and extended by Agosin and Mayer (2000) and Agosin and Machado (2005). Later on, it was applied by most empirical studies interested in the crowding out effect of FDI (Mody and Murshid, 2005; Mileva, 2008; Misun and Tomšík, 2002).

equivalent to $\frac{\beta_S(FDI)}{1-\alpha}=1$, as well as one-sided tests $\beta_L(FDI)>1$, in order to evaluate potential crowding in effects of FDI on domestic investment in the long run.

When combining the short and the long run horizons, four scenarios are possible :

Table 1. Hypothesis on FDI and domestic investment

	Short term effet	Long term effet	Overall impact
H1	$\beta_S < 1$	$\beta_L < 1$	Crowding out
H2	$\beta_S < 1$	$\beta_L > 1$	Creative destruction
H3	$\beta_S > 1$	$\beta_L < 1$	Temporary crowding in
H4	$\beta_S > 1$	$\beta_L > 1$	Crowding in

Note: There is always the possibility for long-term elasticity to be null, and then the four hypothesis are reduced to only two, crowding out and crowding in.

The dynamic nature of equation (2) imposes its estimation through the generalized method of moments GMM (Arellano and Bond, 1991), in order to correct the endogeneity between the residuals and the lagged dependent variable. As preliminary tests showed a high persistence of the investment ratio, we prefer the Arellano and Bover (1995) GMM estimator, which uses orthogonal deviations instead of first order differences to remove the fixed effect. This estimator also presents the advantage of preserving sample size, contrary to the transformation in first difference, and has been shown to have better performance than the first difference estimator (Hayakawa, 2009). Due to our relatively small sample size, we are concerned about the validity of the Sargan over-identification test and limit the number of GMM style instruments to the second and third lags. Farla et al. (2016) have shown that model specification and aggregation bias can be an issue when investigating the FDI–domestic investment relationship. In fact, mixed collection of countries at various stages of economic development (or other forms of heterogeneity) may violate the homogeneity assumption imposed on the coefficients of the lagged dependent variable by the GMM estimators. However, the countries in ours ample show a common pattern of economic development, so the aggregation bias should not be a concern. Moreover, we specifically consider financial heterogeneity as a factor potentially influencing the FDI-domestic investment nexus.

However, causality may run in both directions between FDI inflows and domestic investment. A high domestic investment rate may signal profitability opportunities and favorable business climate, therefore encouraging the entry of foreign investors (Mody and Murshid, 2005).

Davidson-MacKinnon exogeneity tests have confirmed the presence of endogeneity between FDI and local investment. Consequently, in addition to the lagged dependent variable, we also instrument FDI inflows by their lagged levels.

Finally, as variables in levels are known to be weak instruments for the transformed equation in differences, we search for external instruments[7] in order to isolate the exogenous component of FDI. These instruments need to be correlated with FDI, but exogenous to the investment rate. We test several potential external instruments, namely: regional capital flows as a share of regional GDP, financial openness, the U.S. Federal funds rate and the volatility of the real effective exchange rate volatility. Their correlation with FDI and weak correlation with investment is shown in Table 7 in appendix. The difference in the Sargan/Hansen over-identification test, presented in Table 8 in appendix, allows us to discriminate between these external instruments. While both regional flows and financial openness as useful external instruments for FDI, we keep the former, as it is more efficient in eliminating endogeneity in equation (2).

3.2 Data

We focus our empirical analysis on the impact of FDI on domestic investment in Central and Eastern Europe. The sample comprises 10 countries: Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia, Slovenia. These countries, all members of the European Union, show a common institutional and cultural pattern. Additionally, the specific context of their historical transformation makes them suitable for examining the effect of capital flows on domestic investment. CEEC have received considerable amounts of FDI inflows during the last two decades, as reflected in the increase of their stock of FDI, from basically zero at the beginning of the nineties to an average of 7% of GDP per year prior to the crisis. Countries like the Czech Republic, Poland and Hungary, which were among the first to provide economic stability and to proceed with structural reforms, were also the first recipients of FDI. This has led to an accumulation of the FDI stock to almost 50% of the region's GDP by 2008-2009. Inflows have stalled after the crisis, generally remaining positive, with an average FDI stock of around 57% of GDP by 2015.

[7] Although in the original Arellano and Bond (1991) specification all instruments were internal, the efficiency of estimates significantly increases when introducing external instruments.

FDI inflows have indeed played an important role in the restructuring of the industrial sector in CEEC during the transition period. Their participation in the privatization of state owned enterprises has promoted market economy and competition. As such, FDI during early transition essentially took the form of mergers and acquisitions and was hosted in labor-intensive manufacturing industries (figures 1 and 3). Foreign investors were initially motivated by efficiency gains, as relatively low labor costs and the proximity to Western markets facilitated their exports. Manufacturing FDI progressively developed from simple efficiency-seeking assembly plants to more complex integrated production chains. This type of FDI in known to have positive backward spillovers to upstream sectors (Javorcik, 2004), therefore a potential for crowding-in effects on domestic suppliers.

Once the privatization process over, a shift of the entry mode towards greenfield FDI took place (figure 1), as well as an orientation towards market seeking purposes, increasingly into services (figure 3). Besides manufacturing, market-seeking FDI expanded in financial and other business services, as well as in newly liberalized utilities. This explains the increase in the high share of FDI stock in services and the corresponding decrease in manufacturing (Figure 3). Nevertheless, FDI in services might still be conducive of significant downstream spillovers, due to their strong orientation towards the domestic market. For example, FDI in the banking sector and business services may support domestic investment. Romania, Estonia and Latvia received sizable FDI inflows in the financial sector by Western European banks.

The sectoral composition of FDI inflows is slightly different among CEE countries. In 2012, manufacturing was still holding more than 30% of total FDI stock in the Czech Republic, Poland, Romania and Slovakia, and less than 20% in Latvia and Estonia. Services hold an average of around 60% of the total FDI stock in CEE, with financial services reaching more than 20% in 8 out of the 10 countries in our sample, followed by real estate (very important in the Baltic countries and Bulgaria) and business services (30% of the FDI stock in Hungary). A detailed decomposition of the FDI stock in 2012 is presented in Figure 2 in appendix. The Czech Republic, Poland, Romania and Slovakia have a more balanced distribution of FDI between the different sectors, whereas Estonia and Latvia have high FDI in the service sectors. Figure 3 traces the evolution of the sectoral decomposition of the FDI stock during the 2000s. The main identified trends are the general decrease in manufacturing and transports, and the strong increase financial services, business services and real estate.

The origins of foreign investors in CEE are quite concentrated: 85% of FDI comes from within the European Union, essentially from the Netherlands, Germany and Austria. Baltic countries have a significant share of FDI coming from Finland, Norway and Russia, while Irish investors are very present in Hungary. Figure 4 in appendix presents the main origin countries for the accumulated FDI stock in CEE in 2015.

Our analysis focuses on the period 1995-2015. We have avoided the early years of transition, as the economic turmoil that accompanied the fall of the socialist regime led to some erratic behavior in macroeconomic variables. Therefore, the database we are using is an unbalanced panel with 10 countries and 21 years. Data comes from different sources, like the World Bank, the IMF, UNCTAD, EBRD and national sources. The number of observations may vary among the different empirical specifications, due to missing observations for certain variables. Table 5 in appendix lists all the variables, provides a detailed description as well as the data sources. Additionally, Table 6 in appendix summarizes the main descriptive statistics.

Data on the value of cross-border mergers and acquisitions sales is provided by UNCTAD (2016), on a net basis. As Calderon et al. (2004), Wang and Wong (2009) and Eren and Zhuang (2015), we compute greenfield investment as the difference between net FDI inflows and net M&A flows. UNCTAD (2016) also reports data on value of announced greenfield FDI projects, by destination. While some authors may argue in favor of this data as a preferable measure for greenfield investment, we did not use it as it presents several shortcomings for our analysis. First, it represents the initial announced value of the investment project, and not the realized value. Second, the series is not comparable with M&As, which is a transaction in which the ownership of a company is (partially or fully) transferred to a foreign investor. Third, total FDI inflows computed as the sum of M&A and greenfield FDI from UNCTAD is only poorly correlated (40%) with the total FDI inflows from the balance of payments data, so again estimations would not be comparable. Finally, the series is only available starting from 2003, which considerable limits the time dimension of the empirical analysis.

Finally, we are interested in the catalytic role of financial development for the interaction between FDI and local investors. To this end, we use several indicators of financial development provided by the European Bank for Reconstruction and Development. More precisely, we consider three indicators of banking sector, capital market and foreign exchange market development. Additionally, we compute a composite index of financial development

as the simple average of the previous three indicators. The precise definition of these indicators is presented in Table 5 in appendix. We note that financial markets seem more developed in Hungary and Poland, and less developed in Romania and Bulgaria. What actually makes the difference between the different levels of financial development is the capital market component, that is essentially the non-bank financial intermediation (stock market, bond market).

4. Results

Based on the described dataset and the empirical specification presented in the previous section, we present hereafter the main estimation results concerning the effect of FDI on domestic investment. Table 2 presents different specifications of equation (2).

Overall, the main determinants of investment are broadly significant and have the expected sign. Investment is indeed highly path dependent, with a consistent structural component, as the autoregressive term is strongly significant in all estimations. Its value (between 0.5 and 0.8) indicates the lack of unit root, as confirmed by additional stationarity tests. Among the classical determinants of investment, the real interest rate is significant in all estimated models. Most existing studies considering the interest rate (Mody and Murshid, 2005; Agrawal, 2005; Wang, 2010) obtained inconclusive results as to the role of interest rate as a determinant of investment in developing countries. Economic growth appears to be a significant factor driving investment, with some exceptions. The inclusion of the crisis dummy variable seems to considerably diminish (columns 3 and 5), and even completely offset (columns 4 and 6), the importance of the accelerator mechanism. In fact, during crisis periods, it is not unusual for expectations about future economic prospects to be poorly anchored. Moreover, due to high economic uncertainty, economic agents lack confidence and are reluctant to engage in irreversible investment. Uncertainty clearly has a negative impact on investment decisions, whether we measure it by our favorite measure (the difference between the GDP growth forecast in April and the headline growth at the end of the year), or by the volatility of the monthly industrial production index. The terms of trade, while they are positive and significant in some specifications, do not seem to have a consistent influence on investment.

Focusing on the role of FDI, we first note a positive overall contribution to capital formation,

as expected. We obtain a relatively stable coefficient, significant in all specifications, ranging between 0.218 - 0.317. Therefore, a 1 pp of GDP increase in FDI inflows leads to an increase of the investment rate of slightly less than 0.3 pp. The values obtained are significantly smaller than 1, thus indicating that investment increases less than the increase in FDI inflows. Following the methodological discussion in section 3.1, this corresponds to a short term crowding out effect on domestic investment. Increased competition due to foreign entry appears as the main factor explaining this phenomenon.

Table 2. The contribution of FDI to domestic capital formation

Dependent variable GFCF	(1)	(2)	(3)	(4)	(5)	(6)
GFCF (t-1)	0.638***	0.673***	0.765***	0.773***	0.776***	0.799***
	(0.118)	(0.116)	(0.138)	(0.144)	(0.135)	(0.143)
Growth (t-1)	0.222***	0.229***	0.151**	0.105	0.143**	0.095
	(0.051)	(0.047)	(0.065)	(0.078)	(0.067)	(0.081)
Interest rate	-0.067***	-0.059***	-0.076***	-0.073***	-0.064***	-0.074***
	(0.019)	(0.017)	(0.021)	(0.019)	(0.017)	(0.020)
FDI	0.317***	0.269***	0.256***	0.252**	0.218**	0.236**
	(0.092)	(0.093)	(0.098)	(0.100)	(0.098)	(0.100)
Terms of trade	0.070*	0.066*	0.036	0.049	0.050	0.046
	(0.040)	(0.037)	(0.046)	(0.041)	(0.038)	(0.042)
Uncertainty		-0.318***			-0.327***	
		(0.094)			(0.090)	
Volatility of IPI			-0.183**			-0.074
			(0.076)			(0.076)
Crisis				-2.289**	-1.684**	-1.971*
				(0.946)	(0.808)	(1.047)
Observations	186	186	181	186	186	181
N° instruments	8	9	9	9	10	10
Sargan test	4.548	4.911	2.666	2.441	3.230	2.104
Sargan *p-value*	0.208	0.178	0.446	0.486	0.357	0.551
AR2 test *p-value*	0.310	0.674	0.123	0.109	0.464	0.283
FDI long run elasticity	0.877***	0.825***	1.093**	1.112**	0.976**	1.173**
	(0.235)	(0.231)	(0.455)	(0.499)	(0.396)	(0.580)
Wald test H0 : FDI_{LT}=1	0.27	0.57	0.04	0.05	0.01	0.09
chi2(1) and *p-value*	(0.603)	(0.456)	(0.842)	(0.827)	(0.951)	(0.772)

Note: Estimates are made using GMM Arellano Bover. Standard errors are reported in brackets. *, **, and *** refers to the 10%, 5% and 1% significance levels. The null hypothesis of the Arrelano Bond AR (2) test is no second order autocorrelation in the residuals. The Sargan test for validity of instruments has for null hypothesis the exogeneity of the instrument set.

Based on the coefficients presented in Table 2, interpreted as the short term effects, we can compute long term elasticities, based on the methodology exposed in section 3.1. These elasticities are presented in the lower panel of Table 2.

In our different specifications, the long-term elasticity of investment to FDI ranges between 0.825 and 1.173, and the non-linear Wald test confirms its significance in all cases. These values are significantly higher than the short-run elasticities, and in some cases even larger than 1. The two-sided Wald test cannot reject the hypothesis of long run elasticity equal to 1, with quite large *p-values* for columns (3) to (6). Additionally, one sided Wald tests (available upon request) cannot reject the hypothesis of long run elasticity larger than 1. However, the standard errors associated with the computed long run elasticities are relatively high, generating a wide confidence interval and making it rather difficult to reject the null.

We also argue that the very high long run elasticities obtained by previous studies (between 2.4-2.6 for Misun and Tomšík (2002), and larger than 3 for Mody and Murshid, (2005)). Misun and Tomšík, 2002; Mody and Murshid, 2005) may be explained by the omission of some relevant determinants of investment. In fact, with the introduction of additional explanatory variables, as we did in columns (2) – (6), the coefficient of FDI is expected to decrease, so as its long-run elasticity. Actually, when controlling for uncertainty or the economic crisis in our estimations, the autoregressive term for the structural component of investment becomes higher, favoring a higher long term elasticity for FDI.

These elasticities suggest that the increase of investment is equal or higher than the increase in FDI inflows, indicating a long run crowding in effect. The initial crowding-out is found to decrease over time, with the integration of foreign affiliates within the host economy and the time needed for domestic firms to adjust and respond to competition. To a certain extent, local entrepreneurs, pushed to exit the market due to increased competitive pressures and weak institutional support, appear to be replaced after some years. Wang (2010) actually showed that the crowding out phenomenon is expected to disappear after an average of three years from FDI entry. In the long run, the emergence of linkages between foreign and local firms eventually leads to a beneficial effect for domestic investment. These results point to the validation of the second hypothesis in Table 1, namely the creative destruction. For example, in column (4), when FDI increases by 1 pp of GDP, the investment rate will increase by 0.252 pp of GDP in the short run and 1.112 pp of GDP in the long run.

The use of macro-level statistics does not allow us to look at the induced sectoral changes. However, the parallel with the micro-level literature can give us some indications as to the occurrence of these effects. Thus, it is quite likely that the short term crowding in and the long

term crowding out to take place in different sectors. Micro-level studies actually show that negative competition effects are significant among domestic firms within the same sector as the FDI entry (Aitken and Harrison, 1999). Additionally, most positive spillovers occur in upstream sectors, when foreign affiliates source local inputs, thus stimulating domestic suppliers to upgrade and extend their production capabilities (Javorcik, 2004; Giroud et al., 2012; Jude, 2016). Therefore, creative destruction could be a phenomenon observed at the country level, when aggregating all sectors, even though in some specific sectors there may be only crowding in or only crowding out.

Several robustness checks were performed. We considered the pre and post-crisis periods, as well as periods of economic boom, and we seek to find if the effect of FDI on domestic investment could differ depending on these specific contexts. Results are presented Table 9 in appendix. We first restrict the sample to the period 1995-2008 and then, we progressively introduce interactions between FDI and a post-crisis dummy, a boom dummy variable and economic growth. Overall, the same pattern seems to be observed, with a stronger crowding out pressure during the pre-crisis period. Additionally, FDI appears to be a more reliable source of financing for investment during economic downturns. This might be useful in order to complement domestic investment and foster economic recovery. Instead, during boom times (when GDP is above potential, or when economic growth is particularly strong), FDI provides less benefits for domestic investment. Finally, we have replaced total investment by private investment, with results presented in Table 10 in appendix. While we obtain similar results, the long run crowding in effect of FDI on private domestic investment appears more consistent.

5. Entry mode of FDI and impact on domestic investment. M&A versus greenfield FDI

The literature generally treats FDI as a homogeneous capital flow. However, different types of FDI can have potentially different implications for the relationship with domestic investors. The distinction by the entry mode, in greenfield investment and M&A, appears useful in this context. In the case of greenfield FDI, the foreign affiliate represents a completely new firm and the acquisition of fixed assets thus consists of net capital formation. Adversely, M&A consist of an ownership change of existing assets, without an immediate addition to the capital stock. For this reason, the impact of greenfield FDI on capital accumulation is expected to be

higher than for M&A[8], at least in the short run, even though it does not reflect an accounting fact. In fact, the significant share of M&A in total FDI inflows during the nineties, especially in countries rolling out massive privatization policies, as it has been the case for CEEC, has been identified as the main explanation for the observed weakening of the empirical link between FDI and investment during that decade (World Bank 2001).

As described in section 2, the empirical literature on the influence of the two types of FDI on domestic investment is very scarce. The only studies we are aware of are Calderon et al. (2004) and Ashraf & Herzer (2014), using panel settings, and Zajc Kejžar (2016) and Chen et al. (2017) for the individual cases of Slovenia and China. Overall, results seem to point to a crowding out effect for greenfield FDI and no significant effect for M&A. Seeking to compensate this drawback of the literature, we distinguish between greenfield FDI and *M&A* and re-run the estimations. This second set of results is presented in Table 3, columns (1) - (4) for greenfield FDI and columns (5) – (8) for M&A.

The two components of FDI appear to have different effects on capital accumulation. On one hand, we note a positive and highly significant coefficient for greenfield FDI, as expected. The coefficient is still smaller than 1, confirming short term crowding out. On the other hand, M&A seem to have a rather neutral short term impact on capital formation. M&A is poorly significant in column (5) and insignificant in all other estimations. These results seem consistent with the ones observed in the existing literature.

The long run elasticities presented in the lower panel of Table 3 give us some additional information as to the relationship between the entry mode of foreign investors and domestic investment. The elasticity of investment to greenfield FDI is significant and mainly higher than 1, confirming our previous results of long term crowding in. As for aggregate FDI, this conclusion is validated by non-linear Wald tests (even for column 2). When uncertainty and the crisis are taken into account, in column (4), a 1 pp of GDP increase in greenfield FDI leads to an increase in the investment rate of 1.223 pp in the long run. The long run elasticity is higher than for aggregate FDI, suggesting than greenfield FDI develops a stronger a complementary relationship with domestic investment in the long run.

[8] In certain conditions, M&A could be followed by investments in the upgrading of the production process, which would not have been done in the absence of a foreign investor (UNCTAD, 1999).

Table 3. Entry mode of FDI and the impact on domestic investment

Dependent var.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
GFCF	**Greenfield**				**Mergers and acquisitions**			
GFCF (t-1)	0.698***	0.725***	0.792***	0.795***	0.709***	0.733***	0.826***	0.855***
	(0.114)	(0.112)	(0.129)	(0.122)	(0.142)	(0.128)	(0.199)	(0.173)
Growth (t-1)	0.208***	0.219***	0.096	0.131**	0.242***	0.250***	0.068	0.148
	(0.050)	(0.046)	(0.072)	(0.063)	(0.061)	(0.054)	(0.111)	(0.095)
Interest rate	-0.074***	-0.065***	-0.076***	-0.067***	-0.083***	-0.066***	-0.091***	-0.071***
	(0.019)	(0.017)	(0.019)	(0.017)	(0.020)	(0.018)	(0.020)	(0.018)
GREEN | M&A	0.316***	0.266**	0.291**	0.250**	0.574*	0.525	0.314	0.478
	(0.119)	(0.121)	(0.118)	(0.119)	(0.342)	(0.333)	(0.461)	(0.408)
Terms of trade	0.034	0.035	0.025	0.028	0.097	0.095*	0.033	0.059
	(0.036)	(0.034)	(0.036)	(0.034)	(0.061)	(0.055)	(0.075)	(0.065)
Uncertainty		-0.318***		-0.310***		-0.455***		-0.443***
		(0.103)		(0.099)		(0.079)		(0.073)
Crisis			-2.347***	-1.843**			-2.997**	-1.790
			(0.884)	(0.767)			(1.288)	(1.106)
Observations	183	183	183	183	183	183	183	183
N° instruments	8	9	9	10	8	9	9	10
Sargan	3.514	3.900	1.545	2.292	6.096	3.597	5.466	3.601
Sargan *p-value*	0.476	0.420	0.819	0.682	0.107	0.308	0.141	0.308
AR2 test *p-value*	0.118	0.429	0.100	0.572	0.092	0.203	0.196	0.136
Long run elasticity	1.046***	0.967***	1.398**	1.223**	1.972	1.966	1.805	3.300
	(0.348)	(0.346)	(0.673)	(0.553)	(1.256)	(2.464)	(2.310)	(2.350)
Wald H0: FDI_{LT}=1	0.02	0.01	0.33	0.17	-	-	-	-
chi2(1) & *p-value*	(0.894)	(0.924)	(0.567)	(0.683)				

Note: Estimates are made using GMM Arellano Bover. Standard errors are in brackets. *, **, and *** refers to the 10%, 5% and 1% significance levels. The null hypothesis of the Arrelano Bond AR (2) test is the absence of second order autocorrelation in the residuals. The null of the Sargan test is the exogeneity of the instrument set.

Overall, greenfield FDI appears to confirm the creative destruction hypothesis. In a first stage, the entry of a new foreign firm squeezes the market share of existing domestic firms. This corroborates evidence of greenfield FDI becoming increasingly market oriented in CEEC during the 2000s, essentially in non-tradable sectors (see Figure 3), thus incurring strong competitive pressures for domestic firms. In a second stage, its progressive integration into the local industrial network and the emergence of trade linkages creates additional demand, thus stimulating domestic investment, in the sense of a crowding in.

Adversely, we find M&A to have a neutral effect on investment. The takeover of an existing firm by a foreign investor does not significantly change market competition, as these companies operate within existing market shares. Moreover, as trade linkages are already into place, there is little scope for long-run benefits linked to the creation of new activities. If the post-acquisition period is sometimes devoted to productivity improvements, local firms have time to adjust and thus the risk of an adverse competition effect does not seem very strong.

6. Financial development and the relationship between FDI and domestic investment

As stated in section 2, the interaction between FDI and domestic investors may occur on the real market or on the financial market. The policy implications of these two types of interactions are divergent. Therefore, identifying the mechanism by which FDI crowds out domestic investors appears essential for creating appropriate economic policies. In the case of real market crowding out, some local firms are displaced due to the higher efficiency of FDI. However, the net impact on national wealth could be positive as the remaining firms are the most efficient ones, generating higher value added. Public intervention in this case should be limited to alleviating the potential risks related to the denationalization of certain industries and the creation of foreign enclaves (UNCTAD, 2000). Adversely, if crowding out takes place on the financial market, increased demand for loans could result in higher interest rates and banks' preference for foreign companies could restrict access to finance for domestic firms. In this case, the net effect would be a decrease in national wealth, and public intervention would be needed, with measures to facilitate access to credit for local investors.

While our methodology does not allow us to directly investigate these issues, this is, to the best of our knowledge, the first study to try to give an indication as to the importance of the two interaction channels. As we cannot directly measure financial interaction, we argue that it should be all the more intense as local financial markets are developed (Razin et al. 1999). We thus seek to isolate (part of) the financial market interaction by the use of interaction variables between FDI and different proxies for financial development. As described in section 3.1, we use four indicators of financial development from the EBRD: one for the banking sector, a second for the capital market, a third for the forex market and finally, a composite indicator. We create interaction variables between FDI and each of the four financial indicators, as proxies for the financial interaction between foreign and local investors. We refrain ourselves to interpret conditional coefficients (interaction coefficients) as financial interaction *per se*. Interaction variables thus only show the additional effect that FDI brings on domestic investment in the case of development financial markets. We interpret the independent coefficient for FDI as real market interaction.

Table 4. Financial development and the effect of FDI on domestic investment

	Overall FDI				Greenfield FDI				Mergers and acquisitions			
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
GFCF (t-1)	0.737***	0.783***	0.712***	0.783***	0.756***	0.777***	0.765***	0.793***	0.796***	0.770***	0.794***	0.774***
	(0.142)	(0.138)	(0.149)	(0.132)	(0.124)	(0.117)	(0.125)	(0.121)	(0.106)	(0.105)	(0.112)	(0.123)
Growth (t-1)	0.160**	0.138**	0.161**	0.145**	0.150**	0.136**	0.144**	0.134**	0.162***	0.174***	0.162***	0.193***
	(0.069)	(0.068)	(0.069)	(0.067)	(0.063)	(0.061)	(0.063)	(0.063)	(0.059)	(0.059)	(0.061)	(0.072)
Interest rate	-0.064***	-0.062***	-0.063***	-0.064***	-0.064***	-0.065***	-0.066***	-0.067***	-0.080***	-0.077***	-0.078***	-0.075***
	(0.017)	(0.018)	(0.017)	(0.017)	(0.017)	(0.018)	(0.017)	(0.017)	(0.015)	(0.016)	(0.015)	(0.015)
FDI (GREEN/M&A)	0.269**	0.219**	0.333**	0.210**	0.278**	0.266**	0.300**	0.247**	0.314	0.402	0.311	0.443
	(0.109)	(0.100)	(0.130)	(0.098)	(0.122)	(0.121)	(0.132)	(0.120)	(0.298)	(0.285)	(0.311)	(0.306)
Terms of trade	0.060	0.046	0.068*	0.045	0.034	0.030	0.035	0.025	0.066**	0.067**	0.066*	0.063
	(0.039)	(0.039)	(0.040)	(0.040)	(0.034)	(0.033)	(0.034)	(0.035)	(0.033)	(0.032)	(0.037)	(0.044)
Uncertainty	-0.312***	-0.330***	-0.295***	-0.335***	-0.299***	-0.299***	-0.301***	-0.311***	-0.389***	-0.384***	-0.392***	-0.415***
	(0.093)	(0.092)	(0.099)	(0.090)	(0.100)	(0.099)	(0.102)	(0.099)	(0.069)	(0.071)	(0.069)	(0.070)
Crisis	-1.528*	-1.703**	-1.431*	-1.672**	-1.668**	-1.779**	-1.727**	-1.812**	-1.606**	-1.507**	-1.598**	-1.335
	(0.832)	(0.819)	(0.856)	(0.805)	(0.771)	(0.752)	(0.773)	(0.769)	(0.766)	(0.749)	(0.801)	(0.888)
Financial dev.	1.165				1.309				0.597			
	(1.520)				(1.518)				(0.517)			
FDI*Financial dev.	0.585**				0.400*				1.578**			
	(0.244)				(0.228)				(0.670)			
Banking		0.087				0.246				0.140		
		(0.790)				(0.808)				(0.458)		
FDI*Banking		-0.145				-0.021				0.983**		
		(0.247)				(0.212)				(0.424)		
Capital market			1.104				1.097				0.826**	
			(1.012)				(0.968)				(0.342)	
FDI*Capital market			0.382***				0.308**				0.678**	
			(0.144)				(0.130)				(0.314)	
Forex				0.595				0.441				0.428
				(1.559)				(1.536)				(0.628)
FDI*Forex				0.305				-0.218				0.861
				(0.732)				(0.782)				(0.897)
Observations	186	186	186	186	183	183	183	183	183	183	183	183
N° of instruments	12	12	12	12	12	12	12	12	12	12	12	12
Sargan test	4.470	2.974	4.403	3.203	3.518	2.450	4.105	2.234	4.434	5.596	5.433	6.771
Sargan *p-value*	0.215	0.396	0.221	0.361	0.475	0.654	0.392	0.693	0.350	0.231	0.246	0.149
AR2 *p-value*	0.735	0.446	0.229	0.397	0.867	0.673	0.402	0.556	0.202	0.248	0.169	0.279

Note: Estimates are made using GMM Arellano Bover. Standard errors are in brackets. *, **, and *** refers to the 10%, 5% and 1% significance levels. The null hypothesis of the Arrelano Bond AR (2) test is the absence of second order autocorrelation in the residuals. The Sargan test has the null hypothesis of exogeneity of the instrument set.

The definition of crowding in/crowding out should take into account the sum the independent and the conditional coefficients for FDI. In this sense, financial development may mitigate/accentuate the short-term effect of FDI on domestic investment. Additionally, the computation of long run elasticities becomes quite complex when introducing interaction terms[9]. The relatively small sample and the number of coefficients involved lead to imprecise confidence intervals, not allowing us to properly test their significance. We thus prefer not to compute long run elasticities and discuss financial interaction only in the short term. The results of these estimates are found in Table 4, columns (1)-(4) for total FDI, columns (2)-(8) for greenfield FDI and columns (9)-(12) for mergers and acquisitions.

Financial development alone does not appear as a significant determinant of investment in CEEC, neither the composite indicator nor the individual components. However, the interactions of FDI with overall financial development and capital market development are positive and significant in explaining capital accumulation. We interpret this result as an indication of beneficial interaction between foreign and domestic investors on the financial market, essentially on the capital market. The independent FDI coefficient is still significant and its value is less than 1, confirming a real market crowding out effect. The benefits obtained by local investors through the financial market partially offset the short term crowding-out. Developed financial markets, especially capital markets (stock and bond markets) are conducive of a higher contribution of FDI to capital formation, without however leading to a crowding in phenomenon (the sum of the two coefficients is closer to 1). Finally, it appears that negative real market competition effect prevails in the relationship between foreign and local investors.

Given the different nature and scope of greenfield FDI and M&A, we expect this distinction to matter for the precise interaction mechanism with domestic investors. Since M&A are financial transactions only involving ownership transfer of existing assets, the potential for the funds to fuel local financial markets appears higher than for greenfield investment. As capital entering the country through M&A is not spent immediately (Razin et al.,1999), the larger liquidity pool may foster a decrease in interest rates, thus facilitating access to finance for local entrepreneurs (Harrison et al., 2004). Eren and Zhuang (2015) actually showed that a developed financial system complements the impact of M&A on economic growth in CEEC.

[9] $\beta_L(FDI) = \frac{\beta_S(FDI)}{1-\alpha} + \frac{\beta_S(FDI * Fin\_dev)}{1-\alpha} * Financial\_development$

Adversely, in the case of greenfield FDI, a significant part of the invested capital is used for capital goods purchase. Depending on the source of these purchases (imports or the local market), the increase in the domestic capital supply would be reduced and the potential for financial interaction would be lower.

Results presented in Table 4 columns (5)-(12) broadly confirm our intuition. Greenfield FDI alone keeps a short term crowding out effect on domestic investment, while M&A alone do not significantly contribute to investment in CEEC. Greenfield FDI shows the same behavior as total FDI, with a positive interaction with the composite indicator of financial development and capital market development. Developed financial markets help to alleviate some of the short term crowding-out effects of greenfield FDI entry on domestic investors.

Additionally, the interaction of M&A with financial market development appears very strong. The coefficient for the interaction term in column (9) is quite high at 1.578. Despite no significant interaction trough the real market (the coefficient for M&A alone is still insignificant), developed financial markets foster a consistent complementary relationship between M&A and domestic investment, driving an overall crowding in effect. When looking at the different components of financial development, we note that it is the banking sector that drives the financial crowding in for M&A, followed by capital markets. Additionally, the coefficient for the interaction with capital markets is significantly higher for M&A than for greenfield FDI.

Finally, the interaction with the foreign exchange market is not significant in any of the regressions. This result appears to confirm previous work by Combes et al. (2011), suggesting that the final effect of FDI on the foreign exchange market tends to be neutral[10], as FDI is often used to finance imports, thus offsetting potential appreciation pressures.

These results seem to suggest that the interaction between greenfield FDI and domestic investment essentially occurs through a competition effect on the real market, giving rise to short term crowding out pressures. Adversely, real market interaction does not appear very strong for M&A, for which most of the interaction with domestic investment occurs through the financial market, potentially leading to a crowding in effect. Overall, it appears that negative real market competition effect prevails in the relationship between foreign and local

[10] This may also be due to the low variance of this variable for the countries in our sample.

investors. Financial development can mitigate part of the crowding out pressures. In this sense, the development of capital markets appears crucial, as well as proper functioning banking systems. Countries with developed financial markets, like Hungary, Poland or Estonia, appear to benefit from a higher contribution of FDI to capital formation.

7. Conclusions

When looking at the relationship between FDI and domestic investment, theoretical studies suggest that FDI may crowd out domestic investment in the short term, while leading to a long-run complementarity. In order to test this hypothesis, we extend the empirical framework of Agosin and Machado (2005) by including some additional determinants of investment. Second, we investigate the individual effects of greenfield FDI and M&A on domestic investment. Finally, we provide some information on the nature of the interaction between foreign and local investors, real and financial interaction, with different implications for the dynamics of local investment and with potential divergent policy implications.

Our empirical analysis on CEEC points to the existence of a creative destruction phenomenon. FDI crowds out domestic investors in the short term. As domestic firms progressively adjust and foreign affiliates develop trade linkages with local firms, the effect on domestic investment eventually becomes beneficial and tends towards a crowding in. The entry mode of foreign investors seems to matter for the impact of FDI on domestic investment. Our results suggest that greenfield FDI has a strong initial crowding-out effect, while M&A have no immediate contribution to capital accumulation. Greenfield FDI appears prone to developing trade linkages within the local economy, therefore leading to a long-term crowding in effect on domestic investment.

Finally, we investigated to what extent does financial development influence the interaction between foreign and local investors. Our results confirm that developed financial markets partly compensate for the negative competition effect, due to their ability to effectively redistribute financial resources and thus facilitate access to finance for domestic investors. Conditional on developed financial markets, especially a strong banking sector, M&A can be conducive of a crowding-in effect on domestic investment. The effect of greenfield FDI is less

conditioned by financial development appears, as it main influence on domestic investment appears to channel through the real market.

To the extent to which the short term crowding out phenomenon is the result of a competitive market mechanism, with the most productive firms remaining on the market, no strong policy measure should be needed as the overall effect on national welfare should be positive. Still, caution is needed as local firms exiting the market may cause unemployment and there is always the risk of a denationalization of some industries. Consequently, specific incentives to FDI entry may prove useful to mitigate the short run crowding-out effect. Greenfield investment may be preferred to M&A as it appears to be beneficial for domestic investment in the long run. The entry of foreign investors in underdeveloped local industries could be encouraged, while the incentives to use local inputs could favor the emergence of trade linkages within the host economy and thus benefit investment. Governments could also use fiscal levers in order to stimulate reinvestment of capital resources released by the cessation of activities. Finally, public action should facilitate access to credit for local investors, thus helping to alleviate some of the competition effects and allowing a more balanced redistribution of financial resources.

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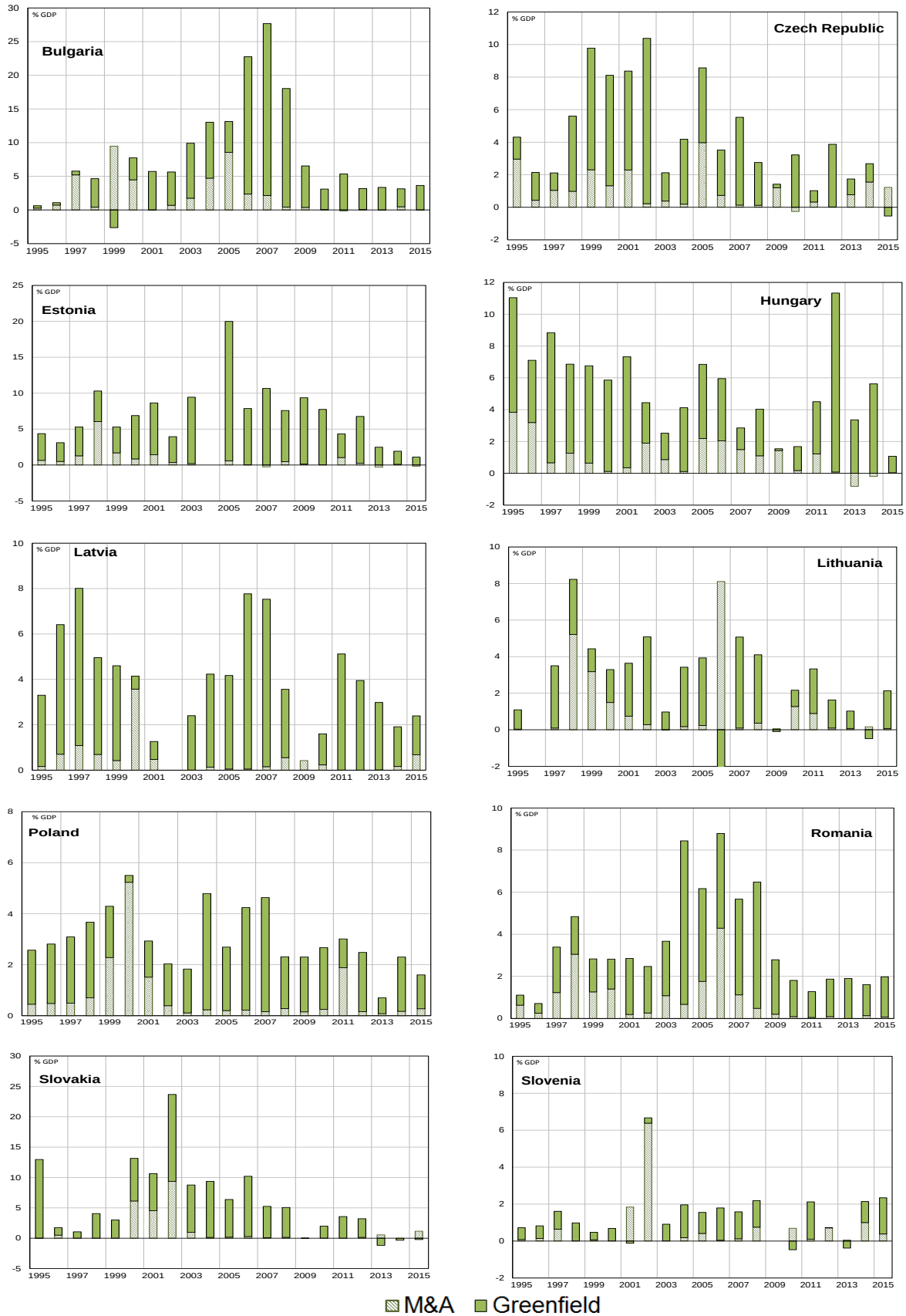
APPENDIX

Figure 1. Greenfield FDI versus M&A (1990-2010)



Source: UNCTAD, WIR 2016 (FDI). M&A refer to cross-border mergers and acquisitions, as reported by the country of the seller. Greenfield is the difference between total FDI net inflows and net M&A flows.

Figure 2. Sectoral composition of the FDI stock (2012)

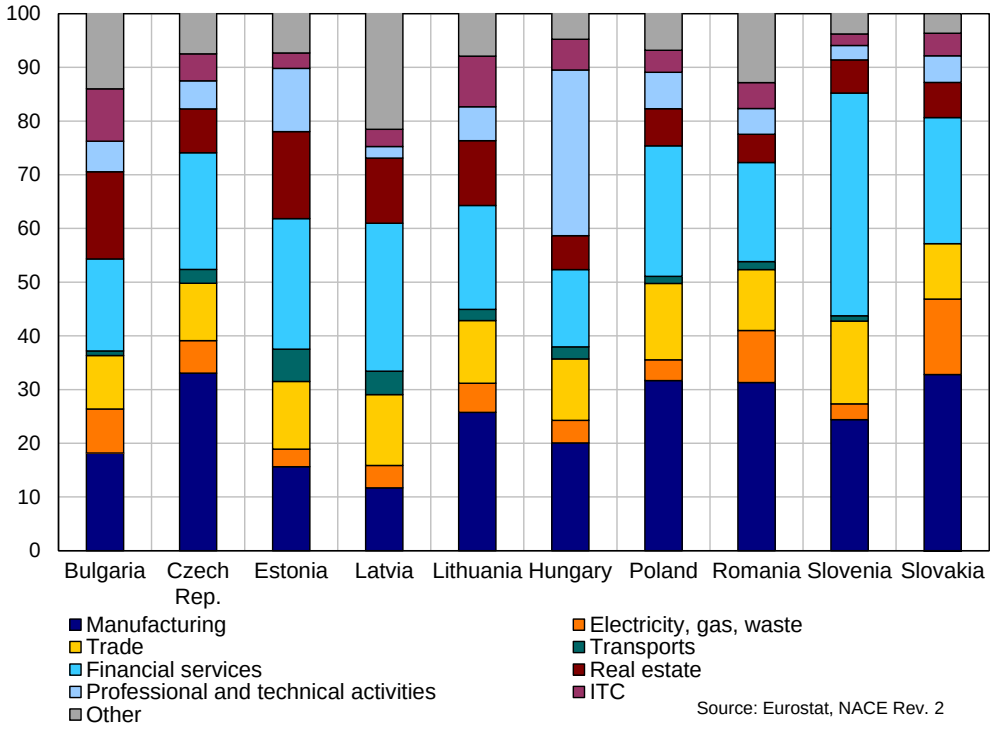


Figure 3. Change in the sectoral composition of the FDI during 2003-2009

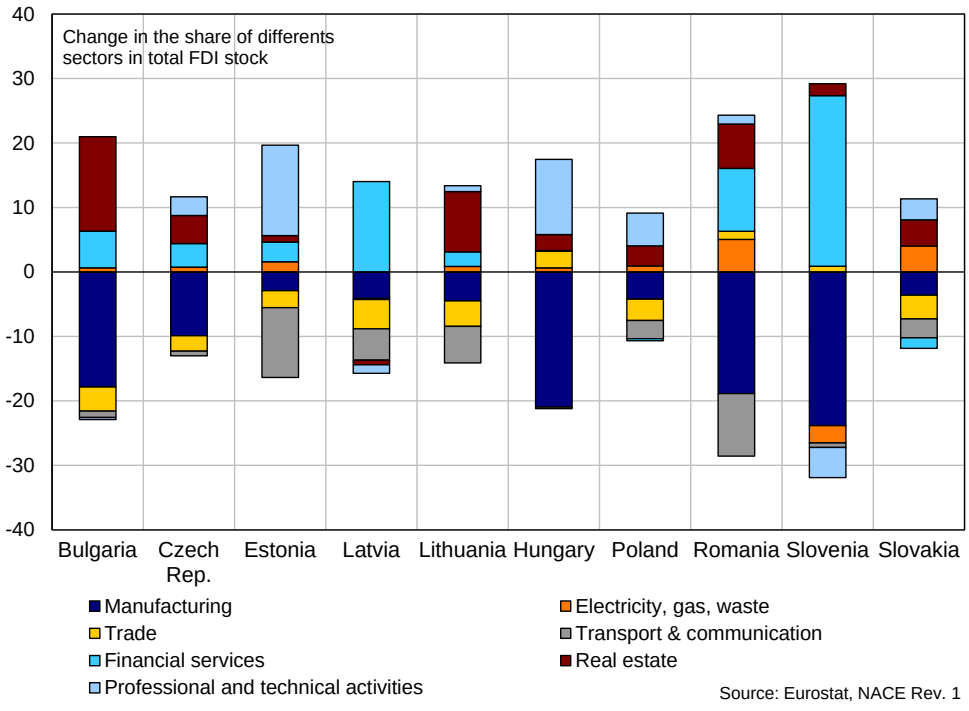
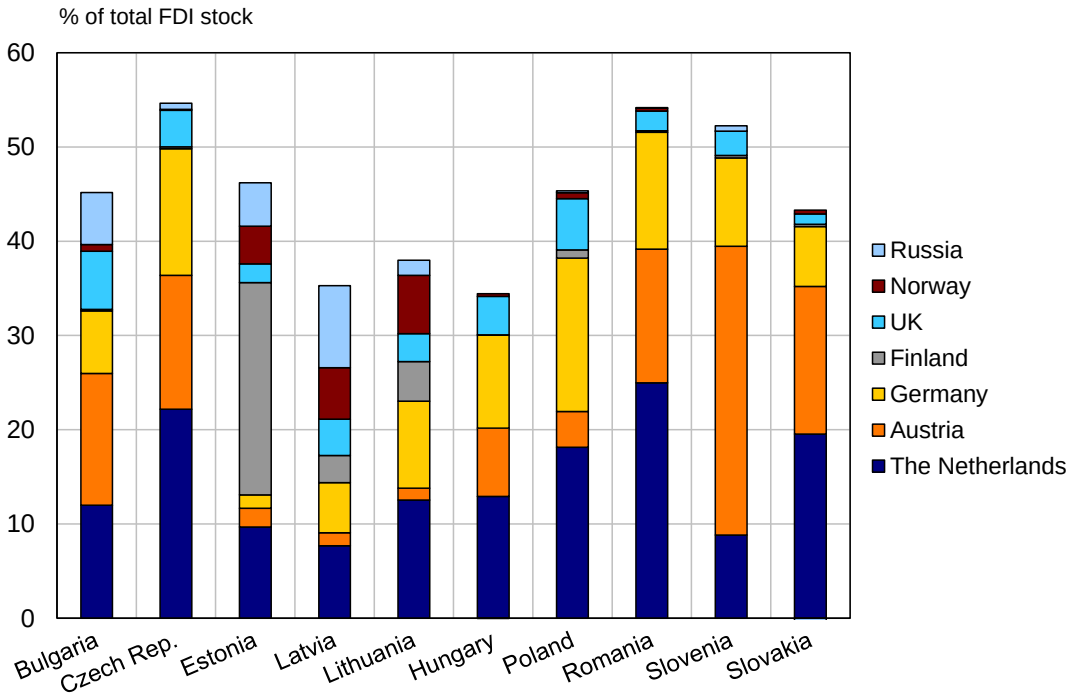


Figure 4. The main source countries for FDI stock in CEE in 2015



Source: Eurostat

Table 5. Description and data sources for the main variables

Variable	Description	Data source
GFCF	Gross fixed capital formation as a share of GDP	WDI
GFCF private	Gross fixed capital formation by the private sector as a share of GDP	WDI
Growth	The annual growth rate of real GDP (2010 prices)	IMF IFS
FDI	The net inflow of foreign direct investment as a share of GDP	IMF BOP
M&A	Mergers and acquisitions, consisting of cross-border mergers and acquisitions sales, as reported by the country of the seller, on a net basis, as a share of GDP.	UNCTAD and IMF IFS
Greenfield	Greenfield FDI, computed as the difference between total net FDI inflows and net M&A flows, as a share of GDP.	Authors, based on UNCTAD and IMF data
Interest	The real interest rate, computed as the 3 months interest rate minus the GDP deflator	IMF and national sources
Uncertainty	The difference between the GDP growth forecast in the April World Economic Outlook and the headline growth rate observed at the end of the year	Authors, based on IMF WEO
Volatility of IPI	The volatility of the industrial production, computed as the standard deviation of the monthly industrial production, divided by the average industrial production for the year.	Authors, based on IMF IFS
Crisis	A dummy variable taking the value 1 in years 2009 and 2010 and 0 otherwise	Authors
Post_Crisis	A dummy variable taking the value 1 in years 2011 to 2015	Authors
Boom	A dummy variable taking the value 1when the output gap is positive, and zero when it is negative. The output gap is computed by means of a Hodrick Prescot filter applied to annual GDP	Authors
Terms of trade	The ratio between the exports price index and the import price index	UNECE
M&A	Mergers and acquisitions, consisting of cross-border mergers and acquisitions sales, as reported by the country of the seller, on a net basis.	UNCTAD
Volatility of REER	The volatility of the real effective exchange rate, computed as the standard error of the monthly REER divided by the average REER for each year.	Authors, based on BIS data
Regional capital flows	The sum of total capital flows (FDI, portfolio and banking flows) to the 10 countries in the sample, divided by the total GDP of the sample.	Authors, based on IMF
US Fed	Us Federal Funds rate	IMF

Financial openness	The sum of total foreign assets and liabilities, as a share of GDP	Authors, based on IMF
Banking	Banking reform and interest rate liberalization. The indicator ranges from 1 to 4+, where 1 indicates little progress beyond the establishment of a dual banking system, while 4+ indicates full compliance of banking regulation of the Bank for International Settlements and the existence of competitive banking services.	EBRD
Capital market	Capital market development. : The indicator ranges from 1 to 4+, where 1 indicates low progress, while 4+ indicates full convergence of regulations on transactions with financial assets to the IOSCO standards and the full development of non-bank financial intermediation.	EBRD
Forex	Foreign exchange market development. The indicator ranges from 1 to 4+, where 1 indicates limited access to foreign currency and restrictions on imports and exports, while 4+ indicates total convertibility of the currency and the full liberalization of the current account, with the removal of all restrictions on foreign currency transactions.	EBRD
Financial development	A composite indicator of financial development, constructed as an average of Banking, Capital market and Forex indicators.	Authors, based on EBRD

Table 6. Descriptive statistics of main variables

Variable	Mean	Std. Dev.	Min	Max
GFCF	24.3	5.0	5.4	38.4
GFCF private sector	20.2	4.5	4.7	32.3
FDI	4.6	4.1	-1.0	27.7
M&A	1.0	1.7	-0.8	9.5
Greenfield	3.6	3.7	-2.6	25.5
Growth	3.4	4.2	-14.8	11.9
Interest rate	4.5	9.5	-15.6	32.7
Uncertainty	-0.3	2.3	-7.4	9.3
Terms of trade	96.7	9.0	64	112
Volatility of REER	1.7	1.4	0.2	10.1
Financial openness	1.5	1.0	0.3	5.9
Regional capital flows	8.4	5.1	1.3	23.4
Financial development	3.6	0.3	2.7	4.31
Banking	3.5	0.4	2	4.3
Capital market	3.0	0.6	1.7	4.3
Forex	4.3	0.1	3	4.33

Table 7. Correlation of different instruments with the dependent variable

	GFCF	FDI	Regional capital flows	Financial openness	Volatility of REER	US Fed fund rate
GFCF	1					
FDI	0.28	1				
Regional capital flows	0.21	0.54	1			
Financial openness	0.14	0.61	0.59	1		
Volatility of REER	-0.25	-0.39	0.14	0.12	1	
US Fed fund rate	0.21	0.37	-0.63	-0.48	0.19	1

Table 8. Difference-in-Sargan tests of exogeneity of instrument subsets

Instruments for FDI	Difference in Sargan/Hansen test *p-value*
Regional capital flows	(0.394)
Financial openness	(0.597)
US Fed fund rate	(0.213)
Volatility of REER	(0.203)

Note: Tests are based on a baseline dynamic regression of GFCF including lagged growth, the interest rate and FDI as explanatory variables. FDI is endogenous and recursively instrumented with each of the considered external instruments. The difference in the Sargan/Hansen test computes the increase in the Hansen J statistics when the given subset of instruments is added to the estimation. Under the null of joint validity of all instruments, the change in J is $\chi 2$ with degrees of freedom equal to the number of added instruments.

Table 9. The effect of FDI on domestic investment using different time periods

Dependent variable	(1)	(2)	(3)	(4)	(5)
GFCF	1995-2008	1995-2015	1995-2015	1995-2015	1995-2015
GFCF (t-1)	0.786***	0.775***	0.793***	0.772***	0.753***
	(0.148)	(0.036)	(0.035)	(0.120)	(0.041)
Growth (t-1)	0.295***	0.010	-0.023	0.011	0.035
	(0.081)	(0.058)	(0.059)	(0.064)	(0.074)
Interest rate	-0.058***	-0.064***	-0.070***	-0.048***	-0.051**
	(0.017)	(0.018)	(0.018)	(0.020)	(0.023)
FDI	0.180**	0.233**	0.192*	0.356***	0.368**
	(0.084)	(0.116)	(0.112)	(0.184)	(0.250)
Uncertainty	-0.278***	-0.361***	-0.347***	-0.342***	-0.604***
	(0.095)	(0.074)	(0.075)	(0.083)	(0.159)
Crisis		-2.653***	-3.460***	-2.508***	-3.032***
		(0.713)	(0.844)	(0.896)	(0.880)
Post_Crisis		-0.059	1.146		
		(0.536)	(1.040)		
FDI * Post_Crisis			-0.296		
			(0.188)		
Boom dummy				1.956**	
				(0.933)	
Boom dummy * FDI				-0.296**	
				(0.131)	
Growth * FDI					-0.047*
					(0.026)
Observations	126	186	186	186	186
Instruments	8	10	11	11	10
Sargan	3.183	3.542	3.613	5.614	3.247
Sargan *p-value*	0.528	0.365	0.400	0.230	0.462
AR2 *p-value*	0.107	0.333	0.202	0.290	0.697
Long run elasticities					
FDI	0.841*	1.036**	0.928*	1.562***	1.490***
	(0.501)	(0.618)	(0.587)	(0.577)	(0.489)

Note: Estimates are made using GMM Arellano Bover. Standard errors are reported in parentheses. *, **, and *** refers to the 10%, 5% and 1% significance levels. The null hypothesis of the Arrelano Bond AR (2) test is the absence of second order autocorrelation in the residuals. The Sargan test for validity of instruments has the null hypothesis of exogeneity of the instrument set.

Table 10. The effect of FDI on Domestic Private investment

Dependent variable Private GFCF	(1)	(2)	(3)	(4)	(5)
GFCF private (t-1)	0.790***	0.905***	0.716***	0.897***	0.738***
	(0.101)	(0.105)	(0.212)	(0.170)	(0.120)
Growth (t-1)	0.165***	0.072	0.068	0.046	0.090
	(0.048)	(0.056)	(0.072)	(0.070)	(0.059)
Interest rate	-0.056***	-0.049***	-0.046**	-0.047**	-0.048***
	(0.018)	(0.016)	(0.018)	(0.020)	(0.016)
FDI	0.239***	0.152*			
	(0.085)	(0.085)			
Greenfield			0.319**		0.314***
			(0.132)		(0.111)
M&A				0.374	0.045
				(0.393)	(0.255)
Terms of trade	0.005	0.004	-0.035	0.124	0.042**
	(0.030)	(0.027)	(0.068)	(0.112)	(0.021)
Uncertainty		-0.334***	-0.178*	-0.326***	-0.218***
		(0.076)	(0.102)	(0.108)	(0.082)
Crisis dummy		-2.239***	-2.208**	-3.100***	-1.981***
		(0.645)	(0.966)	(0.817)	(0.706)
Observations	186	186	183	183	183
Instruments	8	10	10	10	11
Sargan test	4.135	2.876	8.264	12.57	14.94
Sargan *p-value*	0.388	0.579	0.424	0.136	0.326
AR2 *p-value*	0.299	0.254	0.134	0.344	0.169
Long-run elasticities					
FDI	1.136**	1.596			
	(0.442)	(1.320)			
Greenfield			1.123*		1.197**
			(0.644)		(0.540)
M&A				3.638	0.171
				(7.025)	(0.946)

Note: Estimates are made using GMM Arellano Bover. Standard errors are reported in parentheses. *, **, and *** refers to the 10%, 5% and 1% significance levels. The null hypothesis of the Arrelano Bond AR (2) test is the absence of second order autocorrelation in the residuals. The Sargan test for validity of instruments has the null hypothesis of exogeneity of the instrument set.